THE CONSTRUCTION STUDY UNIT

DEPARTMENT OF MECHANICAL ENGINEERING

AN INVESTIGATION INTO THE PERFORMANCE OF MANAGEMENT

CONTRACTS AND THE TRADITIONAL METHODS

OF BUILDING PROCUREMENT

Thesis submitted for the

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by

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SUMMARY

This research pursues the development of management contracting in the UK construction industry, and aims to compare it with the traditional method with a view to providing some indication of how both systems may be matched to particular circumstances. A theoretical model was used to assist in comparing project performance in a case study sample of 39 management contracts and 30 traditional form of contracts, and have identified several variables which could influence the performance of a project.

The first main hypothesis proposed is:-

' Management contracting can satisfy clients who need their projects quickly and for projects that are large and/or highly complex'.

This led to a second hypothesis,

' Project performance is a function of the characteristics of the client, the project, the designers, the contract procedure employed and the procurement method adopted for their projects'.

The use of management contracting is growing throughout the UK, but the percentage of traditional contracting is still greater than other forms of building procurement method.

Analysis of the 69 case studies suggest that management contracting performs better in some respect than traditional contracting, in particular, when time is the essence of the contract and when the project is highly complex. However, in the construction of large simple buildings, there was no strong evidence which shows that management contracting can perform better than the traditional form of contracts.

Moreover, analysis of the results also suggest that procurement method is not the only variable affecting project performance. The client's requirement, the designer, the characteristics of the project and the contract procedure employed, all had their relative effect on certain performance measures as defined by time, cost and quality.

1.1 NATURE OF THE PROBLEM

It is an axiom of construction management that a project may be regarded as successful if the building is delivered at the right time, at the appropriate price and quality standard, and achieving a high level of client satisfaction. Increasingly the achievement of these criteria has been associated with problem of procurement method for the construction. In short the selection of the appropriate method can shape the success of the project.

Broadly speaking, the problem facing the building process can be established under the following factors for the purpose of initial investigation and review. The factors are by no means exhaustive nor ranked or selected in any particular manner other than they could be regarded as the 'popular' choice at the initial stages of any similar research. These are:-

- Lack of effective communication and co-ordination between the building team.
- 2. Lack of integration of the design team.
- 3. Uncertainty within the work of an organization.
- 4. The changing environment.
- 5. Advanced technology.
- 6. Experience of the building team with the building process.
- 7. Increasing project complexity.

Having set out the general problem it is clear that any account of the manner in which the building process operates should be set in the context of management responsibility and functional demarcation in the client organization or the organization which design or construct the project. In the first place there is the question of intercommunication and then there is the problem of the actual construction of the project.

Another generally accepted view is that the last few years have been an especially difficult period for the construction industry (Hillebrant 1977 and 1985) - Construction output has fallen steadily, partly as a result of the recession but also of the uncertainties generated by some projects exceeding their time and cost budgets. This situation is perhaps more prevalent in the UK than some other Continental European Countries and the USA where the problems are often greater in magnitude but more limited in their type and range particularly within the confines of each contract (Slough Estate 1976 and Nahapiet 1985). UK contracts seem to be fraught with a continuum of problems and difficulties from the onset, across a very wide spectrum, through to the completion stage. For example, among the findings of the Slough Estates' report (1976) was that, total time from inception to completion in the UK was at least 70% longer than in Canada, Australia, Belgium, USA, France and Germany. Moreover, preliminary design phases were more complex; prices in the UK were comparable to those in Europe but more than those in North America.

The intention of the thesis is to utilize this plethora of variables as a basis for study to compare the conventional procurement method with management contracting with the hope that a number of significant and useful factors can be extracted and to be used as a guide for clients who want to know about the system of management contracting and wish to improve efficiency and effectiveness for their future projects.

1.2 BACKGROUND

Observations of the industry, at the time commencing this research, suggested that some sort of analytical approach, such as is now presented in this thesis, was needed in an attempt to solve problems facing the client from the building process.

It is likely that when the design and production are combined to each other then good relationships and greater co-ordination and co-operation between the parties involved can be developed (Philip 1950, Emmerson 1964 and Banwell report 1964). The selection of the right contractor for a particular job is an essential factor in controlling what was planned.

Each member of the building team have a criteria for success which may differ from one another. Sidwell (1984a) notes that the client may regard completion of his project on time and within budget as a success. However, client satisfaction may differ in respect of the owner, the occupier or tenant, or the general public. In many cases, client satisfaction depend upon the degree

of conformity between expectations, interpretation of the brief, and the realization of the project. For the professionals a criteria for success can be a successful interpretation of the clients needs and a smooth going project. The contractor may also regard conflict free project as a success to secure future work with the client and to satisfy the shareholders.

The N.E.D.O. report (1983) indicated that many clients drifted into the traditional method of contracting towards building without being aware of the alternatives available to manage a contract. Various client guides have suggested ways in which construction projects should be tackled, other than by the traditional method. These include management contracting, project management, design and construction management etc.

The traditional approach is one where the client appoints the architect and the other professionals to design the building and prepare the tender documentation. A main contractor will then be appointed, under a certain form of contract, to actually construct the building. Figure 1.1 show the arrangement of the traditional team in relation to the client and to each other.

The traditional approach has come under increasing pressure, apace with the increasing complexity of building projects. Whilst technology and complexity has forged ahead in the construction process, the approaches to its management have lagged behind.



SOURCE - HIGGS AND HILL BUILDING LIMITED (1979)

The Emmerson report (1964) has identified a common criticism of the building process where there is a lack of liaison between Architect and the other professionals and contractors, and between them and clients. It comments that, "In no other important industry is the responsibility for design so far removed from the responsibility for production."

The report pointed out that although a common course of initial study for designers and producers of buildings had been recommended in the Philips report (1950), no practical steps had been taken by 1962.

Emmerson concluded that there was still a general failure to adopt enlightened method of tendering in spite of the recommendations of earlier reports. His recommendations in this respect led directly to the establishment of the Banwell (1962) committee to consider these issues in more detail.

Emmerson recognized that the Royal Institute of British Architect (R.I.B.A.) was aware of the need for improved efficiency in architectural practices. The R.I.B.A. subsequently made a significant contribution to the co-operation by publishing the Plan of Work (1965) and the first edition of their handbook (1974).

The Banwell report (1964) and it's review "Action on the Banwell Report" (1967) have been considered to have had significant impact upon the building industry and it's professions.

The Banwell (1967) review found some progress on pre-planning of projects but professions had done little to "de-restrict" their practices. The review was encouraged by the increase in selective tendering and urged further consideration of serial negotiated tendering.

The Emmerson and Banwell Reports have emphasized the need to reform the organizational approach to building projects. Building project management was seen to be a passive procedural activity (National Joint Consultative Committee of Architects, Quantity Surveyors and Builders 1963) but the movement towards a more dynamic integrated approach was being suggested by Higgins and Jessop (1965) in a pilot study sponsored by the N.J.C.C..

Higgins and Jessop (1965) clearly identified that the problem of communication in the building industry were created to a large extent by the attitudes and perceptions about the values of contributors to the building industry. The most important drawback to the traditional approach, as noted by Higgins and is lack of effective communications and Jessop, the co ordination. In other words the nature of the relationships between the communicators which creates the difficulties for communications structures. Five problems were outlined, namely:-

- 1. Communication with prospective clients
- 2. Communication between clients and advisers.
- 3. Communication within the design team.
- 4. Communication related to the contract.
- 5. Communication within the construction team.

Higgins and Jessop then went further and noted that ' if building is thought of without the people involved it can be seen as a chain of interdependent operations called the (Technical System) ie. briefing, design, estimating, billing, supplying, etc. To undetake these operations a wide variety of resources eg. material and skill, remain under the control of people and, organizations which is called the resource controllers ie. the (Social System).

The central problem brought forward by Tavistock (1965) arises from the fact that the basic relationship which exists among 'resource controllers' has the character of interdependent autonomy. There is a lack of match between the technical interdependence of the resources and the organizational independence of those who control them. Any attempt to re-order the division of responsibilities among resource controllers that might arise from a purely technical study would run up against deep-seated difficulties of conflicting values and vested professional, technical and commercial interests.

This view is pointed out by Trist (1967) who studied the effects of mechanization in British Coal mining. The study of the effects of technological changes led Trist to develop the concept of the working group as being neither a technicsl system nor social system, but as an interdependent socio-technical system. The social and technical requirements are mutually interactive and they must also have economic validity, which is a third interdependent aspect. The aim should be joint optimization.

This socio-technical system approach was also applied to supervisory roles by Rice (1958) in studies of an Indian textile firm. He found that it was not enough to allocate to the supervisory a lsit of responsibilities and perhaps insist upon a particular style of handling men.

In a subsequent research by the Tavistock Institute (1966), a thesis was writen exploring the forgoing problem of communication by providing a model of the structure and functions of the building industry. Two important characteristics were identified that are incorporated in any model of the building process, these are, ' Interdependence and Uncertainty '. The construction industry as a socio-technical system and it's performance was seen as being dependent on the communication between and the interdependence of the participants. The building team was described as a sub-system within the overall system of environment.

Based on competitive tendering procedure, it was reported that within the building process there are five closely sub-systems, these are:-

a) a system of operations
b) a system of resource controllers
c) a system of formal controls
d) a system of informal controls
e) a system of social and personal relation

The traditional competitive tendering was criticised by professionals as being unable, in a situation of certainty about all factors affecting time and cost, to provide the basis for a

valid and protective contract. There were two main types of attacks on the problem of the unsatisfactory nature of the organization, functioning and communications in the building industry : Firstly, exhortations to return to the formal system in its pure form ie. directive functions, this of which was deplored. Second, a call for some new form system which incorporates the more adaptive characteristics of the informal system.

Thus, the socio-technical analysis and the three dimensions described by the Tavistock institute (1965 and 1966) of complexity, uncertainty and interdependency had a great impact for the introduction of the new management methods in an attempt to acheive a wide coordination of control of the building process such as package deals in the late 1960's and management contracting by early 1970's.

For instant, large and complex projects , principally, require longer time to build than small and simple ones, which make uncertainties concerning the future unavoidable. The wider they are the more persistent is the need for a local managerial ability to manage uncertainties, so that the objectives of the project could be attained.

Before continuing further, the attributes of integration should also be considered. Principally, the changing technologies, procedures, materials and complexity of the building process are such that the sequencial approach of independent professionals to

the formation of design and construction solution is unable to provide an efficient solution to the client's requirements. As mentioned earlier, the problem of communication within the building industry were documented over 20 years ago by the Tavistock institute and integration was seen as a necessary solution to the interdependence and uncertainty involved. Sidwell (1979) sees that high integration is one of the fundamental characteristics of management contracting.

The notion of integration of the building team has been reported in Sidwell's field study of organizational forms (1979). Over 80 interviews and ten detailed case studies were undertaken throughout UK and abroad to identify the range of organizational forms in use in the industry and analysing their principal characteristics. The report groups the diverse range of patterns under three headings, namely, the fragmented pattern, fully integrated system and partially integrated system. Sidwell (1982) considers that the degree of integration of the design team is an important criterion for consideration. The level of integration increasing from traditional through management contracting and project management. They offer a more integrated approach to handling uncertainty. Under management contracting, the contractor is aware of his organizational and contractual obligations in the pre-tender stage and is therefore more adequately able to obtain insights into decision-making and to anticipate information requirements in the post contract stage. With project management, the main emphasis is on co-ordination in order to reduce uncertainty through integration.

This would stress the earlier view in this chapter that organizational relationships are of prime importance for the successfully run project. Furthermore, for organizational relationships to work effectively, interpersonal relationships must likewise operate in an effective manner. Organizational relationships are important also in handling the uncertainties which exist within the building process.

The problem of increasing project complexity and it's measurement have been highlighted by Sidwell (1982) and Bennett and Fine (1980). Sidwell confirmed that objective measurement of complexity is not easy; some indication may be gained by consideration of design time, building time, cost. number of variations, etc. He argued that a highly complex project may require a building team which can provide a wide range of services and expertise. A relatively uncomplicated project, regardless of monetary value, should, in theory, require a simpler organizational form. Sidwell went further and noted three aspects of complexity that are worthy of consideration, namely, in the brief, in the design solution and in the technology of the building.

A further factor for consideration of the problems facing the building process is the organizational environment, which can vary between stable and dynamic. Mintzberg (1979) sees the dynamic environment as being the cause of uncertainty within the work of an organization. It is important for the organization to respond quickly to an environment which is becoming dynamic.

Mintzberg (1979) suggested , in terms of the construction process, that project management would be more suited to these environment conditions of uncertainty.

Lawrence (1981) views the construction firms as being located in an environmental perspective of high uncertainty. Furthermore, Mintzberg (1979) notes that, in the building process, there is a prime example of hostile environment facing the construction firm, "who must bid on all contracts". Sidwell (1982) confirmed that the building process must work within the environment and is subject to any influence it may have. The work by Ashridge (1979), viewing the construction industry from a UK perspective at least, supports these ideas.

Changing emphasis of management studies in the construction process began to take place and this has been illustrated in the Bishop's report (1968). That report identified that up to that date most of the Building Research Station's work had been concerned with the management of building sites and building firms but recognized that future work would be concerned more with the management of total building process.

As a response, in the 1970's, three principle references attempted to analyse how frequent various organizational forms had been used. Wood (1975) showed that the majority of the public contracts in the U.K. are still let by traditional methods. The Wilson report (1975) showed the same for private contracts.

Professor Hillebrand's analysis (1977) shows that open selective competition is used for the majority of contracts both in private and public sectors. Negotiated and Package Deals are not used to any significant degree in the private sector, and to a limited extent on public housing and schools.

With these reports and the economical changes in mind (eg. inflation) the professionals and the industry responded by experiencing the four general methods as an alternative to the traditional approach. These are namely:-

- 1. Management contracting
- 2. Project management.
- 3. Design and construct
- 4. Increase use of negotiated contracts.

As the growth of various procurement methods began to increase a number of authoritative body of information has published guides to clients for selecting procurement method for their projects. Figure 1.2 illustrate a guide for procurement paths presented by the DOE (1982) which are based on client priorities. Figure 1.3, was presented by the BDP (1985), also, as an aid to selecting a procurement path. However, it was warned that the questions were intended as a primer for discussion with the client principal adviser before making procurement decision.

Together with these kind of reports, case studies have been undertaken to investigate the management of the building process and in particular the performance of time, cost and quality when using alternative approaches. Some research work are reported

PROCUREMENT PATHS THE BASIS FOR CHOICE	DESIGN AND I	SUILD PATHS	TRADITIO	SHT PATHS	MANAGEM	ENT PATHS
	Direct Design and Build	Competitive Design and Build	Sequential	Accelerated Traditional	Management Contracting	Construction Management
Speed of total process	Highest	Higher	Baseline	Higher	H H H H H H	lest
Building Complexity	Suitable for lower complexity work especially	For normal complexity	For normal to F	ugh complexity	For high com especially	plexity work
Building Quality (performa e and/or image)	Suitable for normal Levels of building d	and less demanding ality	Suitable fo	r normal and more der	nanding levels of build	ng quality
Cost of change after start on site	HI	her	Base	line	<u>8</u> 01	Ğ
Degree of Price Certainty before commitment to build	High with conditional proposal	High	High	Lower		
Degree of Competition for construction work	Low	High	High	Lower	High on all but content	management

FIGURE - 1.2

ECISIONS SOLELY ON THE BASIS OF THIS UESTIONNAIRE. IT IS INTENDED AS A UMER FOR DISCUSSION WITH YOUR UNCIPAL ADVISER.

When all questions have been considered sum the number of ringed dots in each column. The procurement paths with most rings should be worthy of further investigation.

Traditional		Design and build			Management		Design and			
Sequential	Accelerated	Direction	Competitive	Develop and the construct	Management contracting	Construction management	Contractor: Sec projects in manager	Project Sonsultant		
	٠	•			8	•	•	•	Crucial	A Timing
	•	•	•	•	•	0	•	•	Important	THINKS
•									Not crucial	
•	٠		<u> </u>		•	•	•	•	Yes	B
		•	•	9					No	variation
•	•				٠	•	•	•	Yes	C
·	•	•	•	9	•	•	•		Moderately	Complexity
		•	9						No	
		•	•						Basic	D
•	•	•	٠	•	٠	•	•	•	Good	Quality level
•	•				9	•			Prestige	
•		•	•	•	•		•		Yes	Е
	•					•		•	Thrget	Pric e certainty
•			•	•	•	•	•	•	Construction	F
•				G	9	+	1		Construction and management	· Competition
	•	•							No	
•	•				•	9			Separate firms	GI
<u> </u>	1	•	•	•			0	•	One firm only	 Responsibility Division of
		•	•	0			•		No	GII
•	•				•	•		•	Yes	- Responsibility Professional
	1			1		•		•	No	II .
•	•		1		•	-		,	Share	- KISK avoldance
		•	•	•	1		•	1	Yes	-
<u></u>		18.151	1. No.	1 1999	1		alle the second	國際		FIGURE - 1.3

below and specific case studies into management contracting are reviewed in chapter 2.

Harris (1974) confirmed that package deals are, overall, less time consuming from the inception to the contracted completion date of the project, than a competitively tendered method but certain package contracts will produce approximately 10% higher construction prices than comparable competitive tendered projects. Results of the limited survey also indicate that to the industrialist requiring a definite date of completion, a package deal project would have a higher probability of meeting that date than a competitive tendered one, although industrialists with their own design departments appear to have a better time performance than either of the other two systems. Meade (1983) has also showed saving time achieved by a package deal method.

More recently, a PhD study at Brunel University by Rowlinson (1987), has analysed the performance data of industrial projects built by the design and construct method. He compared the time in terms of square metre per week and the unit cost of 17 design and construct contracts against 19 traditional projects and 10 management contracts. All 46 projects were industrial projects to eliminate variables concerning with the technology of the building. Project performance was hypothesised to be a function of organizational form. Rowlinson found that design and construct projects have a tendency to overrun the planned pre-construction times by 40% on average; this compared with an overrun of 20% for all projects. Traditionally organized projects overrun by 7% on

average compared with a mere 2% overrun by design build projects on planned construction times. Both procurement methods are likely to overrun on budgeted costs but by 4% only. It was suggested that the client pays less by taking the design and build approach.

Dr Sidwell of Aston University (1982) investigated the relationship between contractual arrangement and project success. The essential element which brought about success was the level of managerial control. Of the contractual methods studied those with a high level of managerial control e.g management contracting and other non-traditional (e.g design and construct, project management , etc.) performed better on time , gave a higher level of client satisfaction and overran the budget by less.

Ireland (1983), in a study of commercial projects in Australia, supports Sidwell's findings by identifying managerial actions which achieve the objectives of reducing construction time and building cost and increasing architectural quality. He also indicated the scale of effect each action has on performance. He points out in the Unibeam article (1982) that a client may have many objectives, quoting Townsend (1979) and Ferry and Brandon (1982), and so assumes that the lump sum tender on full documentation; package deal and full cost reimbursement are best able to reflect these objectives.

Bromilow (1977) has also investigated the performance of building projects in Australia and has found that projects overran on cost and on time by 5% and 47% respectively. Among the reasons attributed for bad performances was underestimation of construction time at the outset of the project. It was also found that the time taken for the design and construct phases depend on the abilities of people involved and the techniques and resources devoted to the project.

1.3 APPARENT DISADVANTAGES OF THE TRADITIONAL APPROACH

If there is one main reason for the growth of alternative procurement method in this country it surely be the inadequancies of the traditional design and tender system, and the existing procedures are the cause of the increases in cost and delays in completion which are often blamed on the building industry.

These views are expressed by Clamp (1984) and Marler (1983), president of the British Property Federation, who summed up that ' developers can no longer afford to pay the high prices which result from time honoured methods of planning and building which are less efficient than they could be.' The BPF system (1984) has sprung from these concerns by publishing it's five work stages into , concept, brief preparation, design development, tender documents and construction.

Among other problems of the competitive tendering method are the conflicting opinions of the various parties to the contract. The
DOE (1982) views the traditional method as it requires greater co ordination and control because of different firms and contractual relationship. Most of the contractors interviewed throughout this research support this view and those of Affoo's findings (1982) who claimed that one of the deficiencies of the traditional system is the way the building team is related to each other. Too often the relationship between the building team become brittle during the construction process, the only outcome of which is to the detriment of the client.

The competitive tender situation has the disadvantage that it encourages the contractor to submit the lowest possible price, thus reducing his profit margin to a minimum. If the contractor awarded the contract on the criteria of price alone and later the contractor discovers that his price is low, he has alternatives to prevent suffering the loss. Foxhall (1972) stated three alternatives, namely:-

1. To try to economise on the small percentage of the work which he intends to carry out himself.

To reduce the cost and, therefore, the quality of management.
 To look for claims.

Any of the above alternatives could create difficulty for the client.

To conclude, the apparent criticism of the traditional system appear to be the excess time taken, disputes between the parties involved and the fact that the client has to deal with a number

of separate parties. Equally important is the system's inability to meet changing conditions. CIRIA (1983) reported that management contracting grew in 1970's partly as a response to inflation and Carter (1972) consider that the introduction of the management concepts was due to changes which occurred in the last ten to twenty years in:-

 Building techniques - diversity, complexity, standardization.
 Building organization - growing prominence of the subcontractor, notably the manufacture, supply and fix subcontractors, which means dispersal (multipication of the responsibility pattern).

3. Briefing - the growth in size of the project, demand for tighter time and cost targets and for a more unified and purposeful management of the total process.

1.4 APPARENT ADVANTAGES OF THE TRADITIONAL APPROACH

The traditional approach on the other hand can produce a useful set of contract documents which will ensure that the client requirements are fully understood by the tendering contractor, thus forming a common basis for tender evaluation, and illuminating the possibility of any misinterpretation of client criteria. Under this argument the DOE (1982) highlighted the traditional advantages as it provides competitive pricing, ensure high degree of certainty on the basis of cost and specify the performance before a commitment to build.

This situation is not clearly defined by other methods. For example with a package deal the tendering contractors interpret the client's requirements from outline proposals or performance specifications, with the possibility of mis-interpretation and subsequent disputes. With management contracting the contractor usually join the building team before the design is completed.

With the compiling of the list of tenderers for the project the client's professional advisers will be ensuring that only those contractors with the necessary experience in the type of work, reputation, resources, financial stability and technical 'knowhow' will form the basis for the final selection. On the other hand, in a number of management contracts the client is taking a gamble on the experience of the contractor with system that he chooses for the contract.

Young (1971) reported that the London Club Members of the nineteenth century (1834) considered that a competitive tender produced lowest building price, and to a great extent this belief has not changed through the years. As Luder (1970) says "experience appears to indicate that if a client requires the lowest building cost, competitive tendering is the way to get it."

The DOE (1982) appreciated the opportunity to combine the best consultancy and contracting skills for the project when adopting the traditional approach. Cannel (1968) stated that "with a closely knit team of architects, engineers and quantity

surveyors, a strict control over the building price is possible, and what equally important is that cost planning techniques are employed, with the result that the client is obtaining the optimum value for his money.

To conclude, the initial indications are that the use of professional designers, properly chosen and well integrated, and the use of a well chosen contractor by competitive tender has the potential to provide the client with a better building than if he goes to an alternative methods.

1.5 OUTLINE AIM OF THE PROJECT

All of the available evidence in section 1.2 suggested that performance is related to procurement methods and that alternative methods can deliver projects in a shorter time. But clients have other criteria for project success. What are these criteria and does an alternative procurement methods provide the client with the building he wants, when he wants it and at the right price?

This research pursues the development of management contracting and aim to compare it with the traditional method with a view to providing some indication of how both system may be matched to particular circumstances. The author has used a theoretical model for comparing project performance, in a sample of management contracting and traditional form of contracts and have identified several variables which could influence the performance of a

project.

The central hypothesis of the research is that:-

"Management contracting can achieve a higher level of success for clients who need a project quickly and for projects that are large and highly complex"

This led to a second hypothesis:

''Project performance is a function of the characteristics of the client, the project, the designers, the contract procedure employed and the procurement method adopted for the project.''

This research is composed of five chapters. The first chapter has been a general introduction to the research and outlines the main aim and hypothesis to be tested.

Chapter Two is concerned with giving an introductory background to the USA experience with construction management. The various types of management contracting in UK are outlined, together with the literature review of the 'pure' management contracting system. The development of and the market of management contracting in the U.K. is also examined.

Chapter Three examines the research design and methodology and the limitations. It presents the variables, which could influence the performance of a project. The relationship between these

variables are then postulated in a similar manner to the one presented by Sidwell (1982). The model's components are then reviewed together with the research hypotheses and the method for testing the hypothesis.

Chapter Four, analyse and explain the results. Data from 39 management contracts are compared with data of 30 case studies from traditional contracts to examine the hypothesis in the research model and in particular investigate differences in client and project characteristics, procedure and project performance.

Chapter Five, consists of the conclusion and implication in relation to client, those in the industry and those considering possible directions for further research.

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PREFACE

It was apparent in chapter 1 that one of the features of the construction industry of the 1970s and the early 1980s has been the emergence of a diversity of building procurement methods. Among the most popular has been "management contracting" (MC), and this has assumed a prominent place in the battery of procares at methods offered by contractors. The term "Management similar to the concept of "Construction Contracting" is Management" that was first originated in the USA where it is also known as Professional Construction Management (PCM). The early practice of PCM in the USA has been mirrored in the UK construction industry and some pioneers of the CM approach have independently or in conjunction with contractors, established themselves in the UK. However, the CM concept should be distinguished from MC in that the sub-contract packages are agreed directly between the client and construction contractors, with a construction manager acting as the client's agent. More details regarding the concepts of CM and MC are given throughout the chapter.

The author (1984) has defined management contracting as the "process whereby a contractor is employed to undertake the coordination of specialized sub-contractors to complete a project. The management contractor relies upon a percentage fee

or a lump sum to be remunerated for the services offered. The management contractor becomes associated with the client team of professional advisors and in common with other professionals has liability for the provision of a professional service."

This chapter consist of two sections. The first section reports on the US and UK perspectives to construction management and management contracting respectively, together with outlining the type of management contracts. It also presents previous case studies into management contracts and, finally, the apparent advantages and disadvantages of MC are reviewed.

The second section deals with the development of and the market for management contracting in the UK which are seen as a consequence of the growing evidence cited in the first section. It also reports the client perception of management contracting when asked to compare it with the traditional approach.

SECTION 2.1 - LITERATURE REVIEW

2 1.1 THE US PERSPECTIVE

Professional construction management has evolved in the USA as an alternative approach to managing the total construction programme. According to Heery (1976). PCM was rather informal method until the late 1960's but as costs of construction increased during the early 70's and delayed projects become more frequent, the need for PCM became more evident.

Barrie and Pawlson (1976) has defined Professional Construction Management as one where a contractor performs a management function under a professional services contract with client. It treats the project planning, design and construction plan as integrated tasks. Figure 2.1 shows typical organization forms of the PCM practice in the USA. As the construction professional of the construction team, the construction manager works with the designers and the client, from the brief through the completion of construction, providing leadership of the construction team and on all building with regard to time and cost. The construction manager can either be a firm or an individual and in most cases he is paid a fixed fee based on the value of the work.

GENERAL CONSTRUCTION MANAGER

CONSTRUCTION MANAGER



FIGURE - 2.1 ALTERNATIVE CONSTRUCTION MANAGEMENT CONCEPTS IN USA

Heery (1976) defines the process of construction management as that group of management activities over and above normal architectual and engineering services related to a construction programme, carr ed out during the pre design and construction phases and providing control of time and cost in the construction of a new facility.

The role is often undertaken by Construction and Architect-Engineering firms offer this service. In the USA The Public Building Services (PBS) of the General Services Administration (GSA) commissioned a survey (1970) of the various contractual arrangements and their performance. This revealed that the traditional sequential method was resulting in a total design and construction time of 59 months compared to 24 months for similar projects in the private sector. The report recommended that the GSA abandon its outmoded traditional procedures and use phased construction in conjunction with construction management in a new approach to its nationwide building programme. However, it is said that the GSA modified their view in the mid 1970's to restrict construction management firms to acting in a consultant capacity only and preclude them from undertaking any of the direct works at the same time (Sidwell 1984b).

At the end of the decade the GSA, again, modified their view to restrict the use of the system because of the difficulties in ensuring the construction manager has enough incentive to perform, problems over liability and the need for a firm priced tender before start on site.

Rad and Miller (1978) reviewed the practice of Professional Construction Management in the USA and concluded that the greater growth in construction management took place in the 'design' sector of the industry.

Nevertheless, the Engineering News Record (1982) has reported that the situation in the United States is the top 400 construction management firms undertaking an estimated 42.5 Billion Dollars worth of construction management contracts. The majority of these 400 contractors reported such contracts comprising about 25% of their new awards.

According to Langford (1984) review of construction management in USA, the matter of the size of the fee may affect the market for construction management. The consulting and architectural firms made a brief but unsustained effort to obtain a large share of the construction management market in the USA. Larger consulting firms and small architectural practices provided the major impetus for this unsuccessful drive. There may well be solid financial reasons for the limited impact of large consultancies.

Evidently fees are in the range 2-5% of project construction costs whilst profit on construction work typically ranges from 4-8% on costs.

In the USA the Architect-Engineer's view of PCM was addressed by Tatum, Gans and Harper (1979) who identified several differences in A/E performance as construction managers when compared with

the traditional system. During the design process the A/E must be receptive to construction advice from the construction manager an agency outside it's own organization. A positive attitude toward support of construction activities together with the issuance of clear and specific design documentation were seen as essential for effective A/E performance.

Barrie (1979) found that CM projects were generally well organized in the view of the trade contractors. Many of the less favourable comments were the result of design changes or modifications made after contract awarded. A number of individual contractors concluded that while items were generally handled about the same as a general contractor, all indicated that bidding was conducted better than with a general contractor.

Using the construction management as an alternative to the traditional approach, a survey done by Barrie (1981) to show the contractors and the client's opinion on marketing the CM services. In the questions, respondents were asked to rank their management techniques, and to provide comments or qualifications of their responses, or both. Results of the survey show that the average CM client feels that the quality of the CM firm's experience is far more important than the amount of experience or the proposed costs. The most important asset to be marked by the CM firm is the technical and operational expertise of the proposed project manager. The client wants to know if the firm has done similar work. Further they actively seek information from the firm's former clients in order to more accurately

evaluate the firm's proposal and the ability of the proposed project manager.

The rise in popularity of the construction management concept in the USA has encouraged a number of writers to address their work towards the educational needs of the professional construction manager and methods of satisfying them. Jordan and Carr (1976) have concluded the following:-

1. The professional construction manager must possess skills in a number of fields that lie outside the traditional technical areas of civil engineering, and more generally identified with the field of industrial management or business administration.

2. There exist a substantial number of university-level degree programs that undertake to educate graduates for positions in construction management. These programs combine education in the technical areas related to construction with introductory coverage of the major nonengineering areas applicable to construction management. The favourable attitude exhibited by the ndustry toward such programs suggests that they fulfil a perceived need.

3. As an alternative to recruiting graduates of construction engineering and management programmes, professional construction manager firms may satisfy their staffing needs by employing specialists or quasi-specialists in each of the nontechnical areas involved in construction management task.

Finally, guidelines for successful professional construction management in USA is reviewed by a number of writers and organizations. Langford (1984) noted that the AIA, the Association of General contractors of America (AGC) and the American Consulting Engineers Council have prepared guidelines for CM contracts; the AIA and AGC have drawn up standarised contracts.

According to Barrie (1980), the construction management firm should focus its marketing efforts on the skills of the proposed project manager, The project manager should personally visit with the client's engineering staff before the proposal is made, and should have major impact upon the preparation of the proposal.

The construction management proposal should emphasize the firm's discussion of alternative solutions, a list of special charges and a full disclosure of anticipated sub-contracting was recommended by Rad & Miller (1978).

2.1.2 THE UK PERSPECTIVE

As noted above, the early practice of PCM in US has been mirrored in the market development of MC in UK, however there appear to be differences in their practice. While the design sector had greater growth in construction management process in the USA, (formerlly) main contractors were the first to offer management contracting to the client in UK. The first building erected using the system was a large and complex cigarette

factory for John Player & Sons in Nottingham, designed by Arup Associates and built by Bovis Limited (Carter 1973).

Sidwell (1983) distinguished the characteristics of management contracting where by the contractor crosses the professional demarcation line and joins the design team as an equal contributor. his considerable expertise and work being solely in the client's interest. Further function of the system is to divide the project into work packages which are then let in phases. Figure 2.2 show the arrangement of the management contracting team in relation to the client and to each other as perceived by a top management contractor participated in this research. Appendix 1 describes the activities involved in a management contract.

According to Higgs and Hill (1979), management contracting is essentially a team approach to the construction process. It links the management expertise of the contractor with that of the professional design team, to achieve the common objective of providing the client with the finished product in the shortest possible time, within the limitation of the budget and the desired quality. Central to the argument, the management contractor is by definition providing a professional management service.

Roger Downing (1982), one of the personnel who was involved in the first management contract in the UK, the Player's Horizon project, believes in the good communication of a short chain of



command. He enlarged. "the use of high powered sales team by some management contractors does the industry a disservice, inasmuch as a client is often provided with a sea of new faces when the job actually starts".

Downing also comments. "A management contract could be run without a formal contract - it is a philosophy, an attitude, a contract of trust. It eliminates the traditional contracting situation of playing safe with comprehensive tender documents. Decisions are deferred until just before the work is required".

George Neate (1982) stated on behalf of Laing Management Contracting that:-

"A management contractor is employed on a professional fee basis. He is therefore in a position to provide the client and design team with the resources and expertise available within his organization, to provide information in an unbiased and positive manner and to establish an effective working liaison with the design team. It should also be remembered that the inclusion of the management contractor at this early stage would give the project team an extra dimension; he being the only member of the team having practical construction experience."

Neate went further and said that the management contractor should in conjunction with the design team provide the following services:-

- 1. Design management, resources and planning.
- 2. Design evaluation and building methods.
- 3. Development strategy and phasing.
- 4. Material selection and availability.
- 5. Cost planning and budgeting.
- 6. Procurement and construction programming.
- 7. Research and development.
- 8. Project administration procedures and computer application

Report 100 by the Construction Industry Research and Information Association (1983)views management contracting as an arrangement where the client creates a contractual and organizational system which is different from that in the conventional approach. The appointed management contractor works closely with the client's project management team. This removes some contractual barriers found in the conventional approach and tends to increase the client's involvement in the project. Ιn this way management contracting is more closely related to a professional service than a normal conventional contract.

However, care must be taken to distinguish 'pure' management contracting from other form of contracts. The CIRIA report (1983) has segmented management contracting in UK as follows:-

1. Pure management contracting, where the contractor has no responsibility for the design, and is not permitted to use directly employed resources to execute the work. Contractors are employed directly by the MC after approval by the client.

2. Construction Management, where the construction manager is employed in a professional capacity as the client agent, with the contractors directly responsible to the client. As the contracts are made between the client and the construction contractors the conventional allocation of risks, in legal sense, remain unchanged. It can be argued here, that a construction management can be distinguished from management contracting in that the later is a service to design professionals whilst the former would expect to draw upon skills more familiar to a construction organization.

3. Design and management contract, where the contractor also takes responsibility for the design. Scope designers are still employed directly by the client. Compared to a management contract a design and management contractor can give the client extra potential for integration of design and construction and better control of the design process, together with similar administration and co-ordination.

4. Management fee contracts is another diversified concept that became clear during the course of this study. The management contractor carries out exactly similar functions and activities as a management contractor except that the contractor is appointed and paid a fee to manage and build the project.

The organizational differences between these methods is well recognized by the diagrams shown in Appendix 2. It can be seen, that the central difference is the role of the client. Whilst in

construction management the client has an active role, in management contracting and management fee contracts, this may be more muted allowing the client to take more detached view. However, construction management, management contracting and design and management contracts rely upon the trade contractors for the actual construction work. Whilst in management fee contracts the management contractor is involved in executing some construction packages.

The management fee contract was criticized by Hayes (1986) who pointed out:-

"In all its forms management contracting was intended as a norisk situation for the management contractor, the intent being that he should be working with the client's team to manage the design and construction phases of the project development. To do this more effectively, and impartially, the management contractor was only responsible for the management, not for executing the construction. and was not permitted to execute any of the construction himself."

Under the same argument, David Woolf (1979) stated in an interview with the Construction News Magazine that:-

" If the management contractor has a profit motivation on certain elements of the work, it could be argued that he might not always put the client's interest first. All of the work must, therefore, be 'let' on a competitive basis to specialized contractors."

According to Norwest Holst (1984), the divergence of interest inherent in traditional forms of contracts is eliminated in management contracting and the contractor is paid a fee rather than earning a profit, from the outset becoming an integral part of the client's project team.

There have been various views regarding the increased introduction of management contracting by large contractors in the UK building industry. This may take a form of forces imposed on the contractors, the architects, the clients and other members of the building team.

On the contractors side, there have been several acts which affected their use of the traditional approach. For instance, Bayley (1973) comments that "the Redundency Payment Act made a number of firms cautious of their policy to keep labour permanently employed, whilst the Employment Protection Act provides grounds for resisting unfair dismissal". At the present time, because of the way the industry secures its work, continuity of employment is becoming difficult to guarantee. Contractors are looking for minimizing the fixed costs as much as possible. Laing (1968), for instance, states that his firm provides only 25% of their employees with steady employment, the other 75% are, to varying degrees, casual.

The increasing complexity of the construction industry has made the project to be divided into portions of work which are then

subcontracted to specialized sub-contractors (Mckinney 1983). This has encouraged many main contractors, who normally undertake work on a traditional form, to turn to sub-contractors working on a large management contract.

Many who worked in the industry have questioned how accurate can a contractor quote a price for a large complex project given the information and time provided for the preparation of the price. Fine and Leon (1971), in particular, have made attacks on the bill of quantities, dismissing it as an unrealistic and pretentious cost model. Fine (1971) has developed various computer programs and mathematical models which he claims substantiate his hypothesis that "the bigger the job, the bigger the disaster". Fine stated that unless contracts are secured on the basis of full documentation, the competition process is meaningless because contractors will bid to obtain the contract and rely on claims to make a recovery.

Bovis (1983) argued that the prime cost plus fixed fee form of cost reimbursement contract is the evolutionary link between traditional forms of contracting and management contracting. The latter involves an even further isolation of the management fee. Bovis regard management contracting as a logical extension of the fee system.

Other forces are imposed on the architect where the complexity of the building process is putting him in a difficult situation (Carter 1972). He may not realize the consequences of his design

which may not be flexible, not for time and cost only but also on availability of labour and material, productivity, scheduling etc.

On the other hand, clients are increasingly concerned for economy and speed. Clients often look for firms who can deliver the building on time and within a budget.

Dunaway (1973) sees the development of management contracting as a result of the growth of management science, which utilizes new techniques and skills of programming, control and progressing of resources and capital costs of projects.

The size of the work packages on small projects, say below \$1-2M may well also be a force affecting the management contracting market. Management contractors and sub-contractors would obviously have to consider their expenditure in time and resources in terms of opportunity cost. They would, therefore, be more interested in the larger, more expensive projects.

The above discussion of management contracting market forces is a matter of value judgement and many factors require consideration, for instance, the client's criteria with regard to time and cost, the complexity of the project, the nature of the site, labour and material availability and the like.

Finally, many of those involved in the provision of management contracting services fear that the concept may be restricted to

the private sector because of public accountability (Mckinney 1983). It was noted that the public sector have experienced cost reimbursement contracts for many years. This particular form of contract would certainly seem to be far more in conflict with the concept of public accountability than 'pure' management contract, simply because the contractor carries out the work himself with little provision for realistic and comprehensive competition. However. Mckinney went further and said that 'pure' management contracts have been awarded in the public sector and these should provide some type of precedent for their continued use by central and local government eg. General Post Office (GPO), Public Service Agency (PSA), London Transport, Department of Health and Social Services (DHSS) etc.

Official reports such as Banwell (1967) and Wood (1975) noted that traditionally, the public sector has taken a narrow view and awarded contracts by means of open competition on the basis of drawings and bill of quantities. These reports points out that:-"...although in the selection of the contractor competitions on price is very useful, it is not necessarily an essential means to the end of achieving value for money...we suspect that value for money is largely sought in the wrong place, it often seems to be looked for primarily at the letting of the construction contract"

2.1.3 CASE STUDIES INTO MANAGEMENT CONTRACTS

The development of management contracting has interested advocates and researchers to examine it's performance as an alternative system to the traditional method.

One of construction management's major practitioners, Bovis (1976), have hypothesised the construction of a national office block with a basic building cost of £100,000 and investigated the cost implications of the time saved by using their management fee system as opposed to the traditional system. Bovis suggested a cost saving of 23.5 percent due to an earlier available start to construction, thus reduced escalation costs and facilitating an earlier return of investment. Affoo (1982) compared the final accounts for similar projects built under a management and traditional contracts. A cost saving for using a management contract.

The National Economic Development Office report "Faster Building for Industry" (1983) discussed the effect of method of organization on the distribution of site time and total time on 55 projects. Criteria for fast projects were listed and design and build and management methods were picked out as providing projects up to 50% faster than normal at a competitive prices and with no resulting loss in quality.

Some 10 case studies using management contracting were examined by Sidwell (1983). The analysis showed that management contracts

have much shorter pre-construction time than other projects. The results also confirmed that the overall design and construction times are very much shorter for management contracts.

Another body of information regarding management contracting came from C.I.R.I.A. (1983) who visited 52 firms and organizations, 39 in the UK and 13 in the USA. The report concluded that the forms of management contracting can offer viable various and flexible contractual relationships for projects where time is important, especially where there is a likelihood of insufficient design information being available at the stage when a main construction contract would normally be let. C.I.R.I.A. also concluded that MC are suitable where there is a need to coordinate a considerable number of construction contractors and suppliers. It was claimed that management contracting offers potential for improved management of design and construction, particularly where a client has insufficient resources or expertise to concentrate on these crucial aspects of management a project.

Mo e recently, the D.H.S.S. (1986) reported on a four and a half year study of the design, construction and commissioning of three hospital projects, one traditional and two management contracts. The D.H.S.S. concluded that the use of a management contract will be an advantage to a health building project; projects where. for any reason or combination of reasons, the management of design, construction and engineering commissioning stages would be significantly more difficult than usual. The procurement method

was claimed to usually produce a completed building earlier than the conventional procedure. In some circumstances it was seen to produce a building at lower cost. Further it will seldom have a significant influence on the quality and performance of the completed building. It will reduce the risk of substantial overrun of time and cost but has little influence on the risk of unexpected shortcomings in the quality and performance of the completed building. The administrative procedures used with a management contract need be no less robust than those which have evolved for conventional contracting and therefore management contracting is not incompatible with the requirements of public accountability.

It must be noted here that the various pieces of research using the case studies approach discussed above are attempts to illustrate performance of management contracting, but they are all based either on small sample measures (Bovis, Affoo, Sidwell and the DHSS study) or the number of 'pure' management contracts included within the study are of a very limited numbers (3 out of 55 in the NEDO report and 13 in the CIRIA report). Hence, the comparison set out in this research illustrate more detailed variables and objectives and based on a larger sample. facts and explanation of which are given in chapter 4.

2.1.4 APPARENT ADVANTAGES OF MANAGEMENT CONTRACTING

The Construction Methods and equipment Magazine (1972) reported that the major benefit of a management contract is its contribution to the removal of the division which exists between design and construction by approaching project planning and design and construction phases as integrated tasks within a construction system. Tasks are assigned to a construction team consisting of the client, the designers and the management contractor. The team works together from project inception to project completion, with the common objective of best serving the client's interest.

Another major advantages put forward by the management contractors participating in this research is that the early involvement of the contractor in the project provides a tremendous advantage, both in the form of using the contractor's particular expertise in problem solving, and the fact that any early relationship between design and construction can save a considerable amount of time in the building process. Furthermore, Hayes (1986) noted that by reducing the construction programme the client gains possession of his building earlier, and so can start to reap earlier financial benefits.

Interaction between construction costs. quality and completion schedule are carefully examined by the team, so that a project of maximum value to the client is realized in the most economic time frame (Neate 1982). Under a management contract all work

packages and specialist services, which in total constitute over 80% of the project value, are tendered for in total competition. In this sense, the construction market is carefully investigated to ensure that only capable and competitive contractors and suppliers are invited to tender. Tenderers are fully acquainted with their project commitment and tenders received are enforceable under the contract.

Morris (1973) identified the following as the essential basis of construction management expertise:-

1. An appreciation of the design process, of design costing and of process costing.

2. Major expertise in production control, primarily programming and organization but also in quality control and materials management.

3. Skill in tender evaluation and negotiation.

This covers a wide spread of skills and it is suggested that only the experienced management contractor truly possesses them.

More recently the Central of Construction Market Information (CCMI 1985) has carried out a survey which looked to the management contracting market and analysed the advantages and disadvantages of the approach. Table 2.1 summarizes the main advantages perceived by top 16 management contractors operating in UK.

TABLE 2.1 - ADVANTAGES OF MC (CCMI	SURVEY)
ADVANTAGES	NO. OF RESPONDENTS OUT OF 15
(A) TEAM WORK NO SPLIT RESPONSIBILITY CLIENT INVOLVEMENT	13
(B) SPEED EARLY INVOLVEMENT/PROCUREMENT	8
(C) FLEXIBILITY	8
(D) COST BENEFIT MORE COMPETITIVE FEWER CLAIMS	8 5 4

It can be seen from the above survey that management contractors related the benefits more specifically to team involvement. According to the CCMI. the management contractors tending to regard financial benefit to client and contractors as being related. Overall of course all the above advantages are interrelated.

2.1.5 APPARENT DISADVANTAGES OF MANAGEMENT CONTRACTING

Although the Emmerson. Banwell and other reports of the 1960's em hasized the need for a link between the design and construction phases of the building process, this does not necessarily mean that management contracting as an alternative method to the traditional approach is the best and only answer to the problem. There are two major areas where the management contractor may have deficiencies, the CIOB (1983) recorded them as :

 It may take some time to turn the emphasis of management away from the traditional profit motive to one serving the client.
 There may be problems with the human relations aspect of consultancy; rough edges may requiring honing.

Throughout this research study, there has been no standard form of management contract, but in 1988, the J.C.T. published a management contract and a copy is attached as Appendix 3. According to Hayes (1986) the conditions of contracts were first written by the contractors themselves, but subsequently by the clients or their quantity surveyors. These MC were based upon the traditional JCT or GC/works 1&2 standard form of contracts.

The conditions of these previous contracts were criticized by Hayes (1986) as they allocate little risk, in a legal sense, for construction to the management contracting firms.

Tim Cornick (1987) identified the issue of risk for discussion to the Construction Management Forum and said, all those who take on a construction project carry risk from client to component supplier. Who carries what risk depends on where the boundaries of responsibility and liability are set.

Table 2.2 summarizes the disadvantages stated by the top management contractors that were surveyed by the CCMI (1985).

DISADVANTAGES	NO. OF RESPONDENTS OUT OF 15			
(A) NO REAL DISADVANTAGES	7			
(B) CLIENT UNCERTAINTY TO FINAL COST	6			
(C) VERY COMPETITIVE MARKET LOW PROFIT/FEES	4			
(D) ADMINISTRATIVE LOAD/PAPERWORK/ MANAGEMENT	2			
(E) CONFUSION OVER TERMINOLOGY	1			
(F) PRINCIPLES NOT FULLY UNDERSTOOD	1			
The CCMI has noted that the top man	nagement contractors tended to			
equate competition, and low pr	icing with lesser qualified			

contractors entering the market.

TABLE 2.2 - DISADVANTAGES OF MC (CCMI SURVEY)

Finally, a published article by Penny Guest (1986), has criticized a management contract in that it creates problems of site safety. Guest asserted that, "management contracting is causing problems. The safety officers cannot control the number of contractors and sub-contractors on their sites - yet they are in an ideal position to do so". "The large contractors are well aware of the problems, but the middle tier just coming into management contracting are not used to co-ordinating other contractors. Safety matters just tend to happen, rather than get organized". "Fast - track systems, where speed is essential, and sites are congested, present particular difficulties".

However, it must be stressed that the above evidence is too crude to allow conclusions to be drawn on the relative performance of safety under a management contract, but further research could examine the safety issue in a more detailed study.

SECTION 2.2 - THE MARKET DEVELOPMENT AND CLIENT PERCEPTIONS

OF MANAGEMENT CONTRACTING

The technical and environmental changes of the late 1960's have changed the traditional attitudes towards marketing, eg. changes in construction operation sequences and procedures, in materials and tools that need to be used etc. Thus contractors began concentrating on their external environment by establishing new customer satisfaction, a situation which again leads to the management contracting concept.

During the late 1960s there was much discussion on the development and provision by contractors of 'Package deals', and the first references to management contracting began to appear from 1972 and with increasing frequency in the late 1970s. However, until the CIRIA report 100 (1983) on management contracting, the subject had not aroused the construction industry as a whole to widespread awareness of the significance of management contracting. It is only now that management contracting output in the UK is beginning to be recognized as an mportant aspect of the construction market.

An estimate of the size of the market for management contracts and a description of output by type of work were part of the objectives investigated in this research. The following sections summarizes the development of, and the market for, management contracting in the UK.

In order to distinguish the information gathered by the author from those published by other sources of information, Table 2.3 summarizes details of the surveys that are referred to in the following sections.

TABLE 2.3 - DETA MARI	AILS OF SU KET DEVELOU	JRVEYS CONDUCTED TO PMENT AND CLIENT PERC	INVESTIGATE THE EPTION OF MC.
SOURCE OF INFORMATION	CONDUCTEI BY	D THE AREA INVESTIGATED	YEAR REPORT PUBLISHED
9 MC INTERVIEWED THROUGHOUT 1983	NAOUM	1.RANKING CRITERIA	1984 BY NAOUM & LANGFORD (SEE REFERENCES)
9 MC INTERVIEWED THROUGHOUT 1984 & 1985 UPDATING THE ABOVE FIGURE TO 18	NAOUM	 NO. OF MC. IN UK. 2.BREAKDOWN FOR MC. TURNOVER. 	1987 BY NAOUM & LANGFORD (SEE REFERENCES)
10 MC. CLIENTS INTERVIEWED IN 1985 & 1986	NAOUM	CLIENT PERCEPTIONS TOWARDS MC.	1987 BY N. & L.
170 COMPLETED MC. PROJECTS GATHERED FROM THE ABOVE 18 MC. & 10 CLIENTS	NAOUM	1.MARKET SHARE 2.PROJECTS BUILT UNDER MC.	1987 BY N. & L.
35 MC. WITH D FFERENT MC. EXPERIENCES.	ССМІ	1.NO. OF MC. 2.MARKET SHARE	1985 BY CCMI
NOTE : 1. MORE AB GIVEN I	OUT HOW TH N CHAPTER	E AUTHOR CONDUCTED T THREE (RESEARCH DESI	HESE SURVEYS ARE GN & METHODOLOGY)

2. SOME OF THE MANAGEMENT CONTRACTS INCLUDED IN THE MAIN STUDY (IE. THE CASE STUDIES) ARE SELECTED FROM THE 170 LIST OF MC PROJECTS REFERED TO IN TABLE 2.3.

2.2.1 THE USE OF MANAGEMENT CONTRACTING IN THE UK

This research has identified eighteen principal management contractors operating in UK. The MC interviewed were asked when organizations were first involved with their management contracting, the results of which are shown in Table 2.4.

							_	
YEAR	NUMBER	ENTERED	MARKET	CUMULATIVE	COMPANY	IDENTIFICATION	,	
1928								
(MFS)						J		
1968		1		1		J		
1970		1		2		К		
1971		2		4		A. D		
1974		1		5		F		
1977		1		6		В		
1978		1		7		G		
1979		3		10		E, M, Q		
1980		5		15	(C, I, L, M, P		
1981		2		17		0, R		
1982		1		18		Н		
NOTE:	IN 198	35 THE C	ENTRAL (OF CONSTRUCT	ION MARK	ET INFORMATIO	N	
	(CCMI)	UPDATED	A NUMBER	R OF 35 COMP	ANIES OFF	ERING MC, 16 O	F	
	WHICH	WERE CL	ASSIFIE	AS TOP MC	S AND 19	WITH SOME MO	7	

TABLE 2.4 - HISTORY OF THE MANAGEMENT CONTRACTORS STUDIED

WHICH WERE CLASSIFIED AS TOP MCs AND 19 WITH SOME MC EXPERIENCE.

From the results shown it can be seen that the management fee system (MFS) has been used as early as 1928 by Bovis. It was not until the late 1960's that 'pure' management contracting gained recognition within the industry. Now it is seen as part of an essential business portfolio by most large contracting firms in the UK and much competition among them to stay in the management contracting market.

Figure 2.3 plots the growth in the number of firms offered management contracting as a service. It shows no entry to the MC market in 1972, 73, 75 and 76. However, the number of management contractors increased by 50% between 1979 - 1983 with an estimated £580 million in 1983. This rapid increase by early 1980's was, perhaps, because at that time it was recognized by a number of influential organizations that clients could benefit from management contracting and that it had certain advantages to offer. By early 1980 many reports, articles were published, seminars and conferences held like the ones organized by the Midland study Centre (1982 and 1984), and by the High Point Research and Studies (1985). These events encouraged the industry to talk and think about what management contracting meant and its utility to the industry.



FIGURE 2.3 - CUMULATIVE NUMBER OF CONTRACTORS ENTERING MC MARKET

* (THE CCMI UPDATED ESTIMATE)
The number of contractors involved only provides part of the picture. More critically, this research investigated how committed were these organizations to the provision of management contracting services. Table 2.5 show the extent of management c ontracting work in relation to the contractors total turnover.

TABLE 2.5 - PROCUREMENT METHOD ADOPTED FOR THEIR TURNOVER BY THE
MANAGEMENT CONTRACTORS STUDIED

.

	PEI	RCEN' BY	TAGE THIS	OF ' METI	TOTA HOD,	I, TUI BY (RNOVI CONTI	ER OB RACTO	BTAIN DR
BUILDING PROCUREMENT METHOD	A	В	С	D	E	F	G	Н	I
TRADITIONAL	40	30	-		75	08	70	95	80
MC.	30	20	50	25	25	15	25	5	15
OTHERS	30	50	50	75	-	5	5	-	5
TOTAL	100	100	100	100	100	100	100	100	100
NUMBER OF PROJECTS									
CONSTRUCTED	31	20	6	40	12	40	28	6	5
	J	К	L	 М	N	0	 Р	Q	R
TRADITIONAL		70	60	30	80	80	70	50	80
MC.	100	25	20	60	15	10	25	25	20
OTHERS	-	5	20	10	5	10	15	25	-
TOTAL	100	100	100	100	100	100	100	100	100
NUMBER OF PROJECTS CONSTRUCTED	61	51	22	33	26	15	27	30	11

Al hough one firm stated that 100% of their turnover was obtained by a management contract, a high proportion of this work was in the form of management fee contracts. which for the purpose of this research is classified as a hybrid form of management contracting. The percentage of traditional contracting was still greater than other forms of contract, on average 50% of the management contractor's construction output, with 25% for management contracting and 25% other types of procurement methods eg., project management and package deal. The results also reveal that, on average, 95% of their MC work were commissioned by competition and only 5% by direct negotiation.

2.2.2 THE MARKET SHARE OF MANAGEMENT CONTRACTING IN UK

The market share of management contracting can be illustrated by a survey carried out by the author which indicated that the system is becoming increasingly common and popular in the UK construction industry. Table 2.6 show the total output of management contracting for the contractors interviewed, obtained from their management contracting lists of projects.

TADDL 2.0	OUT OF MANAGEMENT		
YEAR	TOTAL OUTPUT	NUMBER OF PROJECTS	
1982	£338 MILLION	83	
1983	£580 MILLION	110	
1984	£740 MILLION	154	

TABLE 2.6 - OUTPUT OF MANAGEMENT CONTRACTING (1983 PRICES)

Comparing this figure of £740 million output for 1984 with these resulting from the CCMI survey at approximately the same period which showed an output of £890 million, it would seem that the two figures are about the same. The difference between the two surveys could be attributed to the fact that some contractors find it difficult to separate output to the various packages they offer, and this is particularly true of management fee contracts.

Based on the DOE (1984) Register of Contractor Firms and the 3rd quarter output analysis by size of firm. the targeted sample of the 105 top contractors accounted for approximately 19% of all UK contracting output and around 37% of all work done by builders and civil engineering contractors. The management contract output of £890 million represents some 4% of total contracting output at say £21,000 Billion. According to the CCMI it was expected a growth by 9% in 1985 while the general growth of the market was still at about 1%.

From the above figures one could conclude that the market share for management contracting is sizeable and has a healthy growth, hence the temptation of more companies to jump on the band wagon.

2.2.3 - MANAGEMENT CONTRACTING PROJECTS

The author (1987) has published the distribution of management contracting work based on 170 completed buildings. The results revealed that management contracting was applied to all types of projects and clients. The building types were offices, health, factories, schools, public premises and general buildings, and Figures 2.4, 2.5, 2.6 and 2.7 shows percentage of MC projects according to their category.



FIGURE 2.4 - PERCENTAGE OF MC BY VALUE OF PROJECTS

It can be seen from Figure 2.4 that management contracting had been used for projects costing more than £1M (in 1984 prices) and in particular projects ranging between £1M to £5M. It can be argued, however, that many small contracts can be very complex and difficult, especially on restricted sites, or where high technological inputs are required.

In 1981 work exceeded £2 million in the contract value accounted for 16% of the total value of all new work or £1.468 million at 1977 prices (Mckinney 1983). It is not suggested that management contracting should be considered for use in all contracts in excess of £2 million. Indeed many authorities on the subject would consider contracts of less than £6 to £10 million unsuitable. The information is, therefore, only a general indication of the market in terms of the larger contracts, ie. those in excess of £2 million.

Figure 2.5 below divides the value of projects by building type and shows that about 50% of those surveyed MC were commercial buildings and offices and 27% were industrial buildings. The industrial sector could be further subdivided into 60% factories and 40% warehouses and others. The rest of the work was accounted for banks, houses and other public premises.



FIGURE - 2.5 PERCENTAGE OF MANAGEMENT CONTRACTING BY BUILDING TYPE

Figure 2.6 shows that 63% of the MC were used for new types of construction and 37% for other than new, ie. refurbishment, remedial work, modernization, etc. Figure 2.7 indicates that 68% of the projects have been commissioned by private-sector clients, 27% by the public sector and 5% by a mixed co-operation.





The literature available to date has considered the A/E's role. the trade contractor's position in respect of PCM in the US and the management contractors perception in regard to management contracting in the UK, but little research has been conducted on the clients' or owners' perspectives. Hence, in an interview conducted with construction clients, an attempt was made to assess their satisfaction with management contracting when compared with the traditional method of project procurement. Appendix 4 reports on the views of Ten clients with management contracting, presented for the ASCE by Naoum and Langford (1987). The report discusses the system from different aspects of it's use and the following are summary of the main findings:-

1. The results of the clients studied showed that management contracting work accounted between 3%-8% of the firm's total expenditure on construction work. The prominent criteria of the 10 participating organizations for choosing the management contracting method were the following: Minimizing the overall time of the building process; obtaining reliable time estimates for the project; and suiting large and complex projects.

Earlier, in 1984, Naoum and Langford reported on a pilot study conducted with nine management contractors to review the system of management contracting. The following are the ranking criteria for clients when considering a building project: (1) Increasing the reliability of cost and time estimates; (2) minimizing the

duration of the pre-construction and construction periods; (3) increasing management contractors' involvement during the design stage; (4) more flexibility during construction; (5) reduced maintenance costs; (6) suitability; (7) providing a high degree or personal control over specialized work; (8) lower costs in use; (9) cheapest cost; and (10) aesthetic appeal.

2. Having established the criteria by which clients choose a management contract, it is necessary to compare their views when practising a management contract and the traditional method of contracting, having in mind his needs in terms of function, cost, speed and aesthetics. Table 2.7 are summary of clients' responses.

OUESTION		RESPONSI	E OUT	OF 10
	QUESTION	YES	SAME	NO
1.	IS MC MORE RISKY TO CLIENTS?	6	 2	2
2.	IS MC MORE PROFITABLE TO THE CONTRACTORS?	10		_
3.	DOES MC INVOLVE FEWER CLAIMS?	3	4	3
4.	IS MC MORE FLEXIBLE?	10	-	3
5.	DOES MC ALLOW AN EARLIER START ON SITE?	10	-	-
£	IS MC QUICKER?	10	~	-
7.	IS MC MORE RELIABLE IN PREDICTING			
	THE CONSTRUCTION TIME?	9	1	
8.	IS MC CHEAPER?	2	4	4
9.	IS MC MORE RELIABLE IN ESTIMATING			
	CONSTRUCTION COST?	6	3	1
10.	DOES MC PROVIDE MORE CONTROL FOR			
	SUB-CONTRACTORS?	9	1	-
11.	DOES MC EXERCISE MORE CONTROL OVER			
	CONSTRUCTION OPERATIONS?	9	1	-
12.	DOES MC PROVIDE A BETTER BUILDING DESIGN?	1	1	8

TABLE 2.7 - RESPONSES TO QUESTIONS ON MC VERSUS TRADITIONAL METHOD

As can be seen, there is a conflict of opinion concerning the risk to be absorbed by clients when dealing with a management contractor. Three clients saw the principal risk arising from the absence of a tendered lump sum price from the main contractor prior to construction. Another client claimed that clients are subject to a greater risk in respect of costs because of the staggering and phasing of orders for specific work over a long period. While in the traditional method it was the main contractor who was taking that risk by putting a lump sum bid out at the outset, the contractors' perception of risk was also different for management and traditional contracting. With MC the contractor is likely to settle for a smaller guaranteed profit and abandon a higher potential profit through the management of implicit risks.

It must be stressed, however, that the risk issue is very difficult to define and consequently the associate risk can not be easily measured .

All clients studied agreed that management contracting is flexible in that it enables variations on the original design and specifications throughout the course of construction; they added that cost can be controlled by changes in the design but without affecting project performance.

Frequently the time factor was seen as one of the major advantages of management contracting; none of the clients sampled commented unfavourably about the MC's time performance. All

clients agreed that a MC reduces the precontract period by overlapping the design and construction process; this enabled the project to be completed in a shorter period than for a traditional method. However, some clients added that their experience with past management contracts counted very much in considering the company's other needs.

Conflicting attitudes about the cost factor were observed. When interviewing a large public client, a mismatch between the expectations of a public body and the procedures of management contracting with uncertain final costs, could be observed. It was reported that, because of the way the public sector is organized, it is naturally biased towards caution in committing themselves to spending taxpayers' money, and ensuring that their accounting officer (ie Chief Executive) has good answers to critical questions which might be put to him by the Public Accounts Committees. However, a second public organization did not feel constrained in using management contracting due to public accountability because they had to change their building procedures.

A private banker stated that there is a tendency for greater involvement of the professional consultants: "The architect and quantity surveyor get involved more than they should in some work which is the management contractor's job." This overlapping responsibility was reflected in higher fees being paid. Another four private clients had a fairly positive attitude toward the cost performance of management contracting. One distinguishing

characteristic amongst this group is that low costs were not considered as essential for client satisfaction.

None of the clients interviewed felt that management contracting produced a better building design than the traditional method, but most clients stated that they did not choose a management contractor for that reason in the first place. This evidence refutes the CIRIA conclusion that clients who use management contracting frequently want the management contractor to be responsible for managing the design.

3. After comparing the experience of clients for management and traditional contracts, it is necessary now to review their attitudes towards using the system in the future. Table 2.8 shows the clients' responses to the question of whether they will use MC again.

_____ STATEMENT NUMBER IDENTIFIER _____ NOT DECIDED 1 Α NOT ON MAJORITY OF OUR PROJECTS В 1 DEFINITELY FOR ALL OUR PROJECTS С, F, H 3 DEFINITELY FOR OUR LARGE COMPLEX PROJECTS 1 D FE 'ER BUT DEFINITELY THE MANG. FEE SYSTEM 1 Е DEPENDS ON OUR CRITERIA 1 G DO NOT KNOW 2 I, J _____

TABLE 2.8 - ATTITUDES TOWARDS MANAGEMENT CONTRACTING IN THE FUTURE

The difference between clients' criteria and their organizational structures has influenced their views and attitudes towards management contracting. These views have, in one way, prevented the long-term use of management contracting by some clients but

led other clients toward continuous use of the system. For example, client A is a sophisticated firm and is very much concerned about public accountability and financial control. Client A wanted to find the best way to improve its performance in meeting different requirements on major projects. Despite the fact that they have constructed nine projects on MC, the organization had not made up its collective mind yet regarding satisfaction with the system because of the following reasons: (1) The uncertainty of the ultimate cost; (2) the liability of the MC is not well defined; (3) it is an expensive method when spending tax payers' money; (4) the complex organizational structure of the client may influence contractor performance. Client A agrees that MC saves time and saving time is saving money, but to quantity that saving is impossible in the public sector.

Client B is a private firm and also has a sophisticated organization with copious internal resources to manage its construction projects. Client B stated that in its experience MC projects are shorter in duration, but the failures to capitalise on any advantages that MC can offer sometimes lies within the client's organization. If its own procedures are not matched to project requirements, the client could lose the advantages of MC. The client could delay progress if his approvals are not matched to the speed of management contractor's work. Moreover, the type of work client B commissions is not seen as appropriate for the long-term use of management contracting (see comments in Chapter 4, section 4.6.3).

On the other hand, clients C - G, having smaller organizational structure with simple procedures, had a more positive attitude towards MC. However, these clients have their own limits for the application of MC; current experience is shaping how they will use the system in the future. The client's attitude towards MC could be shaped by how the building team performed on the last job. From this, clients may oscillate between traditional and management procurement methods.

The management contractors and clients participated in this research have criticized many contracting organizations for entering MC without the right personnel. Client C noted that, 'although from the client's point of view, the intention is to integrate them with the professional team of architect, structural engineers and quantity surveyors at an early stage in the

proceedings to gain the advantage of their know-how within the building industry, many have not yet understood or chosen to understand this change in status and merely regard themselves as administrative middle-men in between the sub-contractors and the client in his professional team and thus does not inject any creative ideas which is one of the objects of the exercise and is indeed the reason why certainly in our case, after a careful selection process, we bring them into the proceeding at the earliest possible stage.'

Two useful reports commented about the future and marketing of management contracting in UK. The CCMI report (1985) concluded the following:-

1. MC is growing but it is still seen by many respondents to be at an evolutionary stage, as does the whole of project management. It was stated that the leading management contractors have a much more optimistic view of the future than have those in the other groups ie. those with less experience with management contracting. According to their survey, this may well be because they have to a great extent 'cornered' the market. Table 2.9 indicate the resulting summary of the trend to management contracting in the foreseeable future.

RESULTS SUMMARY	RESPO	RESPONDENTS PREDICTING				
NO. RESPONSES	"INCREASE"	"DECREASE"	"NO CHANGE"			
GROUP 1 15 (TOP MC)	15	-	-			
GROUP 2 (FAIRLY EXP.) 15	5	7	3			
GROUP 3 6 (LITTLE EXP.)	1	3	2			
GROUP 4 7 (NOT EXP.)	4	1	2			
TOTAL	25	11	7			

TABLE 2.9 - FUTURE TREND FOR MC (CCMI SURVEY)

2. Management contracting is likely to grow in the public sector where some authorities are changing their standing orders to enable them to carry out management contracts. It was suggested that the PSA will be an important source of advice and experience which other authorities will look to.

3. It was also stated that some contractors are looking to design, construct and manage as well as the provision of integrated sub- contractor packages as the next stage of market development in the UK construction industry.

Finally, a report on marketing by Brailsford (1985), who is the director of Higgs and Hill Management Contracts, believes that "If management contractors intend to become an integral part of the professional services, it is incumbent on them to contribute in a major way to formulating solutions. This can only be progressively achieved by a process of education both clients and designers, in addition to their own organizations. well produced reports, seminars and an awareness of the clients' requirements, all give individual help to this process."

Brailsford went further and said "from whichever angle we look at our marketable image, the main criterion must be creativity, based on a foundation of practical ability. We must produce well designed and economical buildings more quickly, at the same time adopting a more professional approach. Indeed, we must create A BETTER WAY TO BUILD."

3.1 AIMS AND OBJECTIVES

The main aim of the research is to compare two procurement forms, namely management contracting and the traditional approach and to assess their performance. The following are the major objectives of the study as outlined at the commencement of the research work:-

1. To establish the background, apparent advantages and disadvantages to the client, in adopting management and traditional contracting.

2. To find out the extent of management contracting, the typology of projects and the classification of clients using management contracting.

3. To evaluate the client criteria of satisfaction when using a management contract.

4. To evaluate the difference in criteria for project performance, for management and traditional clients.

5. An objective comparison of the time and cost of projects completed with a management contract and comparable buildings constructed using the traditional approach. Both time and cost has a number of aspects associated with it, details of which are given in Chapter 4 (the results).

6. A subjective comparison of client satisfaction with regards to time. cost and quality in adopting both systems.

Before setting out the research frame work and methodology due, consideration must be given to previous research in this and related fields. The first area of interest of concern to the researcher is the development and refinement of building process models. a model forming a framework for the definition and ordering of data on a subject which it visualizes and which allows separate occurrences to be compared. Thus a model is a key element in determining the scope of any research, it points to those variables which must be considered or controlled in data collection and analysis. Echenique (1970) classified the model as can be made for description. prediction. exploration or planning. and can be either physical (eg. architectural models) or conceptua] (ie, matematical model like linear programming).

Since the 1960's various models have been developed to invesigate the effectiveness of the building team or the operation of the building process. Some researchers developed their model to show the structure of the industry (eg. the Tavistock model). but others were interested in showing the processes and participants involved in project development and have a temporal aspect ie. they show sequences of events and not instants in time. However, although the Tavistock report produced the former type of model. showing all the participants and their inter-relationships at an organizational level. it did open the building industry's eyes up to a systems approach. According to Cleland and King (1968), the system approach illustrates the interreaction and interdependence

between the identified variables, suggesting that , an action of one variable can cause reaction on the part of others.

Among the most relevant models for this research that followed the Tavistock report are those of Morris (1972), Walker (1982), Ireland (1983), Sidwell (1982), Nahaphiet (1985), Wearne (1984), Rowlinson (1988) and Newcombe (1988).

Morris (1972) took a system view of the construction industry and studied the interfaces between the design and production. He used the Tavistck reports and the work of Miller and Rice on organizational boundary definition (1967) and Lawrence and Lorsch's studies of differentiation and integration (1967) as a mainspring of his research model.

Model 1 in Appendix 5 show Morris's work where the building process is broken down into three main sub-processes which may occur sequentially or concurrently ie outline design, detailed design and construction. The concurrence of the sub-process is an indicator of the degree of integration of the building process. This integration may be modified by the managerial actions which determine the make up of the building team and the parameters by which they are guided. This managerial action may in turn be modified by the environment, which constitutes all the factors which influence the client, the building team and the building process. This provides one of the first pieces of work which approaches the problem in terms of the process as a whole and attemptss to provide a rationale for actions.

Walker (1980) also adopted a systems viewpoint and defined a model which is client oriented and is common to all projects. He used the technique of linear responsibility analysis to investigate making and decision appropriate organization structures for construction project management. The model is in terms of three stages of project conception, project inception and project realization. In recognising the non-sequential nature of the construction process, the decision points within the system adds task discontinuity to Miller's work (1959) on technology, territory and time.

Ireland, in his PhD thesis (1983) adopted Kast and Rosenweig's model (1973) of the organization and indicated that he had reversed their proposition of management and structure being dependent systems and conducted his research on the basis that 'technology used. structure chosen, the phsychosocial aspects and the way the project is managed will all have an affect on the acheivement of goals and values subsystem'. Ireland maps these 1- - da C sub-systems to form a strategic control of the building process but omits discussion of who should exercise this control. It also appears that the concept of socio-technical analysis is not fully supported from his research. This is so due to the crosssectional approach to the research method evidence for impact of the social system and the adaptive controls would be very difficult to find. A major limitation of the work is that it was not extended to cover non-traditional methods of contracting.

The field of examining project management, project performance and the building process, though continuous and often on a large scale, and the more recent work by Ninos and Wearne (1984), Nahaplet (1985), Rowlinson (1987) and Newcombe (1988) are of interest.

Ninos and Wearne (1984) brought together conclusions from research on case studies and other opinions, that effective control of construction is dependent on the promoter's decision on authority vested in his project team. The guide summarises the need and problems of control and essentially describes the building process in terms of delegation of authority.

The work by Nahapiet (1985), in comparing project performance, proposed that the selection of contractual arrangements is a function of the type of client. his time and cost requirements and the characteristics of his project. Model 2 in Appendix 5 show the main relationships between the factors examined in the course of the study. This is only a partial representation of interdependency factors of project delivery, since it leaves out a number of other important influences, not least the characteristics of the people involved in the project.

In a PhD research programme by Rowlinson (1987), a model was developed to assess the data collection process which showed four main variables, the client, procurement, process variables and performance (see Model 3). The characteristics of he client, complexity and sophistication, are hypothesised to be influences

in the selection of the building team and participation in the building process. The environment within which the building process takes place is a determinant of the effectiveness with which success criteria are matched by performance and the attributes of the client body and project itself were given as examples of independent, situational variables in this context. The controllable variables of building team organization and management, the decision taken by the building team prior to and during the project, are regarded as the major influence on the building process and it's outcome.

Newcombe's Anatomy of a **C**onstruction **F**roject (1988), illustrates the components, context and characteristics of a typical construction project. These components and contextual factors have been conceptually defined in model 4 shown in Appendix 5. A preliminary synthesis of the components and context of a project has been attempted which has highlighted the interactions between the parts of the model. Some perceptions of the success of a project have also been explored, illustrating that different parties may view project performance in contrasting ways.

The various models of previous researchers were studied by Sidwell (1982) who criticised them however for they infers a sequential process and does not illustrate the iterative and cyclic nature of the building process. He, therefore, identified and studied the interrelationship between 19 variables and discussed them under six main headings (see Model 5 in Appendix 5) :-

- A) Client characteristics
- B) Project characteristics
- C) Project procedure
- D) Building team
- E) Environment
- F) Project success.

The elements client characteristics and project characteristics were seen as an independent variables. Project procedures and building team were considered as a moderator variables which are selected to achieve optimum level of the fifth dependent variable, project success. The five variables were all seen as a subject to the influence of the sixth element of the model, the environment.

Sidwell applied the model over 32 case studies to examine, on the one hand, the relationship between the variables: client, project, building team and project procedure, which together define the organization form. And on the other hand, variables of the organization form are examined with variables of project success in respect to time and cost.

However, Sidwell (1982) did not include designer characteristics nor client and contractor criteria, which are modified by the foregoing, in order to guage performance. These criteria have been assumed previously and deemed to be project characteristics. Having said this however, the success measures that he used were both subjective and objective which helps counter criticism on criteria.

The model presented in this research also consist of a number of activities for designing and building a construction project with regards to the type and size of the project. The model points to those variables which had to be measured or controlled in data collection and analysis. Figure 3.1 show the interdependence between these variables which are postulated in a model similar to the one presented by Sidwell (1982).

Although the model show connecting arrows in the inter variables eg. between client and designer characteristics, their relationship were not examined as they are outside the scope of this research. This research model concentrate, firstly, on examining the relationship between two types of procurement methods, that is management contracting and the traditional approach with elements of the client characteristics, designers characteristics, project characteristics and the contract procedure adopted. Secondly, elements of project performance are examined with each component of the research model.

3.4 DETAILS OF THE RESEARCH MODEL

The components of the model are condensed below:-



The Client Characteristics

- 1. Client type public / private
- 2. Client experience
- 3. Client business developer / purpose built
- 4. Client criteria cost / time / quality

The characteristics of the client organization differ in respect of type of business and the experience that the client has of the construction industry. This will generate different expectations and criteria for achieving satisfaction with respect to cost, time and quality and consequently influence the selection of the procurement method. For instance, property developers and commercial clients are likely to place great emphasis upon speed of construction because of necessity to borrow money. Yet the quality will be equally important for the building cannot be sold or let if the quality is not appropriate to the market. For a factory, a successful outcome might be completion of his building on time in order to commence scheduled production needs. In public sector client, because contrast, the of public accountability, is likely to focus upon cost prediction and will be more concerned about the level of certainty associated with the tender sum.

Other variance between clients could be the organizational structure of the firm which will affect the nature of the decision making process especially publicly funded clients. Thus it is hypothesised that these variables will influence the

client's selection of the procurement method for the project and subsequently the performance of the project.

The Designer Characteristics

- 1. Designers type inhouse / outside professionals
- 2. Designers experience

The architect is considered to be the leader of the building team and the advisor of the client organization and it is expected that different designers characteristics will influence the selection of the building team and consequently project performance. In certain cases, sophisticated clients had their own professionals and it is assumed that an outside or an inhouse designers may influence project performance.

Closely linked with the professional characteristics box could be the concept of attitude of designers to appreciate their experience with the new procurement method. The move away from procurement procedures the conventional has meant that organizations have changed to match this new market. Likewise experience professional practices have, for example, adopted new meet new expectations from the management positions to contracting market. The changes of the role of the architect or consultant in the new procurement method may be identified as :-

 The design organization had to retain full responsibility for design and for specifying the quality to be achieved.

- The designers should change their attitude towards new procurement methods in order to accept the input from the contractor.
- 3. The designers role in construction supervision is reduced, but still has to be responsible for quality control. the level of involvement depends on the nature of the project.

The Project Characteristics

- 1. Building type industrial / commercial
- 2. Construction type new / refurbishment
- 3. Complexity / Building rate
- 4. Size cost / area

1. Projects may be distinguished by their level of constructional complexity or technology ie. building type, new or other than new construction. The more constructionally complex the project is, the wider range of services and expertise needed. These differences can impress a greater managerial pressure upon the building team and may require different procurement methods to op imize success in the building of the project.

2. The cost and area of the project can be a measure of the size of the building and to some extent it might be an indication of how complex the project is, ie. if the project is very costly and spacious, it might be complex or it can be argued that the projects is just big. In the former circumstances it may requires a suitable procurement method to achieve higher success.

The Project Procedure

1. Competition - open / selected tender

2. Direct negotiation

This element could influence the selection of the appropriate building team and subsequently affect the success of the project. Project procedures involve the process of documentation and contractor selection (competitive or negotiation). The procedure envisaged for a project will influence the selection of the procurement method.

Procurement Method

- 1. Traditional approach
- 2. Management contracting
- 3. Project management
- 4. Design and build

After the client with the architect establish his needs and priorities, and identify the characteristics of the project, they will then decide on a suitable method to procure the project. This is the process in most building procurement, except for project management and some MC where the contractor is appointed at the very early stages. Therefore, the procurement method selected will be a function of the variables discussed above. The research intention is to utilize these variables and others of the project performance as a base of comparing two of the above methods, management and traditional contracting.

An additional factor which may be closely related to outcome is the team relationship which may be less visible when the project is finished but may be an important component of the overall assessment of a project by those closely associated with it.

Project Performance

Project performance is an assessment or evaluation of project delivery. It is generally seen as some combination of three factors: speed and the time taken from inception to completion; cost, ie the final cost paid per square metre of building; and quality, ie the standard of design and construction attained.

The success of a project is a subjective assessment as well as an objective measure. Whether or not a project is regarded as successful depends on whether it achieves what is required or expected. Success is, therefore, in large part a function of the needs and expectations of the relevant parties. Thus, although in absolute terms one job may take longer to complete than another similar job, this does not necessarily imply that those involved on the former will be less satisfied than those on the latter. Thus, performance measures in this research include the following factors:-

- 1. Site start or pre-construction time
- 2. Building time
- 3. Total project duration

- 4. Speed of construction (area per week)
- 5. Unit cost (cost per sqm)
- 6. % overrun on time
- 7. % overrun on cost
- 8. Client satisfaction on time
- 9. Client satisfaction on cost
- 10. Client satisfaction on quality

The Environment

During the past twenty to thirty years there have been a dramatic changes in the environment we are living in. The term environment describes all external influences on the building process. It could be a meteorological factor, economical, political and technological and they are usually interrelated.

The changing environment could create uncertainty, not only in terms of prices. but also in terms of investment within the work of an organization which will affect the demand for building. The demand depends on the needs and priorities of the client and in certain cases the needs may not had been forcasted. In these circumstances the client require an immediate action to meet his production programme which in turn influences the procurement method that needs to be selected to cope with the changing environment.

3.5 THE RESEARCH HYPOTHESIS

The research model stimulates two central hypotheses, which are:-

1. "MANAGEMENT CONTRACTING CAN SATISFY CLIENTS WHO NEED THEIR PROJECTS QUICKLY AND FOR PROJECTS THAT ARE LARGE AND/OR HIGHLY COMPLEX"

This leads to a second hypothesis:

2. "PROJECT PERFORMANCE IS A FUNCTION OF THE CHARACTERISTICS OF THE CLIENT, THE PROJECT, THE DESIGNERS, THE CONTRACT PROCEDURE EMPLOYED AND THE PROCUREMENNT METHOD ADOPTED FOR THE PROJECT".

For the purpose of comparing, specifically, management contracting with the traditional form of contracts. the major hypotheses are further expressed into more detailed subhypotheses. These are:-

1. The client

Procurement method is a function of client characteristics.
Project performance is a function of client characteristics.

2. The project

2.1 Procurement method is a function of project characteristics.2.2 Project performance is a function to project characteristics

- 3. The designers
- 3.1 Procurement method is a function of design professional characteristics.
- 3.2 Project performance is a function of design professional characteristics.
- 4. The contract procedure
- 4.1 Procurement method is a function of project procedure.
- 4.2 Project performance is a function of project procedure.
- 5. Project performance and procurement method
- 5.1 Project performance is a function of the procurement method adopted.
- 5.2 Performance measures are interrelated with one another.

3.6 DEFINITIONS AND MEASUREMENTS OF VARIABLES

CLIENT CHARACTERISTICS

Client types (C1) were defined as the source of project funding and were categorised as either private funds (given numeral 1), or public funds (numeral 2), for statistical purposes.

Client experience (C2) was measured as the number of similar projects they have commissioned in the past. Those with no previous experience were given a low score of L (or ranked 3). Those with some previous experience (ie., clients who has been involved with one or two buildings) were given M (or ranked 2),

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and those who had considerable experience (ie., been involved with more than two) were given a score of H (or ranked 1).

Client business (C3) was defined as the client's purpose for commissioning the building and were categorised as either a bespoke client (ic., building for the primary use of the company) and given numeral 1, or speculative developers (given numeral 2).

DESIGNERS CHARACTERISTICS

In-house / outside designers (C5) are used to describe the source of building design input as some sophisticated clients may have their own professional team of experts, depending on the scale of their activities. Projects with an In-house design input were given numeral 1, and those designed by an outside professionals ware given numeral 2.

PROJECT CHARACTERISTICS

Project size was defined by building cost (C9) and gross floor area in square metre (C10). Those < £5m and < 7000sqm were considered normal size projects and those > £5m and > 7000sqm as large projects. In order to make a fair comparison, the classification on less than or greater than boundary was decided after considering the frequency distribution of the data that will be included in each group .

Project complexity (C11) was defined in terms of physical complexity, services and number of sub-contractors involved in the execution of the project. The building rate (C12), which is the value of building over the construction period was used as an indication of how technically complexity the project was and it represents the average turnover per week for the project. Those projects with over £50,000 per week were considered having a high building rate. It must be stressed however, that an attempt was made to measure project complexity in more detail but it became apparent that this is a very difficult task to include with this research.

CONTRACT PROCEDURE

Procurement methods (C14) were of four types, two of which were studied, management contracting (numeral 1) and the traditional approach (numeral 2).

In the questionnaire, management contracting was defined as a method of carrying out a construction project by appointing a contractor at the pre-construction stage and paid on a fee basis, to manage and deliver the project. The fee comprises a percentage for profit and fixed overheads. All construction work is carried out by subcontractors, competitively selected and appointed in consultation with the client and his professional advisors.

The traditional approach was defined as a method of procuring a building in which independent professionals (ie. architects, engineers, quantity surveyors) are employed by the client to complete the design work and then the client enters into a seperate contract with a building contractor who construct the designed building.

PROJECT PERFORMANCE

Pre-construction time (C15) was calculated as the number of weeks from start of detailed design to start of construction. This is due to the effects of planning approvals, permits, and public enquiry which made it difficult to identify a clear starting point for a number of projects. Total time (C17) was calculated as the number of weeks from start of design to completion of the project and does not always equal the addition of design time and construction time because of design/build overlap for management contracts.

Time and speed performances were measured by grouping the projects into three separate contract size (< $\pounds 2m$, 2--5, > $\pounds 5m$) and the mean for each group was calculated. The range of time where 60% of the projects fall into represents average performance, value below are faster and above are slower. In certain cases the range of time was taken as 70% depending on the cluster of the projects around the mean. Each project was then studied individually and the number of slow, average and fast projects were calculated. For example, say a project took 100 w eks to build and 60% of the total projects, for that particular group, fall within the range of time of slow.

Unit cost (C19) was defined by the cost of building divided by the square meter of gross floor area. All project tender and final account data was first indexed to the second quarter 1984 using BCIS tender price index. The method for measuring cost

performance was similar to the BCIS cost comparison. After grouping the projects, the mean cost/sqm for each group was calculated and also the range of cost where 60 % of the project fall into (in certain cases 70% range). Projects fall above the top 60% range were considered highly expensive, within the range were average and below the bottom 60% range were cheap. For example, say a project cost £900/sqm and 60% of the total projects, for that particular group, fall within the range of costs of say £380-£700sqm, that project would then had to be considered as very expensive.

Time overrun (C20) for each project was measured by the percentage increase or decrease on the estimated programme in weeks (*+/-TIME), and percentage cost overrun (C21), measured by percentage increase or decrease on budget in pounds (*+/-COST). This was calculated after the +/- authorized value of variations by the client was taken into account. Projects fall within +/-5% of the estimated time and cost were considered as average performance for < £5m building, and 8% for > £5m. Otherwise the contract was categorised as high overrun. This percentage reflect a measure of the certainty of the time and cost to the client as quoted at the outset.

The subjective measures of client satisfaction on time (C22), cost (C23) and quality (C24) were each given a high score H (or ranked 1), where there was a high level of satisfaction. Ranked 2 where there was a moderate level of satisfaction and ranked 3, where there was a low level of satisfaction.
The sequence of research is outlined diagrammatically in figure 3.2. The two main subjects of the research are the client and the building team and the form of data collected - subjective and objective. The data collection took the form of interviews and questionnaire to test the research hypothesis.

The nature of this research is a comparable one and there are, broadly speaking, four methods to conduct the study. These can be condensed below, based on Vroom (1971) and previous researchers:-

1. In one, data from one sample is collected and analysed and then compared with what is already known from another sample.

2. Longitudinal study. Here, the data is collected directly from site using a semi-structured interviews to gather the necessary information. This method was used by Nahapiet (1985) in case studies from the USA and UK, and by the DHSS (1986) in comparing two management contracts and one traditional contract.

3. To match one sample against another by collecting comparable data using interviews, questionnaires and project documentations. This is the method used by the author and it is similar to that used by the Slough Estates Limited (1976), Chartered Institute of Quantity surveyors (1979), Sidwell (1982), NEDO (1983) and Rowlinson (1987).



4. An attitudinal survey and this is used widely in social sciences.

The author chosen the third method because it was felt that, within the scope of this research, the comparison would not be fair and valid in the first one due to unmatched samples. The second method can be used for small samples only and involve a great deal of confidentiality and research time. The fourth method (attitudinal survey) were not appropriate because of the subject matter and the uncertainty over validity. (Validity in terms whether the attitude scale measures what it is supposed to measure. In this respect, Oppenheim (1966) says:-

"....behaviour is often not a simple manifestation of an underlying attitude, and so there are dangers and pitfalls in this approach. At the present, there is no way of making sure that an attitude scale is valid.")

The research methodology is summarized below:-

Pilot Study

Like any similar comparative study, the precursor to successful research is be the pilot study. The pilot study was conducted, after a review of the literature had been undertaken, took the form of interviews with managers and directors of companies who were known to have commissioned projects under a 'pure' management contracts. List of names and addresses were collected

from personal contacts, Building Trade Journal and the Building Magazine. The interview questionnaire is attached as Appendix 6 . A pilot study was conducted with nine Management Contractors, ten Clients and four Architects, to validate the form and content of the questionnaire before the main survey was undertaken. The suitability of the form and areas of particular interest to each participant highlighted and the set of criteria evolved from these interviews. The results emanated from the interviews with the management contractors and the clients were published in the CIB-W65 (1984) and subsequently in the ASCE (1987). The materials were largely edited and discussed throughout Chapter 2, and used to support results of the main study in Chapter 4.

The Main Study

The pilot study has prepared the ground for case studies for harder and more empirical data to compare the performance of management contracts and traditionally organized projects. The principal management contractors, clients and architects interviewed at stage one were asked. at the end of each interview, whether they would be prepared to provide details of recently completed projects undertaken on a management contract. Almost all the interviewees showed interest to the subject of investigation and were willing to assist. Some respondents provided details of more than one project, and were also prepared to provide details of similar work undertaken using the JCT form of contract from their traditional contracting division.

Other project names and details were obtained from the contract news and building magazine (Building Dossier). The managing director of the companies were approached, asking for their cooperation for that particular project.

The validity of the case study questionnaire was first tested by visiting ten co-operative firms to answer the questions. Some modifications were made and Appendix 7 gives typical case study questionnaire.

After modification, a postal questionnaire was sent to the appropriate personnel who were actually involved in the project ie. project manager, contract manager etc. In certain cases, telephone discussion and/or interviews had to be conducted after the postal questionnaire to clarify misunderstandings.

Designing the outline of the questionnaire started in Summer 1984, immediately after the management contractor's interviews. Detailed case study questionnaire was finalised and start of data collection took place in Autumn 1985, after the client and architect interviews. Analysis of the data started in December 1986.

3.8 THE MAIN STUDY SAMPLE

In total the number of case studies collected was 61 and further 8 project details were obtained in collaboration with a research fellow (Rowlinson 1986) who conducted a similar study into industrial buildings at Brunel University.

No particular bias was intended in the choice of management and traditional projects and the sampling can be regarded as random which gives equal chance for each sample to include various characteristics and different level of performance. However, there were certain boundary in selecting the type of building, client and the contractor, these of which are explained below.

The use of random sampling in this kind of research is generally preferable (Armitage 1971 and Hill 1962), because chances can be equal. In certain studies, the researcher may chose one well known contractor and draw the whole sample from, but the number will be limited and conclusions may not be general.

It was intended at the commencement of the research to collect a large sample under both management and traditional system, in order to make a valid comparison. Most statistician consider N equal or over 30 as large. It was also apparent that, in recent researches, the trend to obtain a large number of detailed case tudies is increasing (32 cases in Sidwell's study, 49 in Rowlinson, 52 in the CIRIA report, 55 in the NEDO report). Of course, the choice of numbers depends on the kind of objectives and goals set by the researcher intend to find out and, above all, the quality of the responses .

A. The building type used as a basis of comparison

After the market for management contracting was surveyed, commercial and industrial buildings were considered to be the most appropriate basis for the comparison, firstly, because these range of building type were available in large numbers than others such as hospitals, houses, airports etc. Secondly, by limiting the type of buildings and concentrating on two only, variables of project characteristics will be reduced, in which case the investigation would prove to be harder and consequently more valuable.

B. The client type

The constraint imposed on the research in that most of the projects collected were applied to large client organizations which meant that the research is totally confined to large companies. However, clients vary in their familiarity with contracts, their nature (public or private), classification and purpose for building.

C. The contractor

In order to compare the traditional contracting with 'pure' management contracting, it was attempted to confine the case studies to the principle management contractors that were identified during the course of the study. They were all of large national and/or international contracting companies, undertaking projects on different type of contracts.

3.9 CHARACTERISTICS OF THE CASE STUDY SAMPLE

Of the 69 case studies 39 were management contracts and 30 traditional contracts. Table 3.1. 3.2, 3.3 & 3.4 give further categorization by client characteristics, designers characteristics . project characteristics and procedures respectively.

TABLE 3.1 - THE RESEARCH SAMPLE. SHOWING PROCUREMENT METHOD AN CLIENT CHARACTERISTICS _____ PROCUREMENT METHOD CLIENT CHARACTERISTICS MANAGEMENT SUB- TRADITION SUB- T CONTRACT TOTL CONTRACT CASE NO. CASE NO. TOTI. O Т L _____
 PUBLIC
 2.4,5,6.20
 8
 5.9,11,14.

 23,25,26
 22
 5 13 CLIENT _____ TYPE PRIVATE REMAINDER 31 REMAINDER 25 56 TOTALS 39 30 69 ______ _____ 2.3,5.6. 2,4,6,7.9. 15.21.22 14 12,13,15, 9 23 24.25.28 16 С HIGHLY L 16 Ι 30,34,35 Ε E 1.4,8,9, 3,5,8,10. 10.11.12. 11.12,14, E MODERATE 14.16,18, 17 16,18,19, 19.20.23 20.23.26 9 26 19,20,23. 26,27,31, 20,23,26. Р 27,31,33 E 33 _____ R 13.17.29. 4 1,14,19, 4 8 I LOW E 32 26 N С NUMBER E AVAILABLE 35 22 57 ------
 TOTAL
 36.37.38
 4
 11.18.20,
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 33< 21,22,23, AVAILABLE 30 TOTALS 39 30 69

		F	ROCURE	MENT METHOD		
CLIENT CHARACTERISTICS		MANAGEMENT CONTRACT CASE NO.	SUB- TOTL	TRADITION CONTRACT CASE NO.	SUB- TOTI,	т О Т
CLIENT	BESPOKE	1,2,6,7,8. 9.15,23,24 26,27,29, 32.34,35.36 37,38,39	19	1,3,4,8, 12.13.14. 15,16,18, 21,23,24, 27,29,30	16	35
NESS	SPECULA- TIVE	REMAINDER	20	REMAINDER	14	44
TOTALS			39		30	69

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TABLE 3.2 - THE RESEARCH SAMPLE, SHOWING PROCUREMENT METHOD AND DESIGNERS CHARACTERISTICS

		PROCUREMENT METHOD							
DESIGNERS CHARACTERISTICS		MANAGEMENT CONTRACTS CASE NO.	SUB- TOTL	TRADITION CONTRACTS CASE NO.	SUB- TOTL	T O T L			
D E S	IN-HOUSE	2.4,5.7,9 13,14,15, 19,23.24, 25,37	13	2,4,6,7,8 13,22,25, 26,28,30	11	24			
G S O	OUTSIDE	1,3,6,8, 10,13,16, 17,18,20, 21,22,29, 30,31	15	1,3,5,9, 10.12,14, 15.16,17, 18,19,27, 29	14	29			
C E	MIXED	REMAINDER	11	REMAINDER	5	16			
TOTALS			39		30	69			

D E S I G N	HIGH	1,6,7,8, 9,11.13. 15,16,21, 23.24.26, 29,34,35, 36,38	18	2,6,7,12 13,16,27	7	25
E R E X	MODERATE	2.3,10.12 17,18,19, 20,22,25. 30,31	12	1,8,9,25 26,28,29	7	19
P E R	LOW	4,5,27, 28.32	5	5,10,14, 15.17,22	6	11
I E N	NUMBER AVAILABLE		35		20	55
E	NOT AVAILABLE	14.33.37.	4	3.4.11.18 19,20,21, 23.24.30	10	14
TOTALS			39		30	69

TABLE 3.3 - THE RESEARCH SAMPLE. SHOWING PROCUREMENT METHOD AND PROJECT CHARACTERISTICS

PRO IECT		PROCUREMENT METHOD							
CHARACTERISTICS		MANAGEMENT CONTRACTS CASE NO.	SUB- TOTL	TRADITION CONTRACTS CASE NO.	SUB- TOTL	T O T L			
BUILDING	COMMERCIAL	126	26	18 2529	13	39			
IYPE	INDUSTRIAL	2739	13	724	17	30			
TOTALS			39		30	69			

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	LESS THAN 3000 SQM	6,23,38,39	4	3,5,12,14, 15,16,17, 20,27	9	13
GROSS FLOOR AREA	3000 TO 10000 SQM	1,2,3,7,8, 10.12,13,15 16,17,19,21, 27.29,30,31, 32,34,36,37	22	1,6,10,11, 18.19,21, 23,24,30	10	32
	MORE THAN 10000 SQM	4,5,9,11,18, 22,24,25,26, 28,33,35	12	2,4,7,8,9, 13,22,25, 26,28,29	11	23
	NUMBER AVAILABLE		38		30	68
	N/A	14	1	-		1
TOTALS			39		30	69
	LESS THAN £2.0M	6,10,27, 34,36,39	6	11,12,13, 15-21,23 24,27,30	14	20
COST	£2.0M TO £5.0M	7.8,13,15 21,23,31, 32.37,28	10	3,5,6,10, 14,26	6	16
	MORE THAN £5.0M	1-5.9,11,12 14,16-20,22 24-30.33,35	23	1,2,4,7,8 9,22,25, 28,29	10	33
TOTALS			 39		30	 69

	PRO			REMENT METHOD				
PROJECT CHARACTERISTICS (CONTINUE)		MANAGEMENT CONTRACTS CASE NO.	SUB- TOTL	TRADITION CONTRACTS CASE NO.	SUB- TOTL	T O T L		
	LESS THAN 25000 £ / WEEK	10	1	12,15,16, 18,20,23, 27.30	8	9		
B U I D I N G	26,000 TO 50,000	6,8,20,21 27,32,34, 36,39	9	1,3,5,10 11,13,14, 17,19,21, 24,25,26	13	22		
	51,000 TO 75,000	1,7,13,17 23.31,38	7	6,9	2	9		
R A T	76,000 TO 100,000	2,5,12,16 19,24,29, 30,35.37	10	22.25,28	3	13		
E	101.000 TO 125,000	10.15,33	3	2,8	2	5		
(VALU/W)	126,000 TO 150.000	18,28	2	7	1	 3		
	151,000 TO 175,000	NILL	0	NILL	0	0		
	176,000 TO 200.00	3,9,22,25	4	4	1	5		
	MORE THAN 201.000	4,11,14,26	4	NILL	0	4		
TOTALS			39		30	69		

TABLE 3.3 - THE RESEARCH SAMPLE, SHOWING PROCUREMENT METHOD AND
PROJECT CHARACTERISTICS (CONTINUE....)

•

P R O J E C	HIGH	1,2,3,7, 9,10,11, 12,13,14, 15.18,19, 22,24,25, 26.29,37	19	4,6,7,8, 22,25,26, 28	8	27
C O M	MEDIUM	4.6,8,16 17,20,21, 28,30,31. 33,35	12	1.2.5.15 21,24,29	6	18
P L E X I T Y	LOW	5.23,27, 32.34.36	6	3,10,11, 12.13.14. 16,17.18, 19,20,23, 27,30	14	20
	NUMBER AVAILABLE		37		28	65
	N/A	38,39	2		2	4
TOTALS			39		30	 69
TABLE 3.	4 - THE RESEA CONTRACT	RCH SAMPLE, S PROCEDURES	SHOWING	PROCUREMENT	METHOD	AND
		[PROCUREM	IENT METHOD		
CONTRACT PROCEDURE		MANAGEMENT CONTRACTS CASE NO.	SUB- TOTL	TRADITION CONTRACTS CASE NO.	SUB- TOTL	T O T L
OPEN TENI	DER	23.25.27. 28,29,37.38	7	15,9,10 11,13,14, 16,20.22	14	21
SELECTED		118.20.24	21	6.7.8,12 15,21,27	7	28
NEGOTIAT	ION	19.22,24.26 3036	11	17.18.19,23 24,25,28.29 30	9	20
TOTALS			39		30	69

The method for analysing data of the main study can be condensed into the following stages, these are:-

1. Data from the survey was first imputed manually on a data sheet with coded variables. Appendix 8 gives the entire data for the whole sample.

2. Data from the 69 case studies were then analysed and evaluated using statistical techniques with the help of a statistical computing package MINITAB running on an Apricot Xi microcomputer.

3. The management contracting data were then separated from the traditional ones to examine if there is difference in performance scores for various type of clients and projects. The differences are presented in Chapter 5 (conclusions) as an implication to clients.

4. It might be worth to note here that, during this research, it was intended to utilize principal component analysis for the analysis of data available as a statistical package on the SPSS X computer program. This advanced technique in data reduction and interpretation. regrettably, had to be abandons and the technique is recommended as an initiative for future researchers.

Different statistics have been selected and used depending on the type of data to be analysed and the hypothesis that need to be tested. These are:-

3.10.1 Spearman's Rho coefficient

The Spearman's test was chosen for the rank correlation among the client criteria for project performance because the data was originally of an ordinal measure and ranking was not tied for this section. The average of individual ranks of the respondents was taken for the two samples separately and the difference/similarity of the ranking between the two samples were then tested using Spearman's Rho coefficient of rank correlation.

3.10.2 Chi Square and Fisher's Exact Probability Tests

The association between the research variables were tested using the chi-square test because the variables measured comply with the conditions of non parametric statistical test shown by Siegel's chart (1956) (ie. independent variables and nominal), and with Greene's decision chart (1987) (i.e. forming categories to test their significant differences). Both charts are given in Appendix 9 and results of the Chi-square tests are given in Appendix 10.

The use of 'Parametric Tests' like the T and F test were not applied to test the significant difference, although the mean, standard deviation and the number of case studies were calculated for each section in the results chapter. This is so because parametric tests can be best chosen for small sample (N is less than 30) and have a variety of strong conditions underlying their use (Siegel 1956). Amongst all conditions, the observations must be drawn from normally distributed populations and this is extremely difficult to obtain with a large sample study. However, if no other test can be applied, the researcher may assume normality and can calculate significant difference between the means.

3.10.3 Pearson's Correlation Coefficient

In addition to the chi square test. the relationship between the ordinal data were also examined using the Pearson's correlation coefficient (Siegel 1956) and tested using computer based statistical package. Appendix 11 gives the correlation coefficient for the entire matrix of the 69 case studies. The correlation expresses the strength of association and were used to support the chi square test.

3.10.4 Graphs

A number of graphs were produced to observe the spread of the date to be measured and each dot in the graph represents the performance of two variables for each project.

As noted earlier, the conclusion chapter presents a performance score matrix to give an indication of the percentage aggregate scores for the performance measures in the two samples. The matrix row represent 14 various categories of clients and projects and the columns represent the 10 project performance measures (see Appendix 12). Methodology of scoring is as follow:-

1. The 69 case studies is separated into two groups, those costing < $\pounds 5m$ and those > $\pounds 5m$.

2. Calculating the average figure of each group for various performance measures e.g. design time, build time, unit cost etc.

3. The 14 categories were examined for the 10 performance measures and each cell in the matrix has a score. Those with high performance i.e better than the average figure were given a high score (3). Those within $\pm/-5$ % from the average were given (2), and those performed poorly scored low (1).

4. Adding all scores for the columns and rows to give the totals.

5. Extracting a table for both management and traditional contracts which show the maximum possible scores, actual scores, percentage actual scores and percentage aggregate scores like the one presented in the conclusion chapter.

6. Best performance and low performance has then been interpreted.

The nature of this research is cross-sectional study and this has imposed certain limitations upon a number of variables. These are:-

1. Sub-contractors - It was the intention of this research to gather information about the sub-contractors involved in the projects but this could not be dealt with appropriately by this study because data about the use of sub-contractors was not stored efficiently. However, a number of sub-contractors were interviewed throughout this research to evaluate their views, but the analysis had to be abandoned because the sample was small and increasing the number would have extended the time span of the research.

3. Fees - It would have been interesting to show if there is a --- relationship between the contractor's fee and project performance under a management contract. This could not be dealt with in this study because most participants consider the issue of fees as highly confidential.

contracts. It is said on many occasions that MC is at its most useful when speed is of the essence, and where the design is not developed when construction starts (Cottam 1985). Neither of these factors generally apply to civil engineering work, which usually have been in the pipeline for many years before construction starts. Therefore, the study was confined into building projects only.

5. Environmental influences - It was reported earlier in this chapter that the effect of the environment and team relationship may be an important components of the overall assessment of a project by those associated with it. These variables were very difficult to measure in this research and require large scale nation-wide longitudinal study to be conducted.

To conclude, the main limitations of this research were the reluctance of certain companies to give confidential information and the lack of records and uncertainties concerning the dominant variables.

CHAPTER FOUR - RESULTS AND ANALYSIS

This chapter analyse the results of 39 management contracts and 30 traditional contracts and in particular them within the elements of the research model. The central hypothesis is broken down into sub-hypothesis as reported in chapter 3 which in turn divided into null hypothesis (of no relationship) to allow the use of the statistical tests. The main statistics used are the chi-square test and the correlation coefficients . The statistic tables by Murdoch and Barnes (1979) was used in showing the significant level and the null hypothesis was rejected for results having a significance of P = 0.05 and below. Some relationships may show high correlation but were not considered conclusive because , when applying the chi-square test. it suggests that chance could have played a part in the relationship.

1. THE CLIENT

SUB-HYPOTHESIS 1.1 PROCUREMENT METHOD IS A FUNCTION OF CLIENT CHARACTERISTICS AND HIS REQUIREMENTS.

- Null hypothesis 1.1.1 There is no difference in type of funding (ie. public or private) between management and traditional contracts.
- Null hypothesis 1.1.2 Management contracting clients and traditional clients do not differ in their experience. defined by the number of similar projects constructed in the past (see also section 3.8 in chapter 3).

Null hypothesis 1.1.3 There is no difference in the type of client between management and traditional clients ie. bespoke or speculative.

There is no difference in ranking the Null hypothesis 1.1.4 criteria project performance . for defined cost and quality bv time. between and traditional management clients.

The research study did not produce enough evidence to show that the characteristics of management contracting clients differ significantly from those using the traditional approach, except for their criteria to project performance which is discussed in Table 4.1 below (see chi-square test no. 1. 2 & 3 applied to the research sample in Appendix 10). It should be remembered though that there were certain constraints in randomizing the client sample in this research for reasons highlighted in Chapter 3. indicating the need for further investigation with a larger sample.

Nevertheless. the CCMI analysis (1985) confirmed that. in recent years. the characteristics of clients using management contracting covers quite a wide range. In their survey there were 33% public and 67% private clients and they varied from inexperienced (50%) ie. with no past involvement in building, moderate (30%) ie. built 1 or 2 before. and highly experienced

clients (20%) ie. built more than two buildings. Additionally, a list of MC projects, provided by the management contractors interviewed throughout this research, agree with the CCMI findings and showed the following classification of clients:-

- 1. 50% of the clients seeking purpose built premises of which the following can be segmented:-
- a) Department stores = 6%
 b) Bankers/merchant bankers = 7%
- c) Industrial and commercial = 16%
- d) Government client premises = 5%
- e) Other purpose-built clients = 16%
- 2. 10% were public or private clients who commissioned premises for commercial or public use.

3. 18% were property developers.

4. 9% were investment companies.

5. 13% were Council, Borough and Public Health Authority.

Table 4.1 gives specific criteria and their ranking for project performance (taking the average of individual rankings of the respondents) for the two samples. The figures show that there is difference in emphasis in the ranking between management and traditional contracts. The ranking between the two samples were statistically tested using Spearman's Rho. and the correlation was found not to be significant (r = 0.29). This indicates that high ranking in one procurement method does not always correspond to high ranking in the other and vice versa. Therefore, null hypothesis 1.1.4 can be rejected and conclude that the criteria for project performance differ between the two systems.

CR	ITERIA	MANAGEMENT CONTRACTING CLIENTS	TRADITIONAL CONTRACTING CLIENTS
Α.	MINIMIZING PROJECT TIME	2	5
В.	RELIABILITY TO TIME AND COST	1	1
с.	CHEAPEST COST OF BUILDING	5	2
D.	FUNCTION OF BUILDING	8	4
Ε.	QUALITY	7	3
F.	VARIATION	3	7
G.	MANAGEMENT FOR LARGE/COMPLX BUILD	4	8
н.	CONFIDENCE IN THE CONTRACTOR	6	6

TABLE 4.1 - RANKING OF CRITERIA FOR PROJECT PERFORMANCE

It can be seen from Table 4.1 that management and traditional clients both placed a great concern to the reliability of time and cost (see criteria B). The criteria of cheapest cost was given low priority by the management contracting clients. presumably because clients prefer to be given a reliable estimate and for the contractor to be bound by the estimate rather than given a low price and ending up with overrun on cost.

However, management contracting clients placed a higher priority on minimizing time, variation (ie, flexibility to change their requirements during construction) and management (ie, more control for large and complex buildings) as opposed to traditional clients (see A,F&G). This can probably be explained by the fact that those clients who uses a management contract normally respond rapidly according to the industry's market and

economy of the country e.g fast investment. occupation during construction, sectional completion etc. These factors undoubtedly call for greater speed and flexibility of the construction process. The results also correspond with the early view of Mintzberg (1979) who notes the importance for the organizational form to respond quickly to an environment which is becoming dynamic.

On the other hand. traditional clients placed a higher priority on cost and qualitý of building as compared with management clients (see criteria C, D & E). This means that in certain cases the traditional process is favoured because the work accounting for greater part of the cost can then be let in competition. This seems less easy with management contracting, although some views of the industry believe that competition for the work packages is possible. Like George Neate (1985) and Woolf (1985). Under the argument of quality. Hillebrant (1985) stated "clients are aware that by using a management contract the architect may have less time to develop the design because he is under greater pressure from the contractor and sub-contractors. Thus the quality may suffer as a result."

The above results also seem to correspond closely with the management contractor perceptions of the factors which satisfy management contracting clients. Table 4.2 indicates a list of possible criteria and their resulting ranking reported by Naoum and Langford in a paper emanating from the initial research of this thesis (1984). It will be seen that the analyses sought to

distinguish industrial and commercial work to assess if the characteristics of the client (as perceived by the management contractor) altered the desired criteria of success.

TABLE 4.2 -	RANKING OF A SURVEY OF CLIENTS' CRITERIA	(BY MC'S)
INDUSTRIAL CLIENTS	CLIENT CRITERIA ACCORDING TO THE MANAGEMENT CONTRACTORS	COMMERCIAL CLIENTS
1	A. RELIABILITY OF THE ESTIMATED TIME.	1
2	B. RELIABILITY OF THE ORIGINAL PRICE.	2
3	C. THE MINIMIZATION OF THE PRE-BUILD TIME.	7
4	D. MANAGEMENT CONTRACTORS INVOLVEMENT DURING THE DESIGN.	4
5	E. RELIABILITY OF ESTIMATED PRE-BUILD TIME.	3
6	F. FUNCTION OF BUILDING	8
7	G. FLEXIBILITY OF THE MC SYSTEM.	5
8	H. MAINTENANCE COST.	6
9	I. A HIGH DEGREE OF PERSONAL CONTROL OF SPECIAISED WORK.	9
10	J. CHEAPEST COST.	8
11	K. AESTHETIC	10

The survey in Table 4.2 indicates that management contractors believe that both industrial and commercial clients place special emphasis upon the reliability of construction time and the original price. Clients also regard as important the preconstruction time. MC involvement during the design stage, flexibility of the system and the maintenance cost. Management contractors feel that other criteria as activities (I to K) have only a moderate impact upon clients when using MC.

Generally speaking, it appears that the weight each client gives to various priorities varies considerably at the time of construction and thus suitability of management or traditional contracting to meet these priorities will alter accordingly. For instance, the client in case study 30 had to build his factory in a busy area. and had emphasized the need for production while construction is in progress. Therefore he appointed a management contractor. On the other hand, a client who is having a factory built on new site, may in theory, not consider this as a priority.

SUB-HYPOTHESES 1.2 PROJECT PERFORMANCE IS A FUNCTION OF CLIENT CHARACTERISTICS.

Relationship between performance measures and client characteristics are expressed in term of null hypotheses and the correlation coefficients are given in Table 4.3. Definitions and classification of client type, experience and business are as described in chapter 3 (Research design and methodology).

			PERFORM	IANCE ME	ASURE	 S	
CLIENT CHARACTERISTICS	PRECONST TIME	BUILD TIME	TOTAL TIME	SPEED A / W	UNIT COST	TIME OVER	COST OVER
түре	.023	.243	.146	067	.275	. 184	.206
EXPERIENCE	07	02	02	161	07	.098	.126
BUSINESS	06	.072	19	232	16	21	.207
CLIENT			IANCE ME	CASURES	(CONT		
CHARACTERISTICS	CLIENT ON TIME	SATISF.	CLIF ON C	ENT SATI COST	SF.	CLIENT ON QUAI	SATISF LITY
ТҮРЕ	12	8		089		. 245	
EXPERIENCE	.30	a 8		.360		.168	
BUSINESS	ISINESS . 226			246		148	
THE STATISTICAL FISHER AND YATES	TABLES B (1974), S AT P < 0.	Y MURDO HOW THE	CH & BA	ARNES (1 VING LEV	979), VEL OF	TAKEN SIGNIE	I FROM

b - SIGNIFICANT AT P < 0.050

Table 4.3 and the chi square test no. 4 and 5 in Appendix 10 show that experienced clients are more satisfied than others in respect to time and cost, possibly because they (experienced clients) may have a larger organization and tend to employ higher level of in-house professional expertise which lead to better control of time and cost. Moreover, experienced clients may be in a better position to judge project success than those moderately and inexperienced ones. Although Table 4.3 indicates that building time, unit cost and the satisfaction on quality differ between public and private clients, these could not be analysed by the chi-square test because the category of publicly funded projects were very small in number (13) when compared with privately funded ones (56). However. a previous research by Rowlinson (1987) confirmed that public sector contracts are constructed more slowly than those for private sector clients (significant at 0.024 level) and that public sector clients are less satisfied with the quality of the building produced. Also, a research by Sidwell (1982) found that public clients were less satisfied on cost performance and their projects were more likely to overrun the budget than projects for privately funded clients.

The difference in building time performance between privately and publicly funded projects support the early analysis of 170 projects into management contracting. collected throughout the pilot study (see Table 4.4). 55% of the public premises were constructed longer than the average compared with only 19% private buildings when using a management contract. Average construction time. longer and shorter than the average are measured as described in chapter 3.

TABLE -	- 4.4	CLIENT	TYPE	AND	CONST	TRUCT	ION TIM	E UND	ER A	MC.	
CLIENT CONSTRUCTION TYPE % OF PROJ						TION ROJEC	TIME TS				
					I	LONGE	R AVE	RAGE	SH	ORTER	
PRIVATE	SEC1	ror				19		55		26	
PUBLIC	SECT	 FOR				55		32		13	
HIGHLY	SIGNI	FICANT	@ 0.0	001 I	LEVEL	(СНІ	SQUARE	TEST	NO.	 6)	

The Wood Report (1975) also stated that the traditional approach did not always obtained value for money when time and cost are considered together but time is often insufficiently weighted in decisions of many public-sector clients.

On the other hand, the private sector is often more concerned with construction time, particularly for industrial buildings, and may place more emphasis on certainty of cost than on lowest cost (Hillebrandt 1984). Thus he imposes more pressure on the contractor and on the professionals to ensure getting the building built within his estimated period.

2. THE DESIGNER CHARACTERISTICS

- SUB-HYPOTHESIS 2.1 PROCUREMENT METHOD IS A FUNCTION OF PROFESSIONAL CHARACTERISTICS OF THE DESIGN ORGANIZATION.
- Null hypothesis 2.1.1 The organization that design a management contract project and those design a traditional projects do not differ in their experience, as defined previously.
- Null hypothesis 2.1.2 The degree of in-house expertise input. as measured in section 3.8. do not differ between management contracts and traditionally organized contracts.

Chi-square test no. 7 & 8 in Appendix 10 and the correlation coefficient supports null hypothesis 2.1.1 and 2.1.2 concluding

that there is no difference in the characteristics of the professionals and both procurement methods. Similarly to the client characteristics, this suggests a more comprehensive survey with a larger sample needs to be conducted to tackling this area separately.

SUB-HYPOTHESIS 2.2 PROJECT PERFORMANCE IS A FUNCTION OF PROFESSIONAL CHARACTERISTICS OF THE DESIGN ORGANIZATION.

Performance measures and the design characteristics studied are expressed in terms of null hypothesis and Table 4.5 gives the correlation coefficients.

DESIGNER	PER	FORMANCE MEASURES	
CHARACTERISTICS	PRECONST BUILD TIME TIME	TOTAL SPEED UN TIME A / W CO	IT TIME COST ST OVER OVER
EXPERIENCE	с 306.118	.241 .021 .1	b b 09345348
SOURCE IE. DESIGNED BY	00509 CLIENT'S IN HOUSE	020 .571 .1 TEAM OR BY AN OU	59 .288 .243 TSIDE DESIGNER.
DESIGNER	PERFORMANCE	MEASURES (CONTIN	UE)
CHARACTERISTICS	CLIENT SATISF. ON TIME	CLIENT SATISF. ON COST	CLIENT SATISF ON QUALITY
EXPERIENCE	b .331	. 273	b .357
SOURCE (DITTO)	a . 455	. 197	.198
a - SIGNIFICANT c - SIGNIFICANT	AT P < .01 AT P < .05	b - SIGNIFICA	NT AT P < .025

 TABLE 4.5 - CORRELATION BETWEEN PROJECT PERFORMANCE AND DESIGNERS

The survey results showed that higher degree of designers experience resulted in corresponding higher performance in a number of performance measures. Pre-construction time, the higher certainty and higher degree of client satisfaction on time and quality were all found to be significant in relation to the designer experience (see also chi-square test no. 9.10.11.12 and 13 respectively). The survey results also shows that higher degree of in-house expertise input resulted in higher performance with respect to speed (chi-square test 14). The significant relationship between designers and project performance could possibly be explained by the following:-

a) A resourceful and knowledgable professional team will ensure that client's requirement brief is thorough. properly implemented and monitored.

b) Highly experienced professionals can keep the client constantly informed of the well-being and progress of his project; such that any deviation or problem can be dealt with quickly and effectively to achieve higher level of client satisfaction and a smooth going project.

3. THE PROJECT CHARACTERISTICS

SUB-HYPOTHESIS 3.1 PROCUREMENT METHOD IS A FUNCTION OF PROJECT CHARACTERISTICS.

Variables of project characteristics and both procurement methods were examined in terms of null hypothesis (of no difference) and results of the chi-square suggest that there is an association between size (in terms of cost only) and complexity for management and traditional projects. Management contracts are used on higher cost (chi-square 15). and projects with higher complexity and building rate dichotomised at \$50,000 per week (chi-square 16 & 17). The analysis did not produce enough evidence to support the view that the gross floor area differs significantly between procurement methods.

SUB-HYPOTHESIS 3.2 PROJECT PERFORMANCE IS A FUNCTION OF PROJECT CHARACTERISTICS.

The correlation coefficients between performance measures and project characteristics are given in Table 4.6.

	PERFORMANCE MEASURES						
CHARACTERISTICS							
	PRECONST TIME	BUILD TIME	TOTAL TIME	SPEED A / W	UNIT COST	TIME OVER	COST OVER
	d	с	с		C		
BUILDING TYPE	252	434	408	178	360	.186	.082
NEW BUILD V OTHER	026	133	146	137	030	.353	.249
COMPLEXITY	.104	.305	.114	184	. 448	.077	.123
BUILDING RATE	. 184 b	. 505 b	.381 a	а . 728 а	.380	.129	.081
GROSS FLOOR AREA	.612	.679	.744	.848	.069	.103	.161
BUILDING COST	с .431 	a .825	b .699	a .631	d . 287	.03	.229

 TABLE
 4.6
 - CORRELATION COEFFICIENT BETWEEN PROJECT PERFORMANCE

 AND
 PROJECT CHARACTERISTICS

PROJECT	PERFORMANCE MEASURE (CONTINUE)							
CHARACTERISTICS	CLIENT SATISF. ON TIME	CLIENT SATISF. ON COST	CLIENT SATISF QUALITY					
BUILDING TYPE	. 074	244	. 158					
NEW BUILD V OTHER	.260	.041	.223					
COMPLEXITY	. 123	179	.060					
BUILDING RATE	194	.145	.046					
GROSS FLOOR AREA	054	.078	026					
BUILDING COST	123	. 133	004					
a - SIGNIFICANT AT c - SIGNIFICANT AT	Γ P < .0.01 Γ P < .025	b - SIGNIFICA d - SIGNIFICA	ANT AT P < .010 ANT AT P < .050					

Table 4.6 shows that significant correlation exists between building type, project size in terms of G.F.A and cost. and preconstruction time. build time. total time and speed of construction. Commercial buildings and Projects that have larger area and higher cost. took longer time to build and produced higher rate of work on site, measured in SQM of gross floor area / WEEK.

Surprisingly. build time and unit cost were the only significant figures found in relation with project complexity (see chi-square 18 and 19) indicating that increasing complexity does not necessarily result in low project performance and in particular to overruns and the level of client satisfaction. Similar results were found with relationship between building rate and performance measures.

The results that overruns and client satisfaction were not correlated with other project characteristics may suggest that the project can be successful and the client can be satisfied irrespective to project characteristics provided the proper procurement method was selected to the project.

4. CONTRACT PROCEDURE

- SUB-HYPOTHESIS 4.1 PROCUREMENT METHOD IS A FUNCTION OF CONTRACT PROCEDURE.
- Null hypothesis 4.1.1 The process for selecting a management contractor do not differ from selecting a traditional main contractor.

The two main variables of contract procedure were selecting the contractor either by competition or by negotiated tendering process. Results of chi-square no.10 did not show difference in procedure between procurement methods, but when competitive tendering were further separated into open and selected procedure. a management contractor tend to be appointed more by a selected tender competition and the traditional main contractor was more selected by open tendering. This states the obvious since the number of contractors offering a MC service are limited in number and hence, an open tender is most unlikely under a MC.

SUB-HYPOTHESIS 4.2 PROJECT PERFORMANCE IS A FUNCTION OF CONTRACT. PROCEDURE.

Table 4. 7 give results of correlation between performance measures and procedure adopted.

PERFORMANCE MEASURES PROCEDURE ADOPTED PRECONST BUILD TOTAL SPEED UNIT TIME COST TIME TIME TIME A /W COST OVER OVER а COMPETITION -.369 -.116 -.258 .059 -.246 -.116 -.298 & NEGOTIATION _____ PERFORMANCE MEASURE (CONTINUE) PROCEDURE _____ CLIENT SATIS. CLIENT SATISF. CLIENT SATISF. ADOPTED ON COST ON TIME ON QUALITY b COMPET. & NEGOT. -.294 -.335 -.037 a - SIGNIFICANT AT P < .025 b - SIGNIFICANT AT P < .050

TABLE 4.7 - PROJECT PERFORMANCE AND CONTRACT PROCEDURE

Table 4.7 show that a number of correlations exist between contract procedure and project performance, but when the chisquare test was applied. pre-construction time and client satisfaction on cost were the only variables found to be significant. Nevertheless, there are two other interesting results, though not statistically proven, observed from the case studies, these are:-

1. Good cost performance was achieved when projects followed a path of selective competition and using the firm price tender with full bill of quantities e.g., traditional case study no. 24,26,28 and 29.

2. It was also observed in traditional case study no 2 (highly successful on cost and on time) that the plan of work and construction contract were based on the American Institute of

Architect's (AIA) standard procedures. The AIA form is that the contractor is in possession of all the consultants' information and shop drawings at the tender stage. In this case firm price tender obtained from selected tenderers was the procedure adopted and the tender based on bill measured in accordance with the international principles of measurement.

5. PROCUREMENT METHOD AND PROJECT PERFORMANCE

SUB-HYPOTHESIS 5.1 PROJECT PERFORMANCE IS A FUNCTION OF PROCUREMENT METHOD ADOPTED.

Within sub-hypothesis 5.1 relating performance measures and both procurement methods, there are 10 null hypothesis linking the variables together, all of which are examined in full details.

1. PRE-CONSTRUCTION TIME

Null hypothesis 5.1.1 There is no difference in preconstruction time between management and traditional contracts.

The mean pre-construction time for both systems is illustrated in Table 4.8 and shows that management contracts had less preconstruction periods than traditional ones. To test the significance difference. the pre-construction time for the 69 csse studies was examined and Table 4.9 show that 79% of the management contracts had short pre-construction time compared
with 38% for traditional contracts. Long, average and short times were measured as described in section 3.6 in Chapter 3. About 50% of the traditional case studies projects needed one year of detailed design and for 70% of management contracts the projects had pre-construction period of less than six months. The Chi Square test and correlation coefficient show that the difference in pre-construction time performance was statistically significant (see Chi Square Test No.21 in Appendix 10). We therefore, can reject null hypothesis 5.1.1 and conclude that management projects are remarkably quicker during the preconstruction stage than traditional projects.

TABLE 4.8 - PROCUREMENT AND MEAN PRE-CONSTRUCTION TIME (WEEKS)

CONTRACT VALUE	M. C	ANAGEMEN ONTRACTS	 IT 5	TRADITIONAL CONTRACTS			
	X	SD.	N	X	SD.	N	
LESS THAN £2.0M	11	4.3	5	18	8.0	7	
£2.0 - £5.0M	14	6.9	9	55	29.6	5	
OVER £5.0M	25	18.8	19	66	31.3	8	

TABLE 4.9 - PROCUREMENT METHOD AND PERCENTAGE OF PROJECTS SHORTER, LONGER OR WITHIN AVERAGE PRE-CONSTRUCTION TIME, MEASURED AS DESCRIBED IN CHAPTER 3 SECTION 3.6

PRE-CONSTRUCTION TIME	MANAGEMENT CONTRAC (% OF NUMBE	TS TRADITIONAL CONTRACTS R OF PROJECTS)
LONG	9	33
AVERAGE	12	29
SHORT	79	38
TOTALS	100	100
SIGNIFICANT @ 0.02	LEVEL (CHI SQUARE T (CORRELATION	EST NO. $21 - APPENDIX 10$) COEFFICIENT =405)

The graph in Figure 4.1 show another interesting feature in that within the management contracting sample, seven projects are of a considerably higher cost than any of the comparable traditional projects, yet these projects had still pre-construction time shorter than half of traditional projects contained within the range of \$10 million (case study 4, 10, 11, 20, 24, 28 and 35). This could be because of the greater complexities of the design and procedures involved in the traditional contracts, to get the building designed according to a particular quality standard.

The nature of the project had a substantial bearing on the systems used for each client. In the traditional contracts, it is more likely for the design characteristics to be more important than for management contracting projects (as noted by the ranking criteria in Table 4.1). In this case the larger the traditional project is, the more important for the client to have a wider choice of designers, whether architects or engineers, and sometimes need to resort to design competition. On the other hand, a management contracting project has, presumably, a greater complexity in the construction process and the contractor's contribution to the design is greater to obtaining flexibility and early start on site than obtaining a sophisticated design.

This finding regarding early start of construction with management contracting stresses the views of the clients that were discussed in Chapter 2 and indeed with the findings of previous surveys. The pre-construction time has been investigated on a number of occasions, notably in the Sidwell paper (1983) and



the Faster Building For Industry (1984). Sidwell studied the nature of the building process and found that a management contract saved nine months when compared with a similar traditional contract because of separation of the management element and phased design.

In the Faster Building For Industry report. the overall process time was examined. one in ten of the case studies projects work started on site within 5 months of the decision to build and for the separate stages the faster 10% of times were less than 2 months.

To ascertain whether pre-construction time can affect or could had been influenced by other variables, the relationship between both procurement methods and other key variables were investigated and the significant ones are filtered in Table 4.10 Key variables are such as building type, client's experience and project success. The investigation showed that pre-construction time is highly correlated with similar variables to both for the unit cost. This could be because systems, except management contracting clients may find the risk of having an expensive building is a sufficient trade-off to complete the project earlier. On the other hand traditional clients are more concerned to obtain a cheap building and have less opportunity to reduce the pre-construction time.

TABLE 4.10 - SIGNIFICANT CORRELATION BETWEEN PRE-CONSTRUCTION TIME AND OTHER KEY VARIABLES

				_		
PROCUREMENT	PRECONST	BUILD	TOTAL	BUILD	PROCE	COST/
METHOD	TYPE	TIME	TIME	COST	-DURE	SQM
MANAGEMENT	b	а	a	a	b	с
CONTRACTING	421	.786	.853	. 640	.443	371
TRADITIONAL	b	a	a	a	d	. 133
CONTRACTING	473	.676	,943	, 804	. 395	
THE STATISTIC TAI	BLE BY MURI	DOCH AN	D BARNES	(1979)	SHOWED:-	
a - SIGNIFICANT A	AT P < .001	L	b - SIGN	IFICANT	AT P <	.01
c - SIGNIFICANT A	AT P < .020)	d - SIGN		AT P <	.05

2. CONSTRUCTION TIME

Null hypothesis 5.1.2 There is no difference in construction time between management and traditional contracts.

Construction time was calculated as the number of weeks from starting on site to practical completion of the project. Unsurprisingly, Figure 4.2 show that construction time for both management and traditional contracts are scattered because construction time depends on other parameters, such as, building type, size, complexity etc. However, Table 4.11 categorically show a detailed breakdown for the mean construction time of three contract values.

The association is tested in Table 4.12 and the results was found just significant at a conventional level P=0.05 (See Chi-square no.22 in Appendix 10). Therefore it can be concluded that this

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research produced a slight evidence that the construction duration is shorter under a management contract than it is under the traditional ones.

TABLE 4.11 - PROCUREMENT	METHOD	AND M	IEAN	CONSTRU	CTION	TIME (WEEKS)
CONTRACT VALUE	MANAGEMENT TRADITIONAL CONTRACTS CONTRACTS						
	X	SD.	N	X	SD.	N	
LESS THAN £2.0M	41	12.5	6	44	11	14	
£2.0M - £5.0M	52	14.8	10	63	29.6	5	
£5.0M - £20.0M	88 2	20.0	13	101	37.3	9	
NOTE: FIVE PROJECTS WE ISOLATED FROM THE	RE EXT ANALYS	TREMEL IS	Y LA	RGE SO 1	ГНЕҮ	HAD I	O BE

TABLE 4.12 - PROCUREMENT METHOD AND PERCENTAGE OF PROJECTS SHORTER. WITHIN AVERAGE CONSTUCTION TIME. LONGER. OR MEASURED AS DESCRIBED IN CHAPTER 3 SECTION 3.6.2 (A) MANAGEMENT CONTRACTS PERFORMANCE TRADITIONAL CONTRACTS (% OF NUMBER OF PROJECTS) SHORT TIME 37 14 AVERAGE 11 54 LONG TIME 32 16TOTALS 100 100 JUST SIGNIFICANT @ 0.05 LEVEL (CHI SQUARE 22 IN APPENDIX 10)

To a certain extent, the above results support the views of the clients and sub-contractors who participated in this research. They claimed that a management contract does not always result in shorter construction time. it depends on the type of construction and the level of control the client wishes to exercise in a given project. The reason for shorter construction time could be attributed to the following:-

1. Under a management contract the building may get the benefit of achieving a higher level of standarization due to the involvement of the contractors at the design stage and can be more effective for larger project.

2. Difference in construction time can be due to the nature of the project i.e the cases are not all strictly comparable, some of them being manufacturing and warehousing facilities while others are office and commercial developments (See also Table 4. correlating project characteristics and build time).

Under the variable construction time, an interesting results was also found significant when analysing the 170 management contracts collected throughout the pilot study. Table 4.13 show that under a management contract. a greater proportion of projects representing refurbishment projects were built shorter compared to new type of construction for similar cost distribution.

TABLE 4.13	CONSTRUCTION	TYPE	AND	CONSTRU	JCTION	TIME	UNDER	Α	MC.
CONSTRUCTION TYPE		CONSTRUCTION TIME % OF PROJECTS							
			L	ONGER	AVERA	AGE	SHOR	TEF	2
NEW CONSTRUC	TION			27	56		16		
OTHER THAN N	 EW			12	35		53		

SIGNIFICANT AT 0.01 LEVEL (CHI-SQUARE TEST NO. 23)

The good performance of management contracting for refurbish jobs was also supported by the management contractors interviewed in that the system can be used for projects that cannot be readily handled within the orbit of the measured work concept.

A refurbish job, as described by the management contractors. consist of a number of work packages need to be re-build or added to an existing building and normally these packages are not properly described. Consequently the work to be carried out by the sub-contractors will not be properly described either. If one examines the characteristics of a management contract which tackles the job by sub-contracting all the work and allow flexibility to design during construction, each element of the refurbish work can be efficiently designed to the client's need concurrent with construction. This benefit can be more utilized when the refurbish job is large and complex because it consist of a higher number of packages that need to be co-ordinated and properly controlled.

In an interview with the client of case study no. 6. the in erviewee stated that, "with the amount of changes our organization made for the last 20m refurbish job it would have been a disaster if we had used the traditional form of contract instead of management contracting'.

In contrast. the client of case study no.2 (a national and international banker). undertake mainly refurbishment work of existing premises costing between £0.1 million and £1.2 million.

The organization did not find management contracting as the best method for the majority of their work mainly because their views that management contracting is definitely not suitable for small refurbishment jobs. In their case. the premises must be occupied while construction is in progress. Therefore, with little packages the job would be too 'messy' ie. a great deal of interaction between the sub-contractors.

3. OVERALL PROJECT TIME

Null hypothesis 5.1.3 There is no difference in total time between management and traditional projects.

Total time is the number of weeks from start of design to completion of the project (see Figure 4.3). The mean total time are shown in Table 4.14 and Table 4.15 gives the percentage of projects in the three performance levels. The results are similar to pre-construction time, in that traditional projects took longer total time than the management contracting ones. This may suggest that the difference between the overall project time of both systems is marked on the design time more than the build time. When the Chi-Square test was applied the difference in total time performance was found highly significant and the Null hypothesis can be rejected concluding that management contracts led to shorter overall project time than traditional ones (see Chi Square no.24 in Appendix 10).



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TABLE 4.14 -	PROCUREMENT	METHOD	AND M	EAN TOTAL	PROJEC	T TIME	(WEEKS)
CONTRACT VALUE		MANAGE	MENT CTS		TRADI CONTR	TJONAL ACTS	
		X SI	D. N		X	SD. N	
LESS THAN £2.	. OM 7	/3 38	.26		75 23	3.5 1	4
£2.0 £5.0M		30 9	.67		57 59	9.6	5
OVER £5.0M	10	07 23	.4 13		163 54	 4.0	9
PERFORMANCE	LONGER OR DESCRIBED I MANA	WITHIN N CHAPT	AVERA FER 3 CONT	GE TOTAL T SECTION 3 	TIME, N 6 ADITIO	MEASURE	D AS
			(% ()	F NUMBER (DF PROJI	ECTS)	
SHORT TIME			22			10	
AVERAGE		(33			50	
LONG TIME			15			40	
SIGNIFICANT @	0.025 LEVEL	(CHI S	SQUARE	24 IN APH	PENDIX	10)	

The causes, apart from the size of the project and complexities of the procedures to be adopted, for long pre-construction time can be attributed to the following:-

1. There are factors outside the influence of the team like statutory approvals, grants, and to some extent finance and land purchase.

2. The client's expectations determine of how long preconstruction will take and consequently the time he allows and prepared to accept. If the actual period corresponds with that planned, then that at least gives him certainty. On the other

hand there are cases where uncertainty plays a major role for long pre-construction time. for example as to whether planning permission or government assistance will be obtained, whether finance will be available and at what price. The greater these uncertainties the more likelihood that the client may postpone commencing other activities which lead to longer pre-construction time.

3. There will be long pre-construction time because of inadequate performance by some members of the building team including the client, for example, delay in finalizing the brief, in acquiring the site or unacceptable sketch designs. The study by CIRIA (1983) found that there were many instances of unduly long tender adjudication periods or schemes being shelved after tendering or re-tendering. These have caused a delay in starting on site.

However the above explanations are typical and does not mean that when a client is in a hurry for a project he cannot obtain his building quickly. He can do this, as the case in a management contract. by undertaking many of the activities simultaneously. A management contract utilises the technique of fast tracking. This technique allow the design and construction to run concurrently to facilitate an earlier start to construction. The technique of fast tracking may however have a detrimental effect on the finished product in terms of inadequate design and pre-planning. Null hypothesis 4.1.10 will discuss this point in further details.

The results in null hypothesis 5.1.2 into construction time take into account only the cost of the project and did not consider size in terms of gross floor area. Appendix 10 contain details of' the size of each project in square metres and the speed of construction in square metre/week. A matrix of speed / unit cost was constructed as shown in Table 4.16.

4. SPEED OF CONSTRUCTION

Null hypothesis 5.1.4 There is no difference in rate of work on site between management and traditional projects, defined by gross floor area constructed in SQM/WEEK.

TABLE 4.16 PROJECT PERFORMANCE - COST AND SPEED

		SP	EED (AREA/WEEK)	
		нісн	MEDIUM	LOW
0007	LOW	MC13.14,22,26,27 MC28.33.34.36 TR 2.4,8.13,22. TR 30	MC24,31,32,35 TR 9.10.12.17. TR 18,19.21,23 TR 25.26,28	MC10 TR 1,11.20 TR 29
PER SQUARE	MEDIUM	MC4.5.9	MC1.7.8.11.15. MC19,39 - T24	MC21 T15
	нісн	MC37	MC2,3,12,15.17 MC17.18.23,25. MC30 TR 6.7	MC6,20,29, MC38, TR 3,5,14, TR 16,27

KEY ---COST ----A - FOR LESS THAN £2M

SPEED

IOM = I	ESS THAN	£500 P	PER SQM	LO₩ =	LESS	THAN	50 S	QM/WEEK
MED = £	500 - 650	PER S	QM	MED =	50 -	100 S	QM/W	IEEK
HIGH= M	ORE THAN	£650 P	PER SQM	HIGH=	MORE	THAN	110	SQM/WEEK

B - FOR £2M - £5M

LOW =	LESS	THAN	£650	PER	SQM	LOW	F	LESS	THAN	60	SQM/WEEK
MED =	£650	- 850	PER	SQM		MED	=	60 -	130 5	SQM/	WEEK
HIGH=	MORE	THAN	£850	PER	SQM	HIGH	=	MORE	THAN	130	SQM/WEEK

Results from Table 4.16 show higher proportion of management contracts buildings (84%) were constructed faster or with medium speed during construction compared with those of traditional contracts (66%) (see the graph in Figure 4.4). The difference in speed performance was statistically tested and the result was significant at 0.05 level only (see Chi Square Test NO. 25).

Those projects which were faster than the average were then analysed to identify any common factors leading to this situation. The following could be observed :-



A. Faster construction was achieved when the client made a substantial investment appointing a project manager / controller acting on his behalf on site (MC9,23, 24,39, T13,21 and26).

B. Fast construction techniques developed from the management contractor's input were valuable in saving time. For example, MC26 cost £10.0 million and took 50 weeks to build used a steel frame superstructure technique. A sizeable overlaps between design and construction were achieved and all 765 tons of steel were erected in only eight weeks.

Other factors may also contribute to speedy projects. namely:

1. the knowledge and experience of the client together with his ability to make decisions quickly (Nahapiet 1985):

2. under the traditional arrangement the architect is given enough time to prepare a detailed brief which lead to faster project, by contrast, under management contracting the architect establish flexible arrangements permitting quick responses to changes;

3. the good working relationships between the main parties to the contract:

4. the simplification and standarisation of construction features.

Null hypothesis 5.1.5 There is no difference in unit cost between management and traditional projects. defined by building cost over sqm of gross floor area.

The spread of cost performance across the cases is relatively wide, and a large proportion of the varience can be explained by . major differences in the nature of the buildings and the level of quality standard that has been specified by the client at the outset of the project.

Table 4.17 gives the mean unit cost of the 69 case studies for management and traditional contracts, segmented into three size projects. The analysis reveal that the mean cost of traditional contracts is lower than of management contracts, but this difference seem to be marginally marked on small size projects rather than medium and large ones. When analysing the data further, it was apparent that 70% of the small traditional contract cases were industrial buildings which , presumably, would have less quality finishing than commercial ones.

The association was statistically tested and it was found that the difference in unit cost between management and traditional contracts was significant at 0.05 when dischotomised at (L&M) VS High unit cost (see Chi-Square Test No.26 in Appendix 10).

TABLE - 4.17 PROCUREMENT MET	THOD AND	AVERA	GE UNIT	r cost		
CONTRACT VALUE	MAI COI	NAGEMEN	VT S	TRAI CONT	DITION TRACTS	AL
	X	SD	N	X	SD	N
LESS THAN £2M	498	381	6	380	196	15
£2M - £5M	616	356	10	520	220	5
OVER £5M	784	379	14	650	286	9

scattered diagram in Figure 4.5 show the potentially The interesting feature. that in the management contracting sample. large buildings have relatively cheaper cost/sqm than smaller buildings. This could be because management contracting can achieve economies of scale and benefits from the repetition inherent in large buildings. However, this observation is too crude to allow conclusion to be drawn. but the possibility of economies of scale in construction could be examined in any subsequent study.

Of the reasons offered by the clients as to why management contracting could be more expensive than а competitive traditional tendering contract. the most plausible ones were:-

There is a tendency for greater involvement of the 1. professional consultants. "The architect and the Q.S. get involved more than they should in some work which is the management contractor's job". This overlapping responsibility can reflect in higher fees being paid and can be very noticable on smaller projects.



2. Most of the staff members have long been involved with the traditional system and their roles are frequently transposed when management contracting is adopted.

3. In an interview with a banker client (case study no.2) the organization conducted an internal cost analysis which found. that under a management contract the client pays more than the traditional system partly because of a large competitive tendering situation at the outset of the project and partly because of higher costs of preliminaries and paper work. Once again this extra cost can be more influential on small jobs and proportionally less on larger projects.

In addition to the above explanation. it must be stressed however, that this could be very much attributed to the fact that the management case studies had larger costs compared to the area constructed, were more complex and had higher building rate than traditional contracts (see analysis of sub hypothesis 3.1 and management contracting case studies 3,6,12,20,21,29,30,37and 38 in Appendix 7).

Another study by the DHSS has been conducted to compare the performance of management and traditional contracts based on three projects. The study team has concluded that:

"there is no type of expenditure which exists in the management contracting arrangement which does not exist conventionally. Those types of expenditure which are likely to be larger in management contracting are outweighed by the reduction in cost

and risk which can be achieved if the management contractor performs well".

Although the two management contracts of the DHSS produced higher final cost, the study team did not conclude that this is attributable to the use of management contracts.

The DHSS study has enabled the factors to be isolated which are likely to increase or decrease costs and enable specific answers to be worked out when applying a future project. The cost outcome on any particular project depend upon the particular incidences of these factors and upon the particular client's view of the risk/cost trade-off. The factors isolated include:-

1. A likelihood that there will be more man-hours applied to site management using a management contract than a conventional. In practice there is no intrinsic reason why this should occur with respect to work that is normally subcontracted by conventional main contractors.

2. The studied projects gave no evidence of significant dullication of management as a direct result of the use of a management contract. Significantly more management time expended by both management contractor and sub-contractors than was usual, but was mainly attributable to the efforts made to recover construction programme delay. It is the study team's view that the additional management effort which may be expended because of the use of a management contract is unlikely to be harmful to the client's interest.

6. TIME OVERRUN

Null hypothesis 5.1.6 There is no difference in the level of percentage time overrun between management and traditional contracts. defined by the ratio between the actual building time and that estimated at the outset of the project.

7. COST OVERRUN

Null hypothesis 5.1.7 There is no difference in the level of percentage cost overrun between management and traditional contracts. defined by the ratio between the actual final cost and that budgeted at the outset of the project.

The distribution of the data for percentage time and cost overrun can be seen from the graph in Figures 4.6 and 4.7 which indicates more likelihood for traditional contracts to overrun on time and on cost than management contracts (see also Tables 4.19 and 4.20). Table 4.18 show that projects procured based on traditional contract registered an average time overrun of a mere 8% compared to an average of 5% using management contracting.





However, the association for time overrun was tested and it was found that the difference was significant at a conventional level P=0.05 (see Chi-Square Test No.27). Categories for Higher overruns and within time or cost are as described in chapter 3 section 3.6.

Similarly, management contracts outperformed the traditional method in respect of cost overrun and the difference was highly significant (Chi Square Test No. 28). The former averaged a cost overrun of only 3% compared to 7% recorded by traditional method. Therefore, it could be concluded that management contracts are more reliable on time and on cost than traditional contracts.

TABLE 4.18 - TIME AND COST OVERRUNS

	MANAGEMEN'I CONTRACI'S	TRADITIONAL CONTRACTS
TIME OVERRUN	5%	8%
COST OVERRUN	3%	7%

TABLE 4.19 - PROCUREMENT METHOD AND TIME OVERRUN

		· · · ·
TIME	ô,	%
	MANAGEMENT	TRADITIONAL
OVERRUN	CONTRACTS	CONTRACTS
	13	38
WITHIN	77	55
UNDERRUN	10	7
SIGNIFICANT @ 0.05 LEVEL (CH	I -SQUARE TEST N	10.27)

TABLE - 4.20 PF	ROCUREMENT METHOD	AND COST OV	VERRUN	
COST OVERRUN	MAN CON	% NAGEMENT NTRACTS	% TRADITIONAL CONTRACTS	· · · · · · · · · · · · · · · · · · ·
HIGH		10	47	
WITHIN		77	43	
UNDERRUN		13	10	
SIGNIFICANT @ ().001 LEVEL (CHI-S	SQUARE TEST	NO.28 IN APPE	NDIX 10)

The above results seem to reinforce the view that phasing the construction work into packages is a valid approach and provide flexible and useful indication of successful project performance.

However, it can be argued on the other hand whether the estimated time and cost were the right ones at the outset of the project. Under this argument, Sidwell (1984) contends that "clients are often puzzled by the various terms used within the industry, there are cost plans. tenders, final accounts and fees. Essentially the client is interested in the early prediction of the total amount he will have to pay and the variance between this figure and the final sum.... For example one reason for the success of package deals is that they are more positive about the final cost to the client.... There is no guarantee that it (the predicted cost) was the right one."

Nevertheless. there are a number of reasons for the overruns on time and on cost, namely:-

1. The client may alter his mind and introduce variations. These, if not substantial. will undoubtably affect performance. One problem is that it is very difficult for the client to find out in advance what the effect of a variation will be. Some experienced clients make substantial allowances in their budgets for cost overruns. Others apply a system where changes can be manipulated without exceeding the budget.

2. There is little incentive under the traditional system for the contractor to deal with the causes of time and cost overruns or to compensate for their effects by, for example, better liaison with the architect's office on provision of drawings and catching up on lost time. At the present time, from the moment a contract is signed the contractor keeps careful record of the evidence on which he is to base his claim for increased cost.

A study on construction times for industrial building by the BRE (1984) comprises a very valuable piece of research. An important conclusion is that:-

"It is not the form of contract which primarily determines whether targets are met but the attitude of the parties to which the form of contract may contribute. The standard form of contract offers penalties for delays but not incentives for speed. Industry and customers should look for ways of sharing the benefits from improved performance".

3. The better performance of management contracting over the traditional method could be attributed to the following features in the management contracting itself, such as:-

a. A management contract provide a higher integration of the various disciplines in the construction industry. By breaking down the 'us and them' syndrome (Turner 1986). the professionals and the management contractors are able to pool together their once fragmented expertise for the overall benefit of the project. Thus for once the participants in the construction industry can work together as a team rather than being excessively concern with their own individual roles. vice a versa other participants (EDC 1978).

Undoubtedly, greater integration will give rise to better communication among the team members which leads to greater co-ordination and managerial control of the construction process.

b. under a management contract there is one professional body that is responsible for managing the building process and he is fully and solely work for the client's interest. His commercial awareness of this will compel him to ensure that every management effort is directed towards achieving the performance criteria as laid out in the contract. especially with regards to time and cost overrun.

3. Finally, there may be something that is within the field of the contractor to organize better or anticipate, such factors were mentioned by Hillebrandt (1984) like bad industrial relations and

plain bad management. It may be bad luck, for example. the weather, or a strike in some other industry and the like.

SUBJECTIVE ASSESSMENT TO PROJECT PERFORMANCE

At the end of each case study questionnaire the respondents were asked to express the level of client satisfaction concerning time. cost and quality on a three point scale. The respondents assessed the time performance on three matters regarding preconstruction time. speed and time overrun. Cost performance cover the unit cost, cost control and overruns. The quality scale includes the function of building, quality of the construction operations and the finishes.

8. CLIENT SATISFACTION ON TIME

Null hypothesis 5.1.8 There is no difference in the level of satisfaction with time between management and traditional clients

Table 4.21 gives the client satisfaction to overall time in three levels for management and traditional contracts samples. The chi square test, based on the number of clients that are highly satisfied against moderately and dissatisfied clients, show that management clients are greater in the highly satisfaction cell at a significant level P=.025. Further analysis of the data suggests that the differences amounted to commercial buildings more than industrial ones. This is so, perhaps, because industrial buildings in the sample were relatively smaller and less complex. In this case the project is a straightforward one and the traditional method can control project time within a stipulated overall time and fast enough for the client to be satisfied.

TABLE 4.21 -	PROCUREMENT	METHOD AND CL	IENT SATIS	FACTION ON TIME	_		
EVEL OF ATISFACTION		% MANAGEMENT CLIENTS		% TRADITIONAL CLIENTS			
HIGH		79		52	-		
MODERATE		13		28	-		
IOW		8		20	-		
TOTAL		100		100	_		
SIGNIFICANT (0.025 LEVEL	, (CHI-SQUARE	TEST NO.29	IN APPENDIX 10)	-		

9. CLIENT SATISFACTION ON COST

Null hypothesis 5.1.9 There is no difference in the level of satisfaction with cost between management and traditional clients.

Table 4.22 indicated no difference in the level of satisfaction with regards to cost between management and traditional clients. Given the facts from null hypothesis 5.1.5 and 5.1.7. that the probability for a management contract to exceed the budget is less than the traditional method but can cost the client more. this can emphasis the suggestion at the beginning of this chapter which account for a great concern placed by the management clients on the importance of cost reliability rather than cheapest cost to project success.

TABLE 4.22 - PRO	DCUREMENT METHOD AND CL	IENT SATISFACTION TO COS	53
LEVEL OF SATISFACTION	MANAGEMENT CLIENTS	% TRADITIONAL CLIENTS	
HIGH	55	53	
MODERATE	26	28	
LOW	19	18	
TOTAL	100	100	
NOT SIGNIFICANT	(CHI-SQUARE TEST NO.30	APPENDIX 10)	

10. CLIENT SATISFACTION TO QUALITY

Null hypothesis 5.1.10 There is no difference in the level of satisfaction with quality between management and traditional clients.

The quality of building is very difficult to compare. firstly because it is difficult to define precisely what is meant by quality and secondly because their is no successful objective measure which can compare both systems. Therefore in this research quality was measured subjectively as the function of b ilding and quality of the finishes. From Table 4.23 their seems to be no difference in the level of satisfaction with quality between the management and traditional contracting clients.

However, those clients who were interviewed feel that there are some snags in the management system which affect the quality of building. None of the clients felt that management contracting produce a better building design but it can be similar to the traditional method. The clients added that they did not choose a management contract for that reason in the first place and that is why no difference appeared in quality satisfaction in Table 4.33. This evidence refutes the CIRIA (1983) conclusion that clients who use management contracting frequently want the management contractor to be responsible for managing the design. The clients have noted the following as criticisms for design and quality of management contracting:

1. A property developer client said that management contracting does not provide a better design because of conflict between the management contractor and the architect. Such conflict may come from the commercial orientation of management contractors being countered by the professional attitudes held by other client advisors.

2. There is the problem of who has to decide quality standards (unlike the traditional method where the architect is responsible).

3. A banking client commented that with management contracting 'there can be an element of jealousy by the professional consultants by the fact that the management contractor is taking their roles and authority as a team leader. The issue of dominance within the project team is often the most vexatious and is the subject of ongoing research (see implication for other researchers in chapter 5).

TABLE 4.23 - PROCURE	EMENT METHOD AND CLIENT	SATISFACTION TO QUALITY		
LEVEL OF SATISFACTION	۳ MANAGEMENT CLIENTS	% TRADITIONAL CLIENTS		
нісн	65	72		
MODERATE	24	20		
LOW	11	8		
TOTAI.	100	100		
NOT SIGNIFICANT (CHI	-SQUARE TEST NO.31 IN A	PPENDIX 10)		

SUB-HYPOTHESIS 4.2 VARIABLES OF PERFORMANCE MEASURES ARE INTERRELATED WITH ONE ANOTHER.

The correlation coefficient between the 10 performance measures are shown in Table 4.24 . they are not expressed in detail but all take the null form.

Results of linking the performance measures together show the following:-

1. The time factors are significantly related with one another. projects that take a long time to build tend to have longer preconstruction time. longer total time and produce higher rate of work on site (SQM/WEEK) (also see relation between variables 1,2.3 & 4 in Table 4.24).

2. The correlation also show that overrun on time is associated with overrun on cost, but this association was found significant only with the traditionally organized projects

3. Finally , Table 4.24 indicates that the level of client satisfaction increases as the certainty of the project with respect on time and cost increases. All other variables are not significantly related.

	PRECONST	BUILD	τοται	SPEED	UNIT	TIME	COST	TIME	COST
	TIME	TIME	TIME	A/W	COST	OVER	OVER	SATS	SATS
	1	2	3	4	5	6	7	8	9
BUILD TIME	. 507								
	a	а							
TOTAL TIME	.879	.853							
	С	С	С						
SPEED A ′ W	.326	.365	. 399						
UNIT COST	.043	.178	.066	.214					
TIME OVER	.264	.150	.219	.016	.211				
COST OVER	.183	. 106	.160	.018	.092	с .340			
TIME	.161	.112	. 183	.104	.004	a . 659	.410		
COST SATISF	. 202	.180	.246	.068	d . 253	.179	a . 677	b . 410	
QUALTY SATISF	.058	.012	.069	.009	.003	.170	. 134	.117	.28

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Figure 4.8 gives the most significant relationships annoted on the research model, which shows that project performance is influenced by a number of variables. Contract procedure and procurement method can be an important variables in affecting project performance but not by themselves are the only determinate.

The independent variables of project and designer characteristics also seem to have a greate weighting in determining project performance. particularly on the time factor. For instance. objective measures of time (C15, C16, C17, C18) are dependent on building type and the size of the project. Commercial building and project with high building cost and G.F.A. take a long time to design and build. whilst industrial projects were relatively less complex which were controlled within a stipulated overall time. and fast enough to satisfy the client.

However, procurement method as an intervening variable can be a factor assisting in optimizing project performance. For instance, total timing of the building process, for commercial building, were reduced by appointing a management contractor. The reduction in time was not so much accounted during construction rather it was due an early start on site by overlapping the design and construction.


Moreover, it was also stated that the project can be successful and the client can be satisfied even if the project is highly complex, provided the appropriate procurement method was selected to the project and according to the client requirements. In this research management and traditional contracts were good examples. The management contracting system was employed on higher cost building projects with higher complexity and building rate and yet a significant number of those projects were found to be completed on time, within the estimated budget and the client was satisfied. Similarly, when the traditional contracts were selected for projects with low or moderate level of complexity and according to the client prioraties, these projects were successful and the client was also satisfied. In general, the results presented in this research do support the central hypothesis.

INTRODUCTION

The opening chapter of this thesis discussed problems facing the construction industry, it looked at the weaknesses and strength of the traditional approach and management contracting. The aim of the research has been to identify variables that lead to selecting a management or traditional contract and which would influence project performance.

The author looked at various models of previous researchers and postulated the relationship between the identified variables in a model similar to the one presented by Sidwell (1982). The variables were discussed under six main headings:-

- 1. Client characteristics and requirements.
- 2. Designer characteristics.
- 3. Project characteristics.
- 4. Contract procedure.
- 5. Procurement method.
- 6 Project performance.

Two central hypothesis were drawn:

 Management contracting can satisfy clients who need their projects quickly and for projects that are large and/or highly complex." 2. "Project performance is a function of the characteristics of the client, the project, the designers, the contract procedure employed and the procurement method adopted for the project.

The research model was applied over 69 case studies to examine the evidence of the main hypothesis and two sets of measures have been used: objective. absolute measures; and subjective measures of client satisfaction.

The following are the main conclusions drawn from this research:

5.1 TEST FOR MAIN HYPOTHESIS ONE

Results of sub-hypothesis 5.1 in Chapter 4 and the clients' perception toward management contracting strongly support the first proposition of hypothesis one, ie. a management contract can satisfy clients that need their projects quickly.

79% of the management contracting projects had a short preconstruction time (PCT) as defined by the number of weeks from detail design to start on site. The corresponding figure for traditional contracting was 38%. Short, average and long times were measured depending on cost of building as described in Chapter 3.

Moreover, Table 5.1 show an extract from Appendix 12 for the matrix of project performance. scoring This matrix was constructed from data of 69 management and traditional contracts as a guide to clients who wishes to know how both systems were performed for different categories of clients and projects. The scoring method is as described in Chapter 3, section 3.10.5. In summary, the method is based on giving a scoring level for each category of client or project against each of the ten performance measures. Those performed high were scored 3, Those showed a figure which lie between +/-5% from the mean were scored 2 and low performance were given a score of 1 (see section 3.10.5 in Chapter 3 for more details).

Table 5.1 reinforce the better performance of management contracting on the time factor, indicating that management contracting projects had highest aggregate scores for timing the overall building process and the client satisfaction with it (32%). The corresponding figure for traditional contracts is 22%.

These results provide ample confirmation for the earlier case studies discussed in Chapter 2 that buildings let by a management contract are constructed more quickly than buildings let by the traditional approach.

SCORES				
PERFORMANCE MEASURES	MAXIMUM POSSIBL SCORES	ACTUAL SCORES	PERCENTAGE ACTUAI. SCORES	PERCENTAGE AGGREGATE SCORES
1. PCT + BT + TT	126	116	92	16
2. SPEED(A/W)	42	37	88	15
3. UNIT COST(C/SQM)	42	26	62	11
4. % + TIME & COST	84	70	83	14
5. SATISF. ON TIME	42	39	93	16
6. SATISF. ON COST	42	39	93	16
7. SATISF. ON QULTY	42	31	74	12
TOTALS		358	585	100
				PERFORMANCE
TABLE 5.1 (CONTINUE)	MEASURE	S IN SCOR	ES	
TABLE 5.1 (CONTINUE) 1. PCT - RT + TT	MEASURE	S IN SCOR	ES 55	9
TABLE 5.1 (CONTINUE) 1. PCT - BT + TT 2. SPEED (A/W)	42	69 35	55 83	9 15
TABLE 5.1 (CONTINUE) 1. PCT - RT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM)	42	69 	83 97	9 15 17
<pre>TABLE 5.1 (CONTINUE) 1. PCT - BT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM) 4. % + TIME & COST</pre>	42 42 84	69 	83 97 70	9 15 17 12
<pre>TABLE 5.1 (CONTINUE) 1. PCT - RT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM) 4. % + TIME & COST 5. SATISF. ON TIME</pre>	42 42 42 42 42 42	69 	83 97 70 74	9 15 17 12 13
<pre>TABLE 5.1 (CONTINUE) 1. PCT - BT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM) 4. % + TIME & COST 5. SATISF. ON TIME 6. SATISF. ON COST</pre>	42 42 42 42 42 42 42 42	69 	55 	9 15 17 12 13 17
<pre>TABLE 5.1 (CONTINUE) 1. PCT - RT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM) 4. % + TIME & COST 5. SATISF. ON TIME 6. SATISF. ON COST 7. SATISF. ON QULTY</pre>	42 42 42 42 42 42 42 42 42 42	69 	83 97 70 74 95 97	9 15 17 12 13 17 17
<pre>TABLE 5.1 (CONTINUE) 1. PCT - BT + TT 2. SPEED (A/W) 3. UNIT COST(C/SQM) 4. % + TIME & COST 5. SATISF. ON TIME 6. SATISF. ON COST 7. SATISF. ON QULTY TOTALS</pre>	42 42 42 42 42 42 42 42 42 42	69 	55 	9 15 17 12 13 17 17 17 17 100
TABLE5.1(CONTINUE)1. PCT - BT + TT2. SPEED (A/W)3. UNIT COST(C/SQM)4. % + TIME & COST5. SATISF. ON TIME6. SATISF. ON COST7. SATISF. ON QULTYTOTALSCOMPUTATION OF CHI-SQU	ARE TEST F	69 	55 	9 15 17 12 13 17 17 17 17 100 2 MEASURES
TABLE5.1(CONTINUE)1. PCT - BT + TT2. SPEED (A/W)3. UNIT COST(C/SQM)4. % + TIME & COST5. SATISF. ON TIME6. SATISF. ON TIME6. SATISF. ON COST7. SATISF. ON QULTYTOTALSCOMPUTATION OF CHI-SQUTIMESPEED	126 42 42 42 42 42 42 42 42 42 42 42 42 42	69 35 	55 	9 15 17 12 13 17 17 17 100 E MEASURES ST S QULTY
TABLE5.1(CONTINUE)1. PCT - BT + TT2. SPEED (A/W)3. UNIT COST(C/SQM)4. % + TIME & COST5. SATISF. ON TIME6. SATISF. ON TIME7. SATISF. ON QULTYTOTALSCOMPUTATION OF CHI-SQUTIME SPEMANG. CONT. 116	126 126 42 42 42 42 42 42 42 42 42 42 42 42 42	69 	55 55 83 97 70 74 95 97 571 J. PERFORMANCE ORES S TIME S COS 39 39	9 15 17 17 12 13 17 17 17 17 100 2 MEASURES ST S QULTY 31

TABLE 5.1 - MANAGEMENT CONTRACTING AND PERFORMANCE MEASURES IN SCORES

The second proposition of main hypothesis one can be examined by linking sub-hypothesis 4.1 and 4.2 in Chapter 4 (the results). Analysis of sub-hypothesis 4.1 showed that management contracting tend to be employed on higher cost buildings, projects with higher complexity and building rate, and yet sub-hypothesis 4.2 indicated that the client satisfaction was not significantly associated with increasing project complexity. This means that the project can be successful and the client can be satisfied even if the project is highly complex. provided the appropriate procurement method was selected to the project and according to the client requirements (in this research a management contract). Therefore the second proposition of hypothesis 1 can be valid in that management contracting can be successful for highly complex projects but its superiority relevance to large simple project is still open to question. Although Appendix 12 show that large projects scored high under a management contract, a number of traditional contracts were also observed as produced good performance. In particular, case studies no. TR3 (costed £41.0M) and no. TR27 (costed £14.2M) both were constructed under the traditionally organized team. These projects were assessed as large but simple and although produced a slight overruns. other performance measures were successful and the clients were satisfied.

5.2 TEST FOR MAIN HYPOTHESIS TWO

Main hypothesis two is tested under the following two factors:-

- the factors that affect the selection of a management and traditional contract;
- 2. the factors that affect project performance.

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5.2.1 FACTORS THAT AFFECT SELECTION OF A MANAGEMENT AND TRADITIONAL CONTRACTING

Two factors in particular were identified as affecting the choice and application of management and traditional contracting. These are:-

A. Null hypothesis 4.1.4 in Chapter 4 examined the client criteria for project performance measured in terms of time, cost and quality. It was found that the selection of both systems are associated by the different requirement of clients to project performance. The management contracting clients are concerned to minimize time, facilitate variations (ie. flexibility to change their requirements during construction) and provide extra management (ie. more control for large and complex projects). In contrast. traditional clients are more concerned to achieve the cheapest cost and maximize quality. Tighter budget induce a more conservative procedure and one which is sufficiently flexible to control their budget and maintain high standard of quality of the building.

The complexity of the client's organizational structure was seen to influence the selection of the procurement method and subsequently project performance. As noted in Chapter 3. data could not be collected in the main study but interviews this research correspond closely with this throughout proposition. It was stated in Chapter 2 that the difference between clients' criteria and their organizational structures has influenced their views and attitudes towards management contracting. If the organizations own procedures are not matched project requirements, the client may lose the advaitages of to The client could delay progress if his approvals are not MC. matched to the speed of the management contractor's work.

B. The major factors in the different project characteristics of the two samples, is the greater degree of complexity and higher final building costs associated with management contracting projects. Results of analysing the sample indicates that management contracting is used on large buildings as defined by building cost greater that £5 million. and for complex projects requiring a building rate greater than £50,000 of work a week. These factors create the need for specialized sub-contractors, specialized materials, tools etc. as cited by the introduction of new technology within the building industry.

5.2. FACTORS AFFECTING PROJECT PERFORMANCE

The main conclusion to be drawn from this research with regards to project performance is that management contracting perform better in some respects than traditional contracting, but there are other factors affecting project performance which are highly significant. Within the scope of this research Table 5.2 shows the significant relationship between performance measures and other characteristics of the building process, which is derived from the correlation coefficient matrix in Appendix 11. From Table 5.2 the following conclusions can be drawn:

1. The duration of pre-construction and construction is dependent on building type and the size of the project. Commercial buildings and projects with high building cost and gross floor area take longer time to design and build than industrial and small size projects. However, the timing of the building process can be reduced by appointing a management contractor. The reduction in time is not so much accounted during construction rather it is due an early start on site by overlapping the design and construction.

2. The spread of cost performance across the cases was relatively wide. Although the mean unit cost of traditional contracts were lower than management contracting, a large proportion of the varience had been explained by major differences in the nature of the buildings and the level of quality standard that could be specified by the client at the outset of the project.

3. The major factors which affect time and cost overruns are the procurement method adopted and the designers experience, measured by the number of similar type of work constructed in the past. Highly experienced designers and a MC can provide buildings with higher certainty to time and cost than traditional contracts.

	FA	CTORS	SIGNIFICANT A	T P LE	SS THAN	
PERFORMANCE - MEASURES	.001 LEVEL	C.C.	.025 LEVEL	С.С.	.050 LEVEL	C.C.
1. PCT TIME	G.F.A. BLD COST P. METHOD	.621 .431 405	PROCEDURE DS. EXP.	369 306	BLD. TYPE	252
2. BLD TIME	BLD COST G.F.A BLD RATE BLD TYPE	.825 .679 .505 434	COMPLEXITY	. 305	P. METHOD CLNT TYPE	293 243
3. TOTL TIME	G.F.A BLD COST BLD TYPE	.744 .699 408	BI.D RATE	. 381	P. METHOD PROCEDURE DS. EXP.	297 258 241
4. SPEED(A/W)	G.F.A BLD RATE BLD COST DS SOURCE	.848 .728 .631 575			P. METHOD	244
5. UNIT COST	COMPLEXITY P. METHOD BUILD TYPE	.438 409 402	BLD. RATE BLD. COST CLT. TYPE	.380 .287 275	PROCEDURE	246
6. % + TIME			DS. EXP. P. METHOD DS. SOURCE	353 311 288		
7. % + COST			DS. EXP. P. METHOD PROCEDURE	348 318 298	DS SOURCE	249
8. TIME SATS	DS. SOURCE	.455	DS. EXP. CLT. EXP. PROCEDURE	.334 .308 294	P. METHOD	.243
9. COST SATS			PROCEDURE	334	DS. EXP. CLT.EXP.	.273
10. QLTY SATS			DS. EXP.	. 357		

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TABLE 5.2 - SIGNIFICANT CORRELATION COEFFICIENT BETWEENPERFORMANCE MEASURES AND OTHER CHARACTERISTICS.

Projects procured based on traditional contracts registered an average time overrun of 8% compared to an average of 4% using management contracting.

The average cost overrun for management contracts was 3% compared to 7% recorded by the traditional method.

It was reported in Chapter 4 that the higher integration and management control inherent within the system of management contracting had contributed to greater certainty. But it was also stated that since management contracting has a high market orientation it could be argued whether the estimated time and cost were the right ones at the outset of the project.

4. There was no clear evidence to indicate that the level of client satisfaction on quality is associated with the other variables studied. except with the designer experience (see Table 5.1). Nevertheless, under a MC the clients criticized the system for not producing a higher standard of quality in the building for reasons attributed to the conflict between the management contractor and the architect, and to the problem of who has to decide quality standards (see also the higher scoring of quality under the traditional contract in Table 5.1).

To summarize the conclusion, procurement method is not the only variable affecting project performance. The designers, the characteristics of the project and the contract procedures employed, all had their relative effect on certain performance measures and in certain cases more significant than the procurement method adopted.

5.3 OTHER RESEARCH

Sidwell (1982) concluded that managerial control (classed as project procedure) was a key element in achieving project success. being significantly related to all measures of success. Ireland (1983) found similar results for managerial action.

This research agrees with the above conclusions in that higher management control, as a factor considered to be inherent within the system of management contracting, can provide higher level of management, thus reduces the risk of overruns and deliver projects in a shorter time.

The conclusion of this research findings could also be hinged on the contingency theory, but it would be surprising if it did not :-

That is : there is no one method of the two that supersedes the other in all performance measures of time, cost and quality; each method has it's strength and weaknesses contingent on the the client's organization and requirements and the characteristics of his project.

Finally, although this research showed that there had been overruns on time and cost for some projects, the magnitude seem to have been reduced since the publication of the reports of Wilson (1974) and Wood (1975). This was also observed in a research by Rowlinson (1987) into package deal within the field of industrial buildings.

5.4 IMPLICATIONS

This research study has direct and important implications in relation to clients, those in the industry and those considering possible directions for further research.

5.4.1 IMPLICATION FOR CLIENTS

A) It is important that clients develop their precise requirements and priorities as early as possible and for the professionals to achieve a clear understanding of the client's project goals. Performance criteria specified by clients have a vital implications for the selection of procurement method. Most of the participating interviewees highlighted its greatest significance to project delivery (see also null hypothesis 4.1.4 as a guide).

B) A scoring matrix of performance was constructed as shown in Appendix 12 in an attempt to give the client some indication of how both systems scored for various types of clients and projects. Scoring method is as described in Chapter 3 (section 3.10.5). Table 5.3 gives extracts from Appendix 12.

TABLE 5.3 - TOTAL PERFOR	RMANCE 5	SCORES UNDER A M	IANAGEMENT	CONTRACT
CLIENT & PROJECT TYPE	MAXIMUN SCORES	ACTUAL F SCORES A	PERCENT	PERCENT AGGREGATE
NORMAL SIZE PROJECTS IE. <£5M & <7000 SQM	60	49	81	12
LARGE SIZE PROJECTS IE. >£5M & >7000 SQM	60	53	88	13
NORMAL COMPLEXITY & < £50,000 BUILD RATE	60	47	78	11
HIGH COMPLEXITY & > £50,000 BUILD RATE	60	47	78	11
SPECULATIVE BUILDINGS < £5M	30	17	57	8
SPECULATIVE BUILDINGS > £5M	30	22	73	10
BESPOKE CLIENTS < £5M & > £5M	60	51	85	12
INDUSTRIAL PROJECTS < £5M & > £5M	60	53	88	13
COMMERCIAL PROJECTS < £5M & > £5M	60	46	77	11
TOTALS			697	100
TABLE 5.3 (CONTINUE)-	- UNDER	THE TRADITIONAL	APPROACH	
NORMAL SIZE PROJECTS	60	46	77	12
LARGE SIZE PROJECTS	60	38	63	10
NORMAL COMPLEXITY	60	44	73	11
HIGH COMPLEXITY	60	34	57	9
SPECULATIVE < £5M	30	24	80	14
SPECULATIVE > £5M	30	21	70	11
BESPOKE CLIENTS	60	41	65	10
INDUSTRIAL PROJECTS	60	42	70	11
COMMERCIAL PROJECTS	60	42	70	11
TOTALS			632	100

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The following could be a possible interpretation of Table 5.3 :

MANAGEMENT CONTRACTING

1. Best performance can be achieved under a management contract for a bespoke clients building an industrial projects with a cost greater than £5m and an area more than 7000 sqm.

2. High performance can also be achieved for speculative developer building commercial projects which are complex and costing more than £5m. A management contract should similar performance for Normal size projects with normal complexity.

3. Poorer performance was noted by speculative developers on building projects less than £5m.

TRADITIONAL CONTRACTING

1. The traditional approach can provide best performance for speculative developers on building projects of normal size with a low level of complexity.

2. Clients who are building industrial or commercial projects costing less than £5m of normally complexity also showed good performance within the traditional contracting sample.

3. Poor performance under the traditional contracting was evident for bespoke clients who were building large projects with a high level of complexity. B) Another important task that the client should examine before selecting a procurement method is his experience and ability in managing his project. It seems that the selection of a management contractor can be ideal for inexperienced clients which do not have the appropriate level of in-house expertise to manage a project. Having studied the characteristics of a management contract, the client can have the advice of a person experienced in the industry acting as his agent.

C) The one feature which stand out in the successful management contract is the considerable commitment by clients in their projects. This does not mean involvement in the minute of projects, but the ability to structure their organization in order to make decisions quickly when unforeseen problems arise.

5.4.2 IMPLICATION FOR THE INDUSTRY

A) From the evidence available, we must conclude that. (unsurprisingly), neither of the systems; management nor traditional contracting is the solution to all of the problems facing the construction industry. To achieve project success the parties need to match the various organizational forms to the type of clients, his criteria and priorities in respect to time, cost and quality. Similarly the characteristics of the project and, to a certain extent, the characteristics of the professionals need to be matched.

B) Even though attitudes of the clients discussed in chapter two are influenced by the experiences of individual clients it seems that there is room for improvement in the management contracting system. One such shift would be for the industry and in particular the management contractors to adopt a professional-as opposed to commercial-role. Yet this change may be shaped by clients who can do much to fashion events by matching their own procedures to the requirements of the procurement method they have chosen. Project success is often elusive but the appropriate mix of client control and procurement method can make it less so.

C) Whatever form of procurement method is selected, there need to be an increase in employing an independent advice services in UK to providing project planning and progress function services. These services can give the client a tremendous control over planning and programming of a given job and, moreover, total control to the contractor. With these services, inexperienced clients will obtain similar inputs to these who are experienced with in-house technical and managerial facilities.

5.4.3 IMPLICATIONS FOR OTHER RESEARCHERS

A) Now the JCT has published a model document for a management contract, the author suggest that there is likely to be particular value in further exploration of the following :-

i) looking to the area of defining the responsibility of the parties involved in the contract in legal sense eg. what changes

or effect is the changing role of the architect have on the contract.

ii) looking to the problem of quality control. Who is responsible for the quality supervision and control. If it is the architect then where does the management contractor stand and vice versa.

iii) looking to the area of tendering document i.e., what informations are needed for the sub-contract jobs and where does the sub-contractor stand in the contractual document and tenders.

Appendix 3 enclose the standard form of management contract that was published by the JCT in Dec. 1987. This can be used as a guide in investigating the above areas.

B) The model used in this research was found very useful to point those variables which had to be measured and controlled in data collection and analysis. The research, however, is immediately applicable to the field of industrial and commercial buildings and, particularly, new construction. Thus, the author suggests that the model can also be used to compare other forms of procurement methods or procedures on other types of buildings.

The methodology used in this research was a cross-sectional one and has provided a sound basis for comparing the performance of management contracts and the traditional methods of building procurement. However, other useful information on the difference between procurement methods could be collected using a

longitudinal study. For example, to choose one contracting organization, constructing two identical type of building, one for each procurement, and following their projects through to completion. By this approach, the study of the environment and the relationships can be fully understood. The quality of the relationship between team members is increasingly recognised as a particularly critical factor of building team performance and is, as far as it is known, relatively little researched.

To be effective, such a methodology will require extensive collaboration between all those involved in commissioning and procuring the buildings. However, it is only through analysis to ongoing projects, from their very earliest stages through to completion, that it will be possible to develop a better understanding of the influences on the building process and, in particular, project performance.

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APPENDIX ONE

ROLE OF THE MANAGEMENT CONTRACTOR SOURCE : WOOLF PROJECT MANAGEMENT 4

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1. INTRODUCTION

Having developed Management Contracting in the United Kingdom over the last fourteen years, our Managing Director is committed to this form of contracting and will personally ensure the success of every project undertaken by us. Management Contracting as applied to major construction projects, was introduced in 1968 with the Horizon Project at Nottingham for the John Player Company. Our Managing Director, David Woolf, was Resident Project Director on this scheme and has been to the fore in the development of Management Contracting ever since.

This form of contracting has become increasingly recognised throughout the industry as a logical and commercially attractive alternative to traditional tendering. It has been particularly designed to meet the most stringent requirements of public authority accountability. The Management Agreement ensures that the contractor forms part of the client's team from the outset, responsible for co-ordinating on his behalf the construction planning, management and execution of the project. It means what it says: Management by Contract, cn a fixed fee negotiated in advance. It creates an identity of interest between the members of the design and building team and, because of the involvement in the project from the start, design, tendering and construction periods overlap, with a considerable saving in time and cost.

Building is the only major industry in this country in which design and execution are normally divided. A Management Contract bridges the gap; above all, it means that throughout the whole project the main contractor is on the client's side.

Because of early involvement it means that the real cost of the project is exposed at an early stage and appropriate action can be taken where it is most needed. The Managing Contractor is able to ensure that the project benefits from the most economical methods of design, construction, site procedures and materials handling. Claims can be minimised by anticipation and by taking action before they become unavoidable.

The works are broken down into Sub-Contract Elements. Benefits from competition can be maximised since all Sub-Contractors are selected by competitive tender. The Managing Contractor, because he is working on a fee basis, can act in the client's best interests and without the adverse influence of profit motivation. In our experience the Management Contract is the cheapest and quickest way of getting large, complex projects

1. INTRODUCTION cont'd

constructed and applies equally to projects which would be largely sub-let whatever form of contract was adopted.

2. THE ROLE OF THE MANAGING CONTRACTOR

The professional team of Architect, Quantity Surveyor, Structural Mechanical and Electrical Engineers is selected and appointed directly by the client as is normal in traditional tendering.

A Managing Contractor therefore is responsible to the client and his professional advisers for the entire project, including construction planning, management and execution. The Managing Contractor supplies extensive pre-building services to the professional team. The exact nature and extent of these services will vary with the character of design from the point of view of construction management; the fæding of real cost information to the design team; the assessment of design alternatives from the points of view of cost, time, ease of construction and achievement of the hignest quality standards; the preparation of pre-contract materials and labour; and the planning and management of the project.

while the Managing Contractor's relationship with this client is one of main contractor, all physical contractors selected in competition. The Managing Contractor's role is, therefore, one of control and co-ordination of all activity on the site. With the client's Quantiy Surveyor, he will police the cost plan and maintain up to date records of committed and probable actual cost. During the later stages of the execution phase he will be concerned with the preparation of the draft final account, which in the majority of coases will emerge rapidly and without argument, the individual points within it having been sorted out at the time of the event rather than left to be dealt with after completion.

The Managing Contractor will be paid a fee for his services. This fee will probably be in two parts, dealing first with the pre-contract service, and second with the managerial and co-ordinating roles, undertaken during the actual project. Such division allows the client to terminate the arrangement or indeed to postpone it, without arrangement or indeed to much an unqualified claim creating a situation in which an unqualified claim

2. THE ROLE OF THE MANAGING CONTRACTOR

If the Managing Contractor is competent and the project an appropriate one, his employment should reduce the overall cost of the project, firstly by making the design more buildable and thus achieving an earlier completion and secondly by securing the best price in competition for each of the elements.

professional team are maintained and the Managing Contractor works under the Architect's direction. because the Managing Contractor's team is totally integrated with the professionals from the The Architect's role is considerably strengtnened traditional relationships with the client's of contract not covered by extension of time. liquidated and ascertained damages for any overrun His role should not be interpreted as one of the contractual terms. expected of them in practical as well as commenced, all parties are totally aware of what is earliest possible date. in accordance with the contract and is liable for client's agents. He is responsible for completion When the contract has The

3. ENSURING COMPETITION

During the evolution of the design, lists will be drawn up in conjunction with the professional team of appropriate sub-contractors for the evacution of the various elements of work, under the overall management and control of the Managing Contractor. Tenderers for each major package are interviewed and a short list prepared of keen and capable tenderers. Appropriate documentation is prepared for each package which more fully describes what is expected of the tenderer and bids are sought. rollowing the preparation of a tender analysis an order is placed on the successful tenderer.

4. PIRMING OP THE COST PLAN

One of the significant benefits of the Management Contract is that the team can choose the most beneficial time to obtain sub-contract tenders. This may mean that they would delay obtaining prices for certain elements of work until it was agreed that the time was commercially rights, or that certain elements were sought earlier to gain other specific advantages.

At an early stage the whole team is committed to working within the agreed cost plan. If subsequent tenders fall outside the allowance, then it must be accepted that the fallow must be re-examined to

÷	FIRMING UP THE COST PLAN cont'd	
	achieve the necessary savings. The balance from tenders within the cost plan is put against the design contingency and reverts to the client if not used.	
	In normal overall tender contracting, the final account frequently bears little relation to the original bid. At least two thirds of this work will have been sub-let at not necessarily competitive rates. Artempts at cost control through design changes in such contracts may also have heavy time and cost penalties.	
5.	ROLE OF MANAGING CONTRACTOR DURING THE EXECUTION OF THE WORK	
	Although design leadership and ultimate responsibility remain with the Architect, the main burden of executive effort falls upon the Managing Contractor during construction.	
	He is responsible for maintaining activity on the site at the required level to comply with the overall programme. The Managing Contractor will chase the sub-contractors before their arrival on site to ensure that when they start they execute their work with the maximum effectiveness. He will maintain co-ordination between the various sub- contracted activities. He will supply if need be a small multi-service gang for unloading, attendances or other appropriate tasks.	
	He will monitor the production and issue of any drawings or information still outstanding. He will ensure that events which might in any way affact the sub-contractor's final accounts are cost monitored and agreed with the professional Quantity Surveyor at the time of their happening. (Procedures for this and for its enforcement will have been included in sub-contract documentation in the pre-contract phase).	
	The Managing Contractor will continuously police the cost plan with the Quantity Surveyor and will be in a position at all times to make available reports about committed cost, probable completion dates and any unresolved points which may be at issue.	
٠	THE FINAL ACCOUNT With the system of packaging sub-contracts, the Management Contract makes it possible to settle	
	figure for the second of the second	

ه. THE PINAL ACCOUNT cont'd

documentation throughout the project means that towards the end of the construction of any the Quantity Surveyor's aproval and auditing, after completion this draft will be finalised for draft final account. particular element it will be possible to prepare a During the first few weeks F

What the Client pays

The final account is a summation of the following:-

- 6 the Management Fee site Preliminaries
- 66 Common services
- sub-contractors' agreed final accounts

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٦. THE FEE

not an extra. It is part of the total construction cost. the fee by as much as 21. reimbursed to the client. contractor's risk. Each fee inegotiation for individual fact that all trades cash and other discounts are considering the fee, account should be taken of the quotations and no other monies hidden further profits added to sub-contractors' shown to be at a much lower level than wich traditional overall tendering. The profit content in the fee can be exposed and for the Managing Contractor's overheads and profit. This is a fixed fee, pre-determined at the outset, ther monies hidden to cover Each fee is established by This effectively reduces The Management Pee contracts. There are no L S

8 PRELIMINARIES

elements within sub-contractors' quotations. the co-ordination of the contract is centralised, minimising any duplication of the supervision outset of the scheme. agreed with the client's Quantity Surveyor at the together with costs and also salary details is else is established as necessary for the execution of the work. agents, project staff including contract managers, site These comprise the Managing Contractor's site-based planners, services engineers and whoever A full schedule of site staff The effect is to ensure that

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It is, therefore, reasonable to expect that sub-contractors' prices will be considerably keener than would be the case in a traditional situation because they are only concerned with the supervision of work within their own directoring

Good

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Together with the design ter temporary works requirements of water and unstable groun	The Managing Contractor's Fee is his only source of income and cannot be enhanced by renegotiations with sub-contractors. He, therefore, devotes his entire attention to ensuring that the client is entire attention to ensuring that the client is	
All alternative design solut in respect of building maintenance.	. THE INCENTIVE FOR THE MANAGING CONTRACTOR	11.
We will, with the design team recommendations on all c envisaged, testing altern design solutions. Account plant, materials and lab particular emphasis on oper mechanisation.	the Client has more proceduou unan in contract. This risk which is taken by the Managing Contractor is counteracted by the fact that he will be the prime mover in the sub-contractor selection process for all trades. He will ensure that the risk is minimised by providing the sub- contractors with far more information than they could reasonably expect in a traditional situation.	•
14. MANAGEMENT CONTRACTOR'S CONTI DESIGN DEVELOPMENT	There are no nominated sub-contractors to the Managing Contractor, which effectively means that	
involvement by the constant that results it is essential that client and his designers all Our Management Agreement ha Managing Director followi successful use of this type of	All physical work on site is sub-let in appropriate elements and the client can be certain that he is obtaining the cheapest possible price for every sub-trade. This is in discinct contrast to a traditional contract where the lowest main contract tenderer would not necessarily give the lowest individual price on every sub-trade.	
for use on many categories	. SUB-CONTRACTORS COSTS	10.
13. <u>FORM OF CONTRACT</u> There is an increasing bo United Kingdom which sugge Standard Form of Building c	as part of the cost plan. The main criteria for the provision of these services is to avoid the conflict between sub-contractors which inevitably arises on large contracts which are dealt with by traditional means.	
the same motivation as the documenting the sub-contract sub-contracted activities on	The common services costs are established between the Managing Contractor and the client's profesional team and the full schedule is provided	
Under our Management Agr nominated sub-contractors rsponsible for all activitie We thus ensure that we are al	(d) multi-service gang unloading and attendance in order to avoid interface problems between sub-contractors	
12. RISK ACCEPTED BY THE MANAGING	(c) craneage and other plant on similar basis	
to turnover, will decrease.	(b) scaffolding which is required for more than one trade	
Ine managing concursor If he satisfies the client a If the contract cost ove Contractor's fixed fee, consi	(a) welfare and canteen facilities for all sub- contractors	
markets and thus they fu importance of ensuring pr documentation and proper sub-	Other than preliminaries, the only direct costs which the Managing Contractor incurs are services which are not peculiar to any one sub-contract trade. For instance:-	:
TATAlly experienced in worki	COMMON SERVICES	9,

11. THE INCENTIVE FOR THE MANAGING CONTRACTOR CONT'd

ing within competitive illy understand the oper sub-contractor contract control.

l secure repeat orders nd professional team. erruns the Managing dered as a percentage

CONTRACTOR

greement there are no s and we are totally les carried out on site. able to act always with he client by carefully t tender and controlling site.

contract is unsuitable s of buildings. Many antial pre-contract actor and to optimise 1 act as a unified team. as been drawn up by our ing fourteen years of of contract. dy of opinion in the ests that the JCT or at the contractor, the

RIBUTION DURING

.

eam, investigate and make construction methods rnative techniques and nt is taken of economical abour utilisation with erational simplicity and

tions will be evaluated g costs and future

,

am, we will evolve all , including the control , bridging structures, at the formation of the structures,

•	CONTRACTOR'S CONTRIBUTION DURING	15.	INFORMATION CO-O
14.	DESIGN DEVELOPMENT CONC'd		monitor is prepa
	We shall denote and assist in determining all		required by a pa
	special building work, concerning for temporary or accommodation requirements for temporary		This programme consultation wit
	manather with the services designers, we shall		By this means
	assist in development of design of art		of the number of
	installations and commissioning processor		to achieve the f
	ensure that ettertions are employed.		the framework Managing Contrac
	and practice, correction of materials and		
	components. We shall maintain a continuous review	10.	COST CONTROL
	of building materiars and market trends. We escalations, availability and market trends. We		Introduction
	shall investigate alternative sources of the		The management f
	projected availability of materials resources.		prejudice, at
	We shall assist in the preparation of		than more trad
	specifications for the work, include shall,		separate ele
	as necesary, at the design stage visit the works of		
	rests and determine production capacity.		Pre-Contract Pla
	same with the given on design details and working		Upon appointment
	Advice filt of gerticularly in respect of ease		Assign, progra
	of reference and the application of an acceptant in		project with ad
	addition, the responsibility of draving		degion aspects i
	distribution will be determined at an easy story.		costs thus ensur
	Assistance will be given to the design team in		budget.
	supplying information for approvals. recovers		Basis of Control
	site traffic density routing and access. Car		The basis of con
	parking for operatives, monutives, for temporary		the project and
	hutting, water, electricity and telephones and hutting, water, electricity and telephones and		with the varue of variations i
	conjunction with the design team as appropriate.		preliminaries.
•			From the contration sub-contracts with the second s
15.	INFURMATION CO-UNDERVICE STATES		compiled in com
	In conjunction and with the agreement of the services and civil) a		accordance with
	Architect and suggester of all the drawings and schedule will be parpared of all the drawings and		all tenderers
	specifications that are likely to be content of		requirements an information re
	dates for tender are established from the overall dates for tender are established from the overall		resources.

INFORMATION CO-ORDINATION cont'd

e is again drawn up after close h the various designers. ared. This is in bar chart form. the numbers and types of drawings prticular time can be established.

full benefits of this system within of a team attitude between the tor and the consultants. designers involved on the project, possible to monitor the resources and by closely monitoring the

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management expertise without the same time ensuring that the sobtained at more competitive rates litional forms of contract, each ment being ist firms. orm of contract permits the client tendered for by

Inning

t, the Managing Contractor provides sist the designers in advancing the amming the cost planning of the lyice on current availability and in relationship to construction and ring the establishment of an agraed materials, together with practical

this will be the agreed budget for this will be continuously compared f sub-contracts placed, the cost of nstructed and the cost of

e Managing Contractor will advise of their individual programme d will provide the designers with tgarding the proposed tenderers' it programme details of specialist be abstracted and tender lists junction with the designers. All be required to be submitted in the agreed sub-contract terms and

·	17.						16.
The client's appointed Quantity Surveyor's role is of paramount importance as it is that of a 'watch dog' on behalf of the client on all matters with regard to costs. He is intimately involved in cost and budgeting control systems, cash flow, as well as being responsible for certificates for payments on account and for the Final Account.	SURVEYORS' DUTIES	Constant up dating of the information submitted to the consultants will provide the basis for the final account.	Should any claims be submitted by sub-contractors these will be scrutinised by the Managing Contractor and the validity of any such claims will be established within the terms of the contract. Assessment of their value will be made and recommendations forwarded to the consultants.	A further turnover graph will be prepared based on the total achieved turnover of the project, assessed on the master programme. The resultant <i>information will be issued at regular intervals</i> to allow cost reports to be submitted to the employer at defined intervals.	Interim certificate applications will be collated and after adjustment for materials on site, etc. will be monitored against a turnover graph compiled in conjunction with the sub-contractor and propared in accordance with the agreed programme. This will be used as a guide to the sub-contractor's progress on site. All interim payments to the sub- contractor will be agreed and made within the period stated in the contract.	The Managing Contractor will provide information by cost analysis to maintain effective financial control and allow the design team to audit and adjust the cost plan as necessary to keep costs within the agreed budget.	<u>COST CONTROL</u> cont'd <u>Financial Monitoring</u>

In general, the duties of the professional Quantity Surveyor assisted by the Managing Contractor's Quantity Surveyors are to:-

(a) documentation input into the preparation of the tender

с в certify monies to be paid

17. SURVEYORS' DUTIES cont'd

- <u></u> contractors via the Managing Contractor be aware of consultants' instructions to sub-
- (d) contractors' claims where applicable receive, investigate and pass sub-
- (e) agree the cost of variations to the works
- E identify possible sources of variation divergence of sub-contract 0 r
- (g) clauses where applicable agree value of claims under fluctuation
- 3 give advice periodically upon possible probable final cost changes in the value of the sub-contract and
- Ē certify materials paid for in advance of delivery to site and arrange for inspection guarantees, etc.
- G monitor payments made specialists' suppliers on behalf 0 Ē
- Ē obtain and pass to client probable monchly expenditure
- 5 agree and certify the final account.

18. PLANNING PROCEDURES

all projects are unique and require a degree of The commitment of the Managing Contractor to effective planning and the implemenation of enforceable control procedures is a necessity, as requirements of a particular project. design team, set up planning techniques to meet the selective control. He will, in conjunction with the

The following outlines the planning controls which, if acceptable to all parties, could be implemented.

(a) Master Programme

Upon appointment, the Managing Contractor, in conjunction with the design team, will major design activities, tendering, purchasing, pre-construction, construction and commissioning of each major element of and produce a "micro" network. This network will illustrate the inter-relationship of the major design activities, tendering, design together with the various activities, examine all resraints associated with the

18.	PLANN	ING PROCEDURE cont'd
	(a)	cont'd the contract. Being prepared in network form, it will show the earliest and latest start and finish times and the float associated with each activity.
	This or co dates and p detai the de	network, which can be prepared in precedence nventional CPM form, will identify the key to be achieved for each major package of work rovide a basis for the preparation of a more led analysis, culminating in sub-networks and avelopment of a comprehensive programme of all
	activ in a l	ities. All programmes will then be presented bar chart form.
	(b)	Out to Tender Schedule All packages of work will be identified and the Managing Contractor will complete schedules indicating dates for all tender activities.
		Schedule dates or durations will be incorporated within the overall network programme.
		Note: Initially an Out to Tender Schedule will be prepared indicating <u>all</u> packages and associated tender activities in order to ascertain the design team workload.
	(c)	Initial Time and Progress Schedules
		Time and Progress Schedules are prepared as an integral part of the tender documenation and define particular restraints imposed upon individual sub-contractors in respect of time, phasing constraints and interface activities.
		Every effort will be made to minimise such restraints in order to attract the skills and versatility of individual companies, allowing them to make best use of their resources and techniques, thereby maximising competition and obtaining enforceable tenders.
	(d)	<u>Cash Plow Programme</u> In conjunction with the quantity surveyor the
		master network, prepare a cash flow proyenmon indicating the projeted monthly and cumulative expenditure.

- 18. PLANNING PROCEDURES cont'd
- (w) Sub-Networks

All major packages of work, or sections of work as appropriate, will be subject to detailed examination.

Network programmes will be prepared in conjunction with both sub-contractors and the design team, respecting restraints imposed by the master programme. Subnetworks will be progressively introduced into the overall programme as the project develops.

(f) Computer Application

If required our computer can be utilised for critical path analysis, purchasing sequence and scheduling resource allocation.

19. SUB-CONTRACTORS

The selection of sub-contractors for key elements will be one of the most important factors in the successful completion of any project.

The choice of prospective sub-contractors should be made near to the time when each package of work needs to be let and the appropriate tenders obtained in order that account can be taken of the commercial situation operating at that time.

Tenders, on receipt, will be analysed by the Managing Contractor and his recommendations submitted to the designers for agreement.

All contract documents will include a provision that any variation to the works will be submitted within the stipulated time of that variation becoming apparent. Rigid adherence to this requirement ensures that realistic forecasts of final cost are reported to the employer.

20. PROCEDURE FOR THE SELECTION AND APPOINTMENT OF SUB-CONTRACTORS

(a) <u>Out-to Tender Schedule</u>

In collaboration with the design team the Managing Contractor will prepare a programme illustrating the timing and sequence of the following:-

(i) preparation of tender documentation

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-12-

- 20. PROCEDURE FOR THE SELECTION AND APPOINTMENT OF SUB-CONTRACTORS
- (a) cont'd
- (ii) despatch of tender documentation
- (iii) tender period and receipt date
- (iv) tender consideration and analysis
- (v) placing of order
- (vi) provision for sub-contractor's details, shop drawings and associated approvals if appropriate
- (vii) sub-contractor commencement date

(b) Selection of Prospective Tenderers

- (i) In conjunction with the design team the Managing Contractor will prepare a list of prospective tenderers for all packages of work, based upon known performance characteristics and suitability for this particular project.
- (ii) Where appropriate, prospective tenderers will be invited to attend interviews, comment on sub-contract terms, programmes, etc. and respond to questionnaires covering such aspects as labour practices, resource availability, etc.
- (iii) Interviews will be chaired by the project Manager and/or a Director and be attended by the Project Surveyor, Planning Engineer, Building Services Engineer and Construction Engineer as appropriate.

The design team should also be represented at all interviews, to provide a complementary role to the Managing Contractor who will be responsible for taking all interview meeting minutes and for their appropriate circulation.

Interviews will necessarily vary in subject content and emphasis, depending on the particular package under consideration.

PROCEDURE FOR THE SELECTION AND APPOINTMENT OF SUB-CONTRACTORS

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(iv) Subsequent to interviews with prospective sub-contractors and in conjunction with the design team the Managing Contractor will prepare lists of selected tenderers. Tenderers will be formally advised of their selection and the projected date for receipt of enquiry.

(c) Tender Documentation

The Managing Contractor will prepare and confirm the following for inclusion with tender documentation for each package of work:-

- acceptance of, or agreement to variation from, the standard subcontract terms and conditions
- (ii) appendix to general conditions setting out attendances to be provided by the Managing Contractor.
- (i1i) Time and Progress Schedule indicating sub-contract duration, intermediate restraints and associated activities
- (iv) site layout indicating site conditions, access, space allocation, service plant and amenities to be provided by the Managing Contractor.
- (v) details of long delivery materials, plant or components previously ordered by the Managing Contractor and to be assigned to the subcontractor
- Note: prior to invitation to tender the Managing Contractor will prepare a detailed programme of works for each major subcontract package, together with a report on preferred with a report on preferred construction methods. prospective sub-contractors prospective sub-contractors desired, to utilise in part of desired, to utilise in part of appraisal by the menaging appraisal by the preparation contractor in the preparation
- PROCEDURE FOR THE SELECTION AND APPOINTMENT
- <u>.</u> (vi) Surveyor. The Managing Contractor will be available throughout the tender period for discussions and elaboration of project requirements. tender docuemnts will be assembled and despatched by the Quantity

(d) Evaluation of Tenders and Appointments

establish the following comparative Tenders will be opened and inspected by the Managing Contractor and the Design Team to analysis:-

- E examine and reconcile any deficiency in offer or basis of tender :
- (ii) overtime note provision for working hours and
- (iii) **Progress Schedule** check compliance with Time and
- (iv) evaluate any qualifications
- 3 isolate pricing anomolies deliberate 'weighting' of items 0
- (vi) prepara tender report and recommend as aporopriate acceptance or further tender action
- (vii) tenderers of results inform successful and unsuccessful
- (viii) sign sub-contract
- (ix) efficiently progress the sub-contractor prior to start on site
- ž efficiency of sub-contractors' work and maximising their profits within their tender price making efforts to ensure the of integrity and co-operation create a proper working atmosphere У
- (xi) assist with forward labour resourcing 0
- (xii) identify future bottlenecks

- 20. PROCEDURE FOR THE SELECTION AND APPOINTMENT
- <u>e</u> Pre-Start Procedure

contractors to ensure their smooth carried out in conjunction with the subsite, the following activities will be progression to site:-Prior to sub-contractors commencing work on

- Ē canteen arrangments, finalise site organisation, work hours, e.g.
- (ii) set up efficient communications systems
- (iii) obtain and agree informtion required charts and relay this information to the consultants
- (iv) progress chase off-site works
- (v) preliminary meetings set up meeting structure and hold
- (vi) detailed programmes finalise method statements and
- (vii) finalise delivery schedules
- (viii) finalise all attendance items
- (ix) derailed buildability advice
- ž quality control and payment checks off-site manufacturing plants for progress chasing, off-site testing, prepare a schedule of visits to the
- (xi) manufacturing programmes finalise working drawings and
- 5 Control of Sub-Contractors

the application of realistic and enforceable contractual documentation and by gaining the sub-contractors co-operation by assisting him to become more effective. The control of sub-contractors is achieved by

.

The following procedures are also regarded as fundamental in assisting sub-contractors to maintain acceptable progress and quality of workmanship, thus promoting efficiency and fitabilit =-

20.

20. PROCEDURE FOR THE SELECTION AND APPOINTMENT OF SUB-CONTRACTORS cont'd

- E £ establish proper and effective lines of communications
- (11) set up maintain acceptable construction strategy and progress production controls to
- (111) control quality of all construction work and installations implement and maintain procedures to
- (ÍV) provide a proper working environment to maximise output and promote good industrial relations

21. QUALITY CONTROL

(a) quality are invited to tender for this work. contractors with a proven history of jobs completed to the required standards and controls quality by ensuring that only sub-On-site the Management Contractor initially

control will normally be carried out:-The following functions in respect of quality

- Ξ follows the drawings specifications are correctly specifications ensure that the drawings and interpreted and that construction ъсę
- (11) set standards, where possible, using sample areas of work as a yardstick or by entering into "contracts of sample".
- (iii) check all work prior to activity being carried out the next
- (iv) ensure that work sequencing allows high quality standards to be maintained
- 3 check sections of work at completion
- (vi) standards protect work completed ensure correct measures are taken to to high
- (vii) quality controls without increasing the job cost. where necessary, persuade sub-contractors to install additional

- 21. QUALITY CONTROL cont'd
- 9 Off-Site

quality of components being produced off-site and to witness tests of equipment, to ensure that they conform to the specifications. Off-site visits to be made to check the

22. INDUSTRIAL RLEATIONS

United Kingdom and has enabled us to show an exceptional record of work carried out without relationships with union officials throughout the This philosophy has resulted in continuing good creating and maintaining good working conditions. industrial relations and we take the initiative in We fully recognise our responsibility towards good industrial unrest or disruption.

23. REPORTING PROCEDURES

the current situation. dates, which may be monthly or quarterly, to state then prepare a detailed report at agreed cut-off accordance with the time and cost plan. We will Usually, a two-tier reporting system is adopted. or monthly intervals to progress the project in The design and management team meet at two-weekly Typical contents include:-

- Design Progress
- **Construction** Progress
 - Cost Plan
- Cost Control

6

Porecasts of recommendations) bottlenecks (with action

covering outline programmes, layouts, etc. Appendices will also be provided where necessary

the progress of the works at all times and contributes to the policy decisions being made. involved in the scheme, the Client, the Design Team and ourselves. The Client is thus fully aware of This report is then discussed by the principals APPENDIX TWO

ORGANIZATIONAL DIFFERENCES

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BETWEEN VARIOUS MCS

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SOURCE : CIRIA REPORT 100



The design and management contract

APPENDIX THREE

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FORM OF MANAGEMENT CONTRACT

SDURCE : JCT (1987)

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	: :	between
	•	
	<pre>{</pre>	
	j [
	<i>a</i> .	(herenalier called the Employer) of the one part
	8 \ 8	Mq
	<u></u>	·
		of (or whose registered office is situated at]
	1. A.	
	1	
		(heremener cared the Management Contractor) of the other part
	ġ.	
	Š.	
. ماري		Whereas
i versen Osperatoria. A constructione de la construcción d	Rectate First	The Employer wishes to have constructed the building works described in the First Schu
ճարչ-ութեր համանանական է։ Հետարի համանանանան է։ Մահարտութերին համանական է։ Բերեն ընտերութերին		hereig (hereinelier cefied the Project) and her appointed professional advisers (herein cafed the Professional Team) for the design of and otherwise in connection with the Pr who have prepared or set preparing Drawings and a Specification for the Project Nerver
پارت ۳۰. - ۲۵۵ - ۲۵۵ - ۲۵۵ -	Second	called the Project Drawings' and the Project Specification'; the Project comprises works or terms of work to be carried out under Works Contract
		persons other than the Management Contractor in the manner hereinafter appearing top with such see lackness and services to be provided by the Management Contractor at more work to be Personal Taxes and recorded to the DBMs Schedule beam of accord.
	•	with Article 6 3,
		?
the Employer and the Management Contractor have agreed that the Management Contractor	1	or in the event of this death or ceasing to be the Architect for the purpose of this Contract
we subject to the conditions annexed hereto, co-bolistie with the indeptodual sam during the design stages and in the planning programming and cost estimating for the Project, and we secure the Earlying out and completion of the Project, and in so doing anal includer		other person as the Employee shall within a reasonable lime but in any case to like ith days after such death or cessalion nominate for that purpose being a person entered use of the name Architect and nor being a person to whom the Mangement Connect.
in the Pre-Construction Period the services as relevant set out in the Third Schedule hereto, and		later than 7 days after such nomination shall object for reasons considered to be suffici- an Altoristic appointed in accordance with Section 9 [c]. Provided Invess that no p unansourced appointed to be the Alchect under this Contract shall be emitted to drive
in the Construction Period the services set out in the Third Schedule including any aterations made thereto by advertimit between the Professional Team and the		overtule any certificate or opmon or decision or approval of instruction given or express the Architect for the time being
Management Contractor prior to the insue under clause 2.1 of the written notification by the Architecture Contract Administrator of the date when it will be practicable to nominate the nomination of the Provent.) 5	Article 38 [a] [b]
the Employer mends subject to the Conditions to give to the Management Contractor, and the	Administrator	
elements of an clause 21 of the Concisions required the Menagement Contracts to converse such co-operation and to proceed to set out and secure the carrying out and completion of the		
region in accordance with Ancies 1.		a
Finance (No 2) Act 1975 of any amendment of re-enactment thereof as at the date of the Agreement is stated in the Appendix	l	or, in the event of his death or ceasing to be the Contract Administrator for the purpose (
	i	Constract, such other person as the Employer shall write a reasonable time but in any ca- later than 21 days after such death of cessation nomicale for their purpose not being a bi to writen the Management Contraction to later than 7 days after such nomication shall not
	ļ	reasons considered to be sufficient by an Aronretor econnited in accordance with Section Provided sweets that no person subsequently appointed to be the Contract Administrator or thes Contract shall be entitled to distrigated or overhule any centricate or on-sino in discus
Now is hereby agreed as follows	I	approval or instruction given or expressed by the Contract Administrator for the time be
Article 1 For the consideration mentioned in Article 2 the Management Contractor will	l	Antole 4 [D]
1 subject to the Conditions co-operate with the Professional Team during the design stages and in the planning, programming and cost estimating for, and in securing the camping	Quantity Surveyor	The form the Quantity Surveyor' in the Conditions shall mean
out and completion of the Project and in so doing shall include the samces set out in the Third Schedule including any attentions made thereto by agreement between the Projectional Team and the Management Contention provide the site and and the states 2.1 ref	ł	
The written notification by the Architective Contract Administration of the Gate when 4 will be practicable to commence the construction of the Project, and		of

L

1

Postnetes

Subject to recept of the written notice from the Employer under clause 2.1 and subject to the Contract Documents, set out, manugal, organisal, subjective and secure the camming out and completion of the Project on or before the Date for Completion or sub-orthord ofter as may be fixed under the Conditions inclusion ad as such works or terms of work as are to be centred out under and in accordance with the Works Consists which the Management Contractor is required to error into hereounder.

Artiste 2 Subject to the Conditions the Employer will pay to the Management Contractor the amounts due in accordance with section 4,

Article 3A [o] [b] The lemit the Architect' in the Conditions shall mean

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or, in the event of his death or cessing to be the Quarter Survivor for the purpose i Contract, such other person as the Employer shall within a reasonable time but in any ca-lider than 21 days after such death or cession, normale for that purpose nor being a p-to whom the Contractor no liter than 7 days after such normalion strate doerd for in considered to be sufficient by an Arbitrator appointed in accordance with Section 9 [e]

Ancte 3A is applicable uname the periori concerned is ammed to use the name. Anchest under apportance with the Anciences Requiring on Acts, 153 to 1988. Ancie 38 is approximate in all other theorems of the applicable unconvert all apportants and others the seminate where share (or all a concernate appression the Context). Administration shall be devined to have been during the seminate the Context and the Con-temportant the Context. [0]

In cases where the Project is to be carried out under the direction of officient of the Local Authority on names of such officials as are to perform the respective functions of the Architectible C Administration and the Queenty Surveyor under the context. м

e out words in sales in cases where the Architect. The Constant Am -

Signed by or on behalf of the Management Contractor [d1]...

Signed, sealed and delivered by (d2)/The Common seal of (d3);

It the presence of (d2)/wet hereunto attend in the presence of (d3):

- in the presence of

and such other persons as may be notified in writing to the Management Contractor by the Archivectate Contract Administrator.

4-2

Antels 6 The Employer will cause the Project Drewings and the Project Soscification, which descri-generating the scope of the Project, to be prepared as soon as reasonably practicable after a date of the Contract unless previously prepared. ect Drawings, 8-1

The Employer will cause a Contract Cost Plan (to be annexed hereto) based upon the Protect Drawings and the Protect Specification to be prepared as soon as reasonably practicable after the date of the Contract by the Quantify Surveyor in collaboration with the remainder of the Professional Taism and with the Managament Contractor,

63

If the Management Contractor consents to:

- the Contract Cost Plan and to the total thereof, the antries meented in the Appendix Part 2,
- any afterations made to the Third Schedule
- the entries in the Fifth Schedule as agreed between the Professional Team and the Management Contractor and completed by the Professional Team

he shall notify such consent to the Architect/the Contriect Administrator and thereupon initial any plearsons made to the Third Schedule, inhelithe Fifth Schedule and sign the Appandix Per 2, it the Employer status the written notice to proceed under clause 2 in the Employer shall hereupon initial any atterations made to the Third Schedule, install the Fifth Schedule and sign and date the Appandix Per 2 and the Employer and the Management Contractor shall sign the Provid Diversings, the Project Specification and the Contract Cost Plan.

Article 7 The Employer will cause such drawings and specifications and bills of quantities for Works Contracts or otherwest to be prepared and assued by or under the direction of the Professional Teem as are increasing and in such a way as to enable the Management Contractor property to directings the obligations.

Article 8 If any depute of difference as to the construction of this contract or any matter of thing of what-ever network string thermunder or in connection thermult, shall eme between the Employer or the Architeckithe Contract Administrator on his behalf and the Management Contractor enter during the progress or when the connoletion or sbandconnect of the Project, exocit on a decimient of the Employer to state in the writerin notice under clause 2.1 that the Management Contractor is not to proceed or under clauses 5.9 to 5.17 (statuory tax decuction scheme) to the emergi-grounded in taken 5.17 or under clauses 3.9 or under clauses 3.0 million scheme) to the emergi-shall be and is hereby referred to arbitration in accordance with section 8.

Signed, seeled and defivered by (d2)/The Common seal of (d3): in the presence of [d2]/was hereunto affixed in the presence of [d3];

Postnates	[#1]	For use 4 Agreement is executed under hand
	(47)	For use if Agreement is enecuted under seal by an individual or him as unincontrasted by
•	(c)	For use 4 Agreement is executed under seel by a company or other body corporate

Contract Cost Plan Total

Contract Documents

11

THE CONDITIONS hereinbefore referred to

10

SECTION 1: Intentions of the Parties

retation, definitions etc. (1-1 to 1-3)

Contract Coal Plan

Date for Completion Unless attenues specifically stated a reference in the Receipts the Ancies of Agreement, the Conditions, the Appendix of the Schedules to any clause or section means that clause or section of the Conditions Hemodial reference: 1-1 to clauses **Date of Possession** The Recrété, the Ancies of Agreement, the Conditions, the Appendis and the Schedules are to be read as a wrow and the effect or operation of any recreit, anticle or clause in the Conditions, or sem or or entry in the Appendix or in the Schedules must therefore unless otherwise socilically stated be read subject to any relevant qualification or modification in any other recreat, wrice or any of the clauses in the Conditions or sem in or entry in the Appendix or the Schedules. Aricles etc. to be 1-2. read as a whole Delects Laberty Period Employer Escepted Risks: Unless the context otherwise requires or the Rectails or the Articles or the Conditions or an ever in or entry in the Appendix or the Schedules specifically otherwise provides, the following words and prisses in the Rectails, the Articles of Agreement, the Conditions, the Appendix and the Schedules sheat have the meanings over believoir as asched in the rectail, article, clause section, Appendix term or the Schedule to which reference is made: Orthone 1-2 Word or phrase Meening Final Certificate: At Risks Insurance see clause 6.2 struction; the Appendix Parts 1 and 2 to the Conditions as completed, and with Part 2 signed, by the Employer and the Manage-ment Contractor, Interen Certificale: : | Joint Names Pokcy: Arbitrator: the person appointed under section 9 to be the Arbitrator. Anicles or Articles of Agreement the Articles of Agreement to which the Conditions are annexed or any one of the Articles. Management Contractor 1 the person named in Article 3A or any successor duly appointed under Article 3A or otherwise agreed as the person to be the Architect. Architect Management Contractor's Manager on site: ;! Centricate of Complete Making Good Defects: Management Fee: see clause 2 6. **5** m at Completion Dele: Derson: the Dete for Completion or any other date fixed under clause 2 12 or, if applicable, clause 3 5 5. Practical Completion: see clause 2.4 the clauses 1.1 to 9.7, and the Supplemental Provisions ("the VAT Agreement") annexed to the Aractes of Agreement. Pre-Construction Period the penod starting with the day when the Management Contractor is given possession of the site and ending on the day named in the certificate of Practical Completion. ì Construction Penod: Pre-Construction Period Management Feer The amount which is part of the Management Fee and which is stieled in the Appendix as the Construction Period Management Fee and which is adjustable, if applicable, in accordance with clause 4.10.2. Construction Period Asnagement Fee: Preteneny Instruction Prime Cost The person named in Anicle 38 or any successor duly appointed under Anicle 38 or otherwise agreed as the person to be the Contract Administrator, Contract Administrator: Professional Teams Project: the document referred to in Anticle 6.2 which is based upon the Project Drawings and the Project Specification and

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1.3 commed

the total of the Contract Cost Plan as stated in the A which total does not include the Management Fee 4004

the Project Drawings the Project Sciect/Cation the Ar of Agreement the Conditions the Appendix the Car Cast Plan annexed hereto and the Scheduzes

the date fixed and stated in the Appendix unde reference to clause 1.3

the date fixed and stated in the Appendix unde reference to clause 2.3.1,

the period named in the Appendix under the referenciause 2.5

the person named as the Employer in the Amor Agreement

onsing radiations or contamination by radioactive to nuclear lust or from any nuclear waster from the como-of nuclear lust, radioactive to corresponde nuclear lust, radioactive to corresponde nuclear component finear pressure waves cus ancient or other serial devices traveling at sonc or some ments. WC SDeeds.

the certificate to which clause 4.12 refers

an instruction to the Management Contractor issued Architect/the Contract Administrator

any one of the certificates to which clause 4.2 refers

a policy of insurance which includes the Mana-Contractor and the Employer as the insured

the person named as the Management Covinacio Articles of Agreement.

The person named in the Appendix under the relev clause 3 13

the sum of the Pre-Construction Period Manag and the Construction Period Management Fee

an individual, firm (perimership), or body comprise

the period starting on the date of execution of this and ending on the day immediately prior to the Possession.

the amount which is part of the Management Fee a is stated in, or is to be ascentaried in accordance Schedule attached to, the Appendix

an instruction referred to in clause 3.6.3

the cost of the Project ascertained in accordance Second Schedule,

the persons referred to or named in Article 5

the building works briefly described in the First and shown and described generally in the Project and the Project Specification

		s that any interconcerning in the number of any use to the Project Specification			appendia a 1 2 Har Science Concernant and the Management Constactor
	Project Drawings:	the drawings for the Project Ested in the Fourth Schedule hereto upon which the Contract Cost Plan has been besed			issued under the Works Contract
	_	and which have been signed by or on behalf of the Employer and the Management Contractor,			quantity of the Works as shown in the Works Contract including
	Project Extension Nerre:	see clause 2.13 the scientification for the Project science which the Constant			 the addition, privation or substitution of any work;
		Cost Plan has been based and which has been signed by or on behalf of the Employer and the Management Contractor	ļ		2 the effection of the land or standard of any of the metenais or goods to be used in the Works,
	Quentity Surveyor:	the person named in Ancle 4 or any successor duly apported under Article 4 or otherwise agreed as the person to be the Quentity Surveyor.	1		3 the removal from the set of any work, materials or goods executed or brought interior by the Works Connector for the purposet of the Works offer these materials in sector which is contracted.
	Rectal or Rectalit	the Rectals of any one of the Rectals set out before Article 1,	ļ		not in accordance with the Works Contract
	Relevant Event:	any one of the events set out in clause 2.10 of the Works Contract Conditions			2. The imposition by the Employed of by the Management Contractor of any obligations or restrictions in regard to the matters set out in paragraphs 2.1 to 2.4 or the to the matters.
	Relevance	see clause 4 7.			podright to or alteration or omission of any such obligations or restinctions so moosed ir the Works Contract in regard to.
	Schoolwee	the Schedules to the Conditions, that is the First and Second Schedules, the Third Schedule (including any alterations			1 access to the site or use of any specific part of the site.
		made thereto and initialed by or on behalt of the Employer and the Management Contractor), the Fourth Schedule; and the Fifth Schedule as completed and initialiant by or on			2 Invitations of working space,
		behalf of the Employer and the Management Contractor,		•	3 km/alons of working hours,
•	Sie Materials:	see clause 6 2.			4 The execution or completion of the work in an specific order
	Specified Perfe:	We, lightning, explosion, slorm, lempest, flood, bursting or overflowing of water lanks, appearate or pipet, earthquelle, encraft and other senal device or articles dropped here- lrom, not and ovel commotion but excluding Excepted Relia.			Where clauses 4.3 all the Works Contract Condition sophies the lem's Varianch has the start meaning b in parkgraph 1 of the definition delete design out or quartity and these 1 design or quarty thinks Contractors
	Statutory Requiremental	ses clause 5 1.			Obligations of Management Contractor (1 4 to 1 8)
	vat Agreement:	see clause 5 6.		Co-operation with 1-4 Protectional Tearth	The Management Contractor shall upon and subject to the Conditions co-operate with Professional Team as stated in Amile 1
	Works	In respect of any Works Contract the works brief particulars		Specific obligations 1.5	The Management Contractor shall during the progress of the Project
		the second Rectal of Section 3, and which are using those and described in the Numbered Documents listed in the second Rectal of Section 3, of the relevant Works.		of Management Contractor	 prepare all necessary programmes for the execution of the Project.
		Contract1.			2 enter into Works Contracts in sufficient time to enable the Project to be duty carried t and completed on or before the Completion Date;
	Works Contract	the contract between the Management Contractor and a Works Contractor as referred to in clause 8 2-1-1 and			3 ensure that all items of work to be canned out by Works Contractors as reteried to clause § 1 are canned out in accordance with the Project Specification and with t
		defined in the Works Contract Conditions, clause 1.3 etc. The comoleted Sections 1, 2 and 3 of Works Contract/1 including the Numbered Documents leised in Section 3 and			Works Contracts, using materials, goods and workmaniship of the quality and standar, therein specified, and that where and to the estert mult approval of the quality of motion of the standards of workmaniships a a material for the non-upon of the Activitient/the Crossi
		the Works Contract Conditions".			Administrator such quality and standards are to the reasonable satisfaction of t Architectime Contract Administrator;
	Works Contract Conditione:	The Conditions (Works Contract/2) which are incorporated into the Works Contract by Article 1.2 in Works Contract/1, Section 3.			4 provide or secure the provision of such site facilities and services as are listed in the Fi Schedule or secure such site lacking and services as may be apreed with or may instructed by, the Architect/the Contract Administrator.
		14			15 .
—		- <u></u>			
14 convect	5 provide continual super	when of the Project and perform and provide everything		1-14-1 continued	2 COnclusive evidence that any recessary effect has been roven to at the term
	necessary for the organis	ation and management of the Project,			this Contract with regard to payment save where there has been any accide inclusion or exclusion of any work, inversies goods or foure in any computation any mathematical efforts also compared accions or work mathematical Conductions.
	accordance with the Con	fract Documents,			Neve effect as conclusive evidence as to at other computations, and
	agreed with the Ouenety Cost	surveyor to enable the Quantity Surveyor to venty the Prime			J conclusive evolence mail as and only such extensions of time it any as are under clauses 2.12 to 2.14 here been given and
Obligations in 1.4 Ihrd Schedule	Without prejudice to the general specific obligations listed in the	My of clause 1.5 the Management Contractor shall carry out the			4 conclusive evidence that the accentancent of direct loss and/or evidence respect of applications by Works Contractors as referred to in clause 8.5 and inclusion of such accentanced loss and/or evidence on theme. Cost is in in 1.
Varaqement 1-7 Connactor s Aabelity to Employee	Subject to clause 3.21 the Ma any breach of the terms of this any Works Contractor of this op	nagement Contractor shall be fully lable to the Employer for Contract including any breach occasioned by the breach by hgations under the relevant Works Contract,	•		settlement of all or any claims which the Management Contractor has or may h on behalf of Works Contractors ansimp out of any of the metters referred 1 clauses 4.46 1 to 4.46 7 of the Works Contract Conditions whether such claim for breach of contract, duty of care, stanuory duty or otherwise
Comphance with 1.8 Instructions	The Management Contractor sh save that where such instruction	sel forthwith comply or secure compliance with all instructions is one requiring a Works Contract Variation within the definition	•		2 If any arbitration or other proceedings have been commenced by either party before Final Centricate has been insued inte Final Centricate shell have effect as conclu-
	of Works Contract Variation In submit to the Architect/the Cont written consent of withholding (e Hanagement Contractor before securing compliance shall tract Administrator any writen objection, or where relevant any of consent, to compliance with the instruction received by the			evidence as provided in cleuxe 1.14.1 after either 1. such proceedings have been concluded, whereupon the Final Centricate shall
	 Management Contractor from a Conditions, and the Management Instruction to the extent that the 	I Works Contractor under clause 3.4.1 of the Works Contract in Contractor need not comply or secure compliance with such in written objection, or where relevant the written withholding of			subject to the ferms of any eward of judgement in or settlement of s proceedings, or
	convent, of the Works Convecto	or to compliance with the instruction is reasonable			2 Is period of 12 months during which neither party has taken any lumier step in s proceedings, whereupon the Final Certificate shall be subject to any terms agr in partial estimation.
Custody and 1-8	Contract Documents - other of The Contract Documents shell (documents - Works Contracts (1 9 to 1-12)			whichever is the earlier,
topes of Contract Documents	ell ressonable times for the insi execution of this Contract the Management Contractor shall p with one certified copy of the C	bection of the Management Contractor Immediately after the Architectifie Contract Administrator without cherge to the movele him (unless he shall have been previously so provided) oriesct Documents.			3 If any arbitration or other proceedings have been commenced by either party within days after the Final Certificate has been insued, the Final Certificate shall have effect conclusive evidence as provided in clause 1.14.1 save only in respect of all matter which those proceedings restart.
Former ånsverige – 1-16 Ind detarts	The Architect/The Contract Adm provide him with copies of such	newstrator without charge to the Management Contractor shee . Orewings and specifications and bits of quantities as referred			4 The Final Centricate shall in no circumstances be conclusive as to the sufficiency of resum by under how White Computer in an exception to the Emission and
	to in Article 7 and of such lu documents (in a form and by sur the Contract Administrator and necessary exter to explain and models the formation	infer drawngt, details, descriptive schedules or other like chreproduction methods as are agreed between the Architect fee Management Contractor in writing) as are reasonably amplity the Project Specification or the Project Drawings or to		Effect of 1-15	Employer/Works Contractor Agreement (Works Contract)) or to the Manager Contractor under clause 1.7.4 of the Works Contract Conderons Serve as stated in clause 1.14 no certificate of the Architect/the Contract Administrator abu
Linna to una 1-11	None of the Contract Document	r out and completed in accordance with this Contract. It of the documents mentioned in clause 1-10 shall be used by		centricates other than the Final Cundicate	riself be concluence endence that any work materials or goods to which it releases at accordance with the Contract,
ti documente	the Management Contractor for nor any member of the Professi Contract any of the rates or pro the Appandix,	any purpose other than this Contract and neither the Employer onal Team shall divulge or use encept for the purpose of this cas in any Works Contract nor the Management Fee set out in		Certificare	
Copies of Works 5-12 Connects	Investigately plan the executor provide the Architecultie Cone provided) with one cersited cop	h of sech Works Contract the Management Convector shall tect Administrator (unless he shall have been previously so by of each Works Contract.			
	Cardinates - lanue - effect of f	Final Cartificate — effect of other sartificates (1-13 and 1-15)	•		
heur of 1-13 centrates	Except where otherwise specific the Contract Administrator und dualizate contract Administrator und dualizate contra thermal shart in	cally so provided any certificate to be issued by the Architect/ fer the Conditions shall be issued to the Employer and a	•		
Effect of Final 1-14 Centricate	I Encept as provided in clas, Centricate shall have effect Contract (whether by arbit	were within some units to the Management Contractor, need 1-14-2 and 1-14-3 (and save in respect of Haud) the Final cl m any proceedings enteing out of or in connection with this ration under section 9 or otherwise) as			
	-1 conclusive evidence Sho stated in the Ph resconsible saturact Such satisfaction, an	That where the quality of meteriels or the standard of workmen- opect Specification end/or in a Works Contract are to be to the on of the Architect/the Contract Administrator the same are to d			

							4
		Employer's notice requiring Management Contractor la proceed – peesession of the site (2 1 la 2 3)		Central X Project Concession	34	An entry interpointen of the Alcharge management and the second and provide a schemed to estimate terms as we alcharge top instant entry and the dominant of the Provide shall be downed for all the purposes of this Contract to have them pulse on the downeed for all the purposes of this Contract to have them pulse on the downeed for all the purposes of this Contract.	
anter i nanca ante anter anter anter anter	21	When the Architectithe Contract Administrator notifies the Employer structure (with a copy to the Management Contractor) of the date when 4 will be practicable to commonice the contruction of the Project and the Management Contractor has ministrated any stratistics made to the Third Schedule, instead the FAth Schedule and support the Appendix Part 2, the Employer, not later than 14 days from the date of that written notification (or not later than the errory of such other pend as may be stated in the Appendix) shall by notice in writing to the Management Contractor state whether or not he is to contract co-operation with the Professional Teem and to proceed to set out and secure the carrying out and competition of the Protection accordance with Artick 1. If the written notics requires the Management Contractor is to proceed the Employee shall write strater mode to the Third Schedule, instat the FMS Schedule and won and date the Appendix Part 2.	•	Schedule of Griecis - securing Ine making good Glidefects	25	Whoul presidea to the operation of clause 3.12 any detects, stiven apes or strier lauft article phall stripes when the Detects Lathery Period stretch in the distribution of the transition to meterials, goods or wohnsether oid in accordance with this Contract or to fund isclaiming before Precisal Completion of the Project shall be pointed. Contract or to the fund isclaiming before Precisal Completion of the Project shall be pointed by the Monagement Contractor not later than 14 days after the experiation of the Detects Labels, Period. When a insonance time after related is buck should be to Management Contractor shall be course in a wheng good of the detects, strivinages or other lauts preven specified but subject to clause 3.21 all to cost to the conductive resist the Anchestithe Contractor Shall because instead with a lange of a the another the cost of the strip of the strip of the strip of the strip of the detects, strivinages or other lauts preven specified but subject to clause 3.21 all to cost to the another cost of the strip of the another the strip of the strip of the strip of the strip of the another the strip of the another the strip of the another the function of the strip of the strip of the strip of the strip of the another the strip of the function of the strip of the strip of the strip of the strip of the made to the Prime Cost.	
exprent rector not to tend - deemed enversion of wagenen rector 1 rector 1 rector 1	ы	If the Employer stares in the written notice given under clause 2.1 that the Management Contractor is not to proceed or if the Employer last to notify the Management Contractor in accordance with the provisions of clause 2.1, the employment of the Management Contractor shall be deemed to have been determined and the Employer, within one month (or such other pend as may be stared in the Appendix1 clause 2.1 in the start of the Management Contractor and be deemed to have been determined and the Employer, within one month (or such other pend as may be stared in the Appendix1 clause dark the start of the last of the Management Contractor the Pha-Construction Pendo Management feel less any amount ped under an term Centracter is which the reason why the Employer did not require the Management Contractor to proceed as referred to in clause 2.1, such peyment shall be reduced to the interactor low proceed as referred to in clause 2.1 was because of some default, whether by act or amission, of the Management Contractor, his services or agents, in discharging his collegation is proceed prior to the date when the Employer was required to device given by the temployter of a services or agents, in discharging his collegations in the period prior to the date when the Employer was required to		Certificate of Composition of Making Good Defects Froel	2.4	When in the opinion of the Archiect the Contract Administrator any defects shrenkages or of en- tauts which he may have required to be made good under claine 2.5 shift have brein munn- good he shale insue a certificate to the related and comparising of mainting that re- deemed for all the purposes of this Contract to have taken place role and unit reflects toward in secting the "Certificate of Competition of Making Good Dencis 1. In no case shall the Management Contractor be required at no cost to the Environer to secure me making good of any damage by froat which may appear and the actual Competition unless the Archiect the Contract Administrator shall certify that such damage is due to many which look place before Practical Competition.	
		leave the nonice referred to in clause 2-1.			[e]	Partial possession by Employer	
persion of p4 ement of person	23	 If the Employer gives the notice to proceed under clause 2.1, then the Employer shat give possession of the site to the Management Contractor on the Date of Possession whereupon the Management Contractor shall secure the commencement of the Project and shall ensure the regular and degent progress of the Project and its completion on or before the Completion Date Where clause 2.3.2 is stated in the Appendix to apply the Employer may defer the giving of possession under clause 2.3.3 for a period not exceeding 6 weeks or such lesser part that of the Appendix to apply diversion of such lesser 		Employer's with - Management Contractor s consent	28	If all any time of interest before the date of issue by the Architect the Contract Administrator using certificate of Practical Completion the Employer instead to take possession of any pair or juans ¹⁰ of the Project and the consent of the Management Contractor convent share nur take interactional statements and the Contract, the Employer may take possession mered. The Architect the Contract Administration share theretupon issue to the Management Contractor on behalf of the Architect the Contract Administration share theretupon issue to the Management Contractor on behalf of the Architect the Contract Administration share theretupon issue to the Management Contractor on behalf of the Employee a entere statement identifying the part or parts of the Procession and gring the date when the Employer tool possession (in clarkes 28 6 3 6 5 2 and 6 9 referred to as the reference part on of the reference as the respectively).	
		For the partness of the insurance of the Preset - the Mananement Contractor shall relate		Practical		1 For the purposes of clauses 2.5, 2.6 and 4.7 Practical Competition of the remnant part	
Notes of Notes		possistion of the ske and the Project up to and including the date of issue of the certificate of Practical Completion and, subject to clauses 2.3.4 and 2.8, the Employer shall not be entitled to lake possession of any part or parts of the site or Project until that date.		Completion - relevant part Defects etc -		shall be deemed to have accurred and the Defects Lubuly. Period in respect of me relevant part shall be deemed to have commenced on the reevant date. 2. When in the opmon of the Architectifie Contract Administrator any defects shrinkages or other lads in the elevant and which ha mak allow allow are small to hom much accord under	
		4 The Employer may, with the consent in writing of the Management Contractor, use or				clause 2.5 shall have been made good he shall issue a certificate to that effect	
action action		occupy he are of the index of any notice and the parts interest whether on the polyboar of storage of the goods or otherwise before the date of issue of the conficute of Phatcas Completion by the Architectute Contract Administrator Before the Management Contractor shall give the content to such use or occupient in the Management Contractor shall notify the insures under clause 6.4-1.1 or 6.4.3.1 which we may be spokedule and obtain contineation the somethy to such use or occupient on the Management Contractor to such contineation the content of the Management Contractor shall not be unreasonably withhed.		Insurance - relevant part Liquidated damages -		As from the relevant dete the insurance taken out under clause 6.4 shat terminare in respect of the relevant part but not kinet or otherwise, and where clause 6.5 should be the obligation of the Employer to insure under clause 6.5.2 shat hom the inevant gate include the relevant part In heu of any sum to be paid or allowed by the Management Contractor under clause 2.9 to 2.11 in respect of any period during which the Provid may remain incommere 2.9 to 2.11 in respect of any period during which the Provid may remain incommere	
1911 - 1071al		5 Where the insurant in giving the confirmation retended to in clause 2.3.4 have made 4 a condition of such confirmation that an additional premum is required the Management		relevant part		occuring after the relevant date there shall be paid or aboved such sum as here's ne same ratio to the sum which would be paid or aboved agent from the provisions of clause 2.8 as the Context Cost Plan Total less the amount contained interem in respect of the relevant part bears to the Contract Cost Plan Total	
~		Connector shall notify the Employer of the amount of the additional premium, if the Employer commutes to recurse use or occupation under cause 2 34 the Management Contector shall pay the additional premum required and ahall provide the Employer, if to required, with the report theretic.			 (e)	Photod Completion: Suppreners or rough to use with the Manufarture and Kriss Contrarts	
~		Contractor shall notify the Employer of the amount of the additional premium, if the Employer contraves to recurse use or occupation under cause 2 3 4 the Management Contractor shall pay the additional premium required and shall provide the Employer, if so required, with the receipt therefor 18		Fastmany	 (*)	Phone Completion: Supprements by sound to use with the Management and Views Contract.	
~		Contractor shall notify the Employee of the amount of the additional promium, if the Employee contraves to encure vise or occupation under classes 21 4 the Management Contractor shall pay the additional premium required and alial provide the Employee, if so requested, with the receipt therefor 18		Feetrone:	(•)	Phosed Completion: Supprements by sound to use with the Manuaument and News ("entries. 19	
		Contractor shall notify the Employer of the amount of the additional promium, if the Employer contraves to encure vise or occupation under cause 2 3 4 the Management Contractor shall pay the additional premium required and aliast provide the Employer, if to requested, with the recerpt therefor 18	•••	Feetrine:	 (•)	Phone Completion: Supplements by sound to use with the Manuaument and News ("entries. 19	
Art & Hours Int & Hours		Contractor shall notify the Employer of the amount of the additional premium, if the Employer contrause to recurse use or occupation under cause 2.3 4 the Management Contractor shall pay the additional premum recursed and shall provide the Employer, if so recursted, with the recerpt therefor 18	···.	2-13 conned	[•]	Phased Completions: Supprenents are sound to use with the Management and Views (Letters) 2 any Relevant Event, except the Relevant Event referred to in clause 2 10 7 1 of the Works Contract Conduces, which enters any Works Contract Conduces for completion of the Works Contract Conducts 2 7 of the Works Contract Conduces for completion of the Works.	
Art & Secure Set & Secure Set Concertion ethics & read read read read read read read read		Connector shall notify the Employer of the amount of the additional prentium, if the Employer connects to recurs use or occupation under cause 2.3 4 the Management Contector shall pay the additional premum recursed and shall provide the Employer, if to recursted, with the recerch therefor 18		2.13 conved	(*)	Pressed Completions: Supprements are assued to use with the Manupment and Views Criminant 19 2 any Relevant Event, except the Relevant Event referred to in clause 2 10 7 1 of the Works Contract Conducing, which entels any Works Contract Doubleton of the Urder clause 2 3 and/or clause 2 7 of the Works Contract Conduces for completion of the Works. Provided that no Project Estension Hem shall be considered to the entent that it was claused or communed to by any default, whether by act or omission of the Manupment Contractor is servants or agents of all any Works Contractor he servations or sub-contractors.	
WE HOLDE RECOVERENT RE	2 0 7-10	Connects shall notify the Employer of the amount of the additional prentum, if the Employer communits to recurs use or occupation under cause 2.3 4 the Management Contector shall pay the additional premum required and allel provide the Employer, if to requested, with the recept therefor 18	•••	2-13 convect	(e) 2·14	Presed Completion: Supprenents are sound to use with the Manupment and Views (Liver Views) 2 any Relevant Event, except the Relevant Event referred to in clause 2 10 7 1 of the Works Contract Conditions, which enters any Works Contract Conditions of Lives under clause 2 3 and/or clause 2 7 of the Works Contract Conditions for completion of the Works. Provided that no Project Entersion Rem shall be considered to the entert that it was claused or controbued to by any default, whether to just or omission of the Amagement Contractor is servants or agents or of any Works Contract Conditions for contract Conditions nonly the Archeectine Contract Remember of any proposed decision of retenances of the periods for completion of a Switcher Reme to mail the Archeectifie Contract Antimistiator can express in writing to the Management Contractor periods of decision is accordance with clause 23 of the Works Contract Conditions nonly the Archeectine Contract Ammistiator of any proposed decision on the Archeectifie Contract Ammistiator can express in writing to the Management Contractor any ossan from the poposed decision before the Management Contractor any ossan from the poposed decision before the Management Contractor any ossan from the poposed decision before the Management Contractor any ossan from the toposed decision before the Management Contractor is tortiated on the Management Contractor is strated to nonly any works Contract Conditions. If the Archeectifier Contract Contractor is result and the and 2 4 of the Works Contract Conditions to head Management Contractor is the stored to nonly the Works Contract Conditions to the Management Contractor is the stored to nonly any default works Contract Conditions to nonly the Management Contractor is and the Works Contract Conditions to nonly the Management Contractor is and works Contract Conditions to nonly the Management Contractor is and works Contract Conditions to nonly the Management Contractor is and works Contract Conditions is nonly the	
WE B MOUTE BE DEPORTED SECONDENION SECONDENION SECONDENION MEL SECONDENION SEC	20 210 3-10	Connects shall notify the Employer of the amount of the additional prentum, if the Employer promises to recurs vise or occupation under clause 2.3 4 the Management Contector shall pay the additional premum recursed and shall provide the Employer, if to recursely, with the recerch therefor 18 Demeges for non-samplettion (2.9 to 2-11) If the Management Contractor late to secure the completion of the Protect by the Completion Demeges for non-samplettion (2.9 to 2-11) If the Management Contractor late to secure the completion of the Protect by the Completion Demeges for non-samplettion (2.9 to 2-11) If the Management Contractor late to secure the completion of the Protect by the Completion Determine the Architectifier Contract Administrator shall itsue a confidence to Architectifier Contract Administrator shall itsue a settle of such a certificate to their effect in the Contract Administrator shall itsue a settle of such a certificate to the effect. In the Contract Administrator shall itsue a writer cancellation of that certificate and shall state such their certificate under clause 2.9 and to clause 3.21 the Management Contractor shall as the Employer may require in writing not later than the date of the Find Certification and, as the Employer may require in writing not later than the date of the Find Certification and, as the Employer may require in writing not later than the date of the Find Certification and, as the Employer may require in writing not later than the date of the Find Certification and, as the Employer may require in writing not later than the date of the Find Certification and, as the Employer may require in writing not later than the date of the Find Certification than the appendent contraction conter the Contract (included and the Employer of a sum canculated at the rate stated in the Appendix as liquided and Completion of the Management Contractor under the Contract (tracted the Employer may recover the same from the Management Contractor as a doo	•	2.13 conviced	2.14	Presed Completion: Supprements are sound for use with the Manupment and Views (Internet) 19 2 any Relevant Event, except the Relevant Event referred to in clause 2 10 7 1 of the Works Contract Conductors, which enters any Works Contracts to an extension of the under clause 2 3 and/or clause 2 7 of the Works Contract Conducts for completion of his Works. Provided that no Project Estension Hem shall be considered to the extent that it was claused or contractured to by any default, whether by act or omision of the Management Contractor to servans or agents of all any Works Contract Conductes to support Conducted to by any default, whether by act or omision of the Management Contractor Conducted to by any default, whether by act or omision of the Management Contractors. The Management Contractor shall in accordance with clause 2 3 of the Works Contract Conductors notify the Archeectine Contract has servants or agents of all any proposed adecision of me Archeectine Contract and environ in Management Contractor services on sufficient to contract an express in writing in the Works Contract Conditions notify the Archeectine Contract has meaning to the Management Contractor any dissum the proposed decision or before its Management Contractor who scontractor of his decision in accordance with the provision a reducted in ording the works Contract of the decision testice its featured on under the above- contractor on the Management Contractor is reducted or contract from the proposed decision testice its featured with the above- and clauses of the Works Contract Conditions to honly the Works Contractor of the adove- and clauses of the Works Contract Conditions to honly ins Works Contractor of the decision	
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the Management Contractor not having received in due time necessary specifications or bills of quantities for Works Contracts or Instructions, drawings, detail or Invest from the Professional Team for which his specifically applied in writing provided that such application was made on it date which having regard to the Completion Date was retrier unreasonably dotted from nor unreasonably dotted to the date on which it was necessary for tim to receive the same;

where clause 2.3.2 is stated in the Appandix to apply, the determine of the Employer giving the possession of the site under clause 2.3.1;

SECTION 3: Control of the Project

ntation (3 1 and 3 2) e steff, operatives and doc

- The Management Contractor shaft empt 1, upon the Project and working on the stift the management personnel as hitter in an shaftment to the Second Schedule. The consent of the Archectine Contract Aprin strated "151 be obtained for the redictement, addition of detection of any such management perstified but such consent shaft not be unreasonably entrated. Na-agement personnel of Vanagement Comactor – consent of Architect Con 3-1
- To the evient necessary for the proper ensculion of the Project or the escentariment of any payment due to the Management Contriction. The Quarter Surveyor and the Architectime Contract Achimistration shall be afforded spcess to all documentation of the Management Contractor releting to the Project 31 anaqement presactor s

Instructions (3.3 to 3.6)

Administration &

- The Architectifie Contract Administration shall issue to the Management Contractor such instructions as are reasonably instructions and the Management Contractor property to descharge his opergenons. All such instructions shall be resuld in writing 1 Meci & Contract 3 3
 - 2 If the Architect the Contract Administ" stor purports to issue an instruction otherwise them in writing 4 may be confirmed in writing by the Architectine Contract Administration bite Management Contractor or by the Management Contractor is the Architectine Contract Administrator within 7 days of the Durboried issue it not so confirmed 4 shall be of no administrator within 7 days of the Durboried issue it not so confirmed 4 shall be of no elleci
 - If under clause 3.7 of the Works Contract Conditions a Works Contractor requires the Management Contractor to request the Architectthe Contract Administrator to specify in writing the provision of this Contract, which empowers the rate of any Instruction ratued by the Management Contractor to a Works Contractor, the Management Contractor shall so request the Architectiftie Contract Administrator and the Architectiftie Contract Administrator shall condy with any such request and the Management Contractor shall general to the Works Contractor a copy of the answer to that request. 3
- Whout preudice to the generatry of clause 3.3.1 the Archreckthe Contract Administrator may raske to the Management Contractor Instructions which may require Project Changes or Works Contract Vanations, and shall raske instructions in regard to the expenditure of provisional sums in Work Contracts eci Changas 45 Contract akons --sonal sumi
- 3-5 The Architectishe Contract Administrator may issue instructions to the Management Contractor in regard to the postponement of any work to be executed under the provisions of this Contract.
 - 1 Clause 3.6 only applies where so stated in the Appendix. 34
 - 2 Where the Employer desires
 - -

a Completion Dele aarlief then the Completion Date current at the date of a Preleminary Instruction under clause 3 6 3.

the cancellation of, or a reduction in the length of, any enteneon of leng being fixed under clause 2.12 so that either the Completion Date current at the date of the Pretermany instruction under clause 3.6.3 is not extended or is not extended by the length of the extension of lime that would otherwise here been given under clause 2.12

the Employer may cause the Architect the Contract Administrator to issue a Prefiminary Instruction under clause 3.6.3

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If the Emoloyer causes the Archetect the Contract Administrator to issue a Prierr Instruction to the Management Contractor to accelerate the carrying out or to all sequence or timing of, any noise to be securized urowing the provisions of the Na Contra Architectithe Contract Administrator shall in such Instruction set out the exact nail the desire of the Emoloyer in regard to the Contra-Date as referred to in clause for which the Patemaney Instruction has been issued. 3

- 4 If the Management Contractor, or through him any Works Contractor, makes a reaso objection to compliance with such instruction. The Preliminary Instruction shale with withdrawin or so varied as to meet any such objection and then re-issued by the Arci the Contract Administrator.
- 5 As soon as reasonably practicable after receipt of the Preliminary Instruction to receipt of a Preliminary Instruction re-issued under clause 3.6.4) the Manag Contractor shall inform the Architect the Contract Administration in writing
 - 1 in respect of each Works Contractor affected by the proposed instruction

the turns sum reasonably required by such Works Conviscor (in response Management Contractors a mouny made under clause 3.4.6.1 of me Contract Conditions) to be added to in Works Convisci Sum or same most as in the computation of the Ascentened Final Works Convisci Sum as a re comparace with the instruction when issued by the Management Contractor me Works Convisci

that it is not reasonably practicable to state such a tumo sum and that the the Employer of compliance by such Works Contractor will therefore have ascertained in accordance with all the relevant Works Contract Conditions

and

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the earlier Completion Date which can become the Completion Date for purposes of this Contract

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The extent to which an extension of time that would otherwise be hind. Archieoththe Convect Administrator under clause 2 12 can be sworded or in and the Completion Date which as a result will remain or become the Con Date for all the purposed of this Convect.

- 8 If on recent of the information given to the Architect the Contract Administratio claure 3.6.5 the Employer withes to pay the amounts referred to in claure 3.6 to accept the Completion Date stated by the Management Contraction burbant 3.6.5.2 the Employer shall sause the Architect/the Contract Administrator to it.
 - Confirming the details of the acceleration or sheration of securice or required including the change of changes to any Works Contract period or for completion of the Works Contract Works stated by Works Contra-response to the Management Contractor under clause 3.4.6.2 of the Contract Condeions.

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and

lwing the Completion Date

		Ins our mis time classifies a consistency that is a most any work and in a subject in the association of the Provest and Shata provide the Management Convision by why of accurately premisioned drawings with such information as shat ensore the Management Convision to set our the Project. The Management Convision and the responsible for setting out, and shat, at no cost to the Employer, amend any empirical and and the course setting out.	्रमा । सत् न्यवास्य स्वत Or goods – on see	J *5	United matter & and grows new-red to graved on or asserted to the Project and new investor shall not be removed except to use upon the Project univers the Accentisation Co. Administrator has conserted in writing to such removal which consent shall no unreasonably withheid. Where the value of any such materials or goods has been nected any termine Carlicolae unover which the amount property due to be Management Corrector been paid or discharged by the Entropyer, such materials and goods shall become promotely of the Entropyer of Landa All the Nacessment Continues to the two
Usenels gooda ard workmanahap - slandarda	3-0	1 All melenels and goods shall so far as procurable be of the respective lands and standards described in the Project Specification, or as may be required in any specification or bet of quantities in any Works Contract provided that melenels and goods shall be to the reservable satisfaction of the Architective Contract Administrator where and to the element that their sequered in the Project Specification or series to the where and to the element that their sequered in the Project Specification or series referred to	Unfred materials or goods - off-see	3-16	property of the Employer but (subject to clause 8.4) the Management Contractor shall re- responsible for tosts or demage to the same. Where the value of any materials or goods for a Works Contract and stored off-side he accordance with the Second Schedule, Part 2 and clause 4.19.3 of the Works Con- Condexion been included in the amount deviced in an Interm Centecee by the Archedor Contract Administration under clause 3.2 is an annumb included the rest and a tot
		In clause 1.5.3. 2 All workmanship shall be of the standards described in the Project Specification, or as may be required in any specification or bills of quanties in any Works Conrect, or, where no such standards are described or required, shall be it an andard appropriate to the Project provided that workmanship shall be to the reservable basinfaction of the Architecthe Contrast Administration where and to the arisint that this a required in the Project Specification or as referred to in clause 1.5.3.			Contractor and the Employer has paid or decharged the amount property due to Management Contractor under the interm Centricate such materials and goods shall bec the property of the Employer, and Interester the Management Contractor shall not except use upon the Photect, remove or cause or permit the same to be moved or removed howr premises where they are, but the Management Contactor shall not encrease to the property of the Photect and the same to be moved or removed howr premises where they are, but the Management Contactor shall not any toos thereof or damage thereto and for the cost of storage, handing and meanness the same under such time as they are deviced to and placed on or adapted to the Proved interded therefore whereupon the provisions of clause 3 15 (second the words Where the will the words therefore the provision to be a bod ence them to the toos.
homon of reaching	34	The Management Contractor shall upon the request of the Architect/the Contract Administrator secure the provision of vouchers to prove that the materials and goods comply with clause 3.6.1.			Access for the Professional Team to the Project
hepechon – lesta	3-18	The Architect/the Contract Administrator may result instructions requiring the Management Contractor to secure the opening up for inspection of any work covered up or secure the carrying out of any list of any meteriats or goods (whether or not already incorporated in the Project) or of any encurated work, and such opening up or tearing together with any making good in consequence thereof shell be at no cost to the Emologier if are neglection or test shows we are inspections or test and on the second se		2-17	The Professional Team shall at all reasonable times have access to the see of the Protect to the workshoot of other places where work is pering properties for the Protect busines such reasonable restrictions of the Management Contractor or any Works Contractor or necessary to protect any proprietary right of the Management Contractor or any V Contractor in such work.
Renoval from the set - work etc., ret in accordances whiches 3 &	3-11	The Architect/the Contract Administrator may issue instructions in regard to the removal from the site of any work, meternate or goods which are not in accordance with the provisions of cases 3 8. The replacement of such work, meternate or goods and their removal from the site shall subject to clause 3 21,0 be an or cost to the Emphyser.		218	The Employer shall be entitled to appoint a clerk of works whose duty shall be to act sol- mesocior on behall of the Employer under the directions of the Architectime Co- Administration and the Management Contractor shall afford every reasonable laceity it perforance of that duty.
hitsections an	218	The Archeschine Contract Administrator may whenever he conviction it persession to do an	Assignment	3-18	Assignment (3-19 and 3-20) Neither the Employer nor the Managament Contractor shall without the written consent
differs MC.	• • •	Issue instructions requiring any defect, shrinkings or other fault which instead is in fectorisity to do too, take instructions requiring any defect, shrinkings or other fault which hash is any time appear or be discovered and which is due to materiels, poods or workmanship not in accordance with the Contract to its free occurring before Practical Contraction of the Pravet to be made appendix to the contract to its free occurring before Practical Contractions of the Pravet to be	of Contract Assignment by	3 20	other, assign this Contract. Where clause 3 20 is stated in the Appendix to apply then, in the event of a transfer t
		and the Management Continctor shall writin a reasonable line after react of auch index pool and the Management Continctor shall writin a reasonable line after react of auch index pool comply or secure compliance with the same but, subject to clause 3.21, at no cost to the Employer,	Emokoyer – nght Io bring proceedings		Emotoyer of his freehold or lessetoid interest in, or of a grant by the Emotoyer of a less interest in, the whole of the premises comprising the Project, the Emotoyer may at any lens Practical Completion of the Project assign to any such transferee or lesses the roys to proceedings (whether by arbitration or by Migalion) to enforce any of the terms of the G mode to the benefit of the Employer heavier. The Employers and the Management Cost and indicable agreements reached between the Employer and the Management Cost and the terms of provide the terms of the Cost
Wrage -	3-13	The Management Contractor shall constantly keep upon the site a competent Manager who			and which area out of and refere to the Contract (whether or not they are of appear to derogenon from the rights assigned) and made prior to the date of any assignment.
Notwerford Notwerford Notwerfor		shall be approved by the Archeckine Contect Apministrator in the Inte-Construction heriod and who a need on the Appendix and who shall not be changed without the prior approval of the Archeckine Contract Administrator which approval shall not be unreasonably withhed, Any Interconcer given to the Managed (or to his appcession duk appointed) shall be desmed to			Breach of Works Contract by Works Contractor – Management Contractor's Employer's obligations
herorst cf Heropa Forn	3-14	Neve been given to the Management Contractor, The Architect/the Contract Administrator may (but not unvessorably or vesatiously) issue Instructions ordering the removal from the Project of the Management his replacement by a		3-21	Notwithstanding anything contained elsewhere in the Contract are belowing provisions apply in respect of any breach of, or non-compliance well, a Works Contract by a 1 Contractor (which shall be deemed to include a determination of the employment of a 1 Contractor under clauses \$1 to \$5 of the Works Contract Conditions and are employement, as a result of such breach or non-compliance, of other persons to carry ou
Pord		suisble partion proposed by the Management Contector and approved by the Architect/the Contect Administrator which approved shell not be unvessorably wethoud,	•		or the whole of the Works Conviract Works in accordance with clause 7.4.1 of the 1 Contract Conditions;
	-	24			23
					•
18 00000	,	The Management Contractor shall in consultation with the Architect/the Contract Administrator and the Employer take at necessary steps	3 22 continued	,	2 subject to any instructions the Management Contractor shall rate all such action
111 connec		 The Management Contractor shall in consultation with the Architect/the Contract Administrator and the Employer take all necessary steps to operate the terms of the Works Contract for dealing with such breach or non- completions, including enforcement through arbitration of trigation if necessary, to obtain any amount due to the Management Contractor including therein any amount for which the Management Contractor in teologi to the Works contractor. 	3 22 contract	,	Subject to any instructions the Management Contractor shall take all such action be recessary, including, on legal advice (unless the Employer decides to depen the obtaining of such advice) enter setting the claim or befreding the claim in act or legation and shall be pay to the Work Contractor the smourt of any settlement a sudgment including any coals agreed to be paid by the Management Contra everyded against time;
381 connuec		 The Management Contractor shall in consultation with the Architect/the Contract Administrator and the Employer take all necessary steps to operate the terms of the Works Contract to clealing with such breach or non- compliance, including inforcement mough arbitration or legislion if necessary, to obtain any amount due to the Management Contractor including therein any amount for which the Management Contractor in teole to the Employer under clause 17, as a result of the breach or non-complexics by the Works Contractor; and to secure the samplectory completion of the Project including the engagement for their purpose of a further Works Contractor it auto angegement is 	3 22 conned	,	2 subject to any instructions the Management Contractor shall rate all such action be received or to be subject to any instructions the Management Contractor shall rate action to opport the obtaining of such advects retrieve the context or triggition and shall pay to the Works Contractor the amount of any settlement a pudgment including any coals agreed to be paid by the Management Contractor and and approximation of the statement and triggition and shall pay to the Works Contractor the amount of any settlement a pudgment including any coals agreed to be paid by the Management Contractor any enteriner and the statement of the functions in technology the sobigations uncomplexes on the been incurrent of the Management Contractor in dechaging the sobigations uncomplexes. This immediation on removement to an Management Contractor in the Management Contrac
\$11 connuec		 The Management Contractor shall in consultation with the Architect/the Contract Administrator and the Employer take all necessary steps to operate the terms of the Works Contract for dealing with such breech or non- completions any amount due to the Management Contractor including therein any amount for which the Management Contractor in teole to the Employer under clause 1.7, as a result of the breach or non-completions by the Works Contractor; and to secure the satisfactory completion of the Project including the engagement for their purpose of a further Works Contractor if such engagement is in accordance with the terms of the Works Contract or is in the Works Contractor who has lated to comply with the Works Contract or is in breach or 	3 22 convers	,	 Subject to any instructions the Management Contractor shall rate all such action be recreasity, including, on legal advice (unless the Employer decides to depen the obtaining of such advice) enter setting the claim or optimizing rine claim in act or Hightion and shall pay to the Works Contractor the anount of any settement a subgrown including any coals agreed to be paid by the Management Contra awarded against hem; The Employer shall reimburse the Management Contractor the anounce that the domy many settement contractor in connection with setting or detending the claim is refu in clause 3.22 but only to the antent, and not furthe or one-noise that the domy pay such amounts heat been incurred other than by reason of any breach of con nedylogence of the Management Contractor is obligation und Contract. This function in combustionsment to the Management Contractor is however, apply to breacher all contract to which clause 3.21 applies which is governed by Hel clause.
171 20111-00	,	The Management Contractor shall in consultation with the Architect/the Contract Administrator and the Employer take all necessary steps to operate the terms of the Works Contract to dealing with such breach or non- complance, including anticessment mough arbotismic on theydond if necessary, to obtain any amount due to the Management Contractor including therein any emount for which the Management Contractor is leade to the Employer under clause 17, as a result of the breach or non-complence, by the Works Contractor; and to secure the satisfactory completion of the Project including the engagement for the purpose of a further Works Contractor is a book on the purpose of a further Works Contractor or a in breach or in accordance with the terms of the Works Contractor under final Works Contract has been determined because of a breach or non- complence, and	3 22 comment	1-23	2 subject to any instructions the Management Contractor analities all such action be receisary, including, on legal advice (unless the Employer decides to decime in act or legalision and shall bery to the Works Contractor time amound any settlement a sudgment including any coals agreed to be paid by the Management Contractor the amound any settlement a sudgment including any coals agreed to be paid by the Management Contractor and any settlement a sudgment including any coals agreed to be paid by the Management Contractor the amound any settlement and the settlement of the settlement of the coale and the settlement of the settlement of the coales.
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111 2011-00		 The Management Contractor shall in consultation with the Architect/He Contract Administrator and the Employer taxe all necessary steps Is boorste the terms of the Works Contract to dealing with such breach or non- order to which the Management Contractor in budget of necessary, to obtain any amount Que to the Management Contractor including therein any encount for which the Management Contractor is back to the Employer under clause 17, as a result of the breach or non-complexes by the Works Contractor and Is because the satisfactory completion of the Arbeic including the engagement for the purpose of a buffer Works Contractor is back to the Employer under the purpose of a buffer Works Contractor of auch engagement is in accordance with the terms of the Works Contractor or a this breach or who has taked to comply with the Works Contractor under that Works Contract has been dreammed because of a breach or non- complexed, and Is meet any claims properly made under the Works Contractor under that Works Contract, has been dreammed because of a breach or non- complexed, and Is meet any claims properly made under the Works Contract Conditions, by Works Contractors, one them the Works Contract Conditions, by Works Contractors, one them the Works Contract Conditions, by Works Contractors, one them the Works Contractor in a presech or who has taked to complexed, and Is the Employer shall Is pay to the Management Contractor in accordance with Section 1 and the Second Schedule all amounts properly incurred by the Management Contractor in fulling the obligations set out in clauses 3 21 1:1 and 2 31 1 2 but subject to the ngt of deducted or recovered under clauses 3 21 1:1 and 3 21 1:2 but subject to the ngt of deducted or recovered under clauses 3 21 1:0 and 2 1:1 because the Completion Date that been encoursed for management Contractor. Is entitled to moover from the Management Contractor all amounts paid or creterind to	122 connector Information not in Contract Documen Information not in Contract Documen Responsebility of Employer Effect of Ind of antiquities	3-23 3-24 *1 3 25 3-26	 Subject to any instructions the Management Contractor and rate at such action be increasizity, including, on legal advice (unless the Employer decides to oxom the obtaining of such advice) enter setting the claim or believing the claim in at a udgraver ancluding any costs agreed to be paid by the Management Contra- entered against here. The Employer shall reimburse the Management Contractor the amound any settement at indicate against here. The Employer shall reimburse the Management Contractor the amound any settement and the settement of the settem, and not furner or omericas that the doty part and the best normation of meritime to present of any treatment and indicate 3 22 2 but only to the entert, and not furner or omericas that the doty part but amounts hab been incurred or in dechegring the subgrave up to brack of con- ned/genes of the Management Contractor in dechegring the obligations und Contractor. This Intraction on rembursement to the Management Contractor in however, toppy to brackets of contract to which clause 3 21 applies which is govermed by the clause. Work the Contract or particulation at the Employer instant or to contract contractor to accurate the study in the Employer instant or to part of the Contra contractor to accurate the action rate of any work not forming part of the Contra- ctor to accurate the Employer themation of the Photes in accordance - Contractor to accurate the action of provide the information of the Photes in a score accura- tor of the particle to counterist do not provide the information reference to an accordance - Contractor to accurate the action of provide the information reference to an accura- prosised or by partons amployed or otherwise engaged by the Employer, then the Employer set to by partons amployed or otherwise engaged by the Employer, then the Employer set to by partons and to be a Work Contractor which is to be approved or otherwise engaged by the Employer, then the Employer and the contractor of which
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11 2000-00	, 	 The Management Contractor shall in consultation with the Archiectiffe Contract Archivertator and the Employer Lake all necessary steps. Is constate the lemme of the Works Contractor or bugston if necessary, to obtain any amount due to the Management Contractor is bacts to the Employer under clause 17, as a result of the breach or non-complence by the Works Contractor or bugston if necessary and the Durpose of a further Works Contractor is bacts to the Employer under clause 17, as a result of the breach or non-complence by the Works Contractor or to be the Durpose of a further Works Contractor of auch engagement as in accordance with the tempory of the Works Contract or a to the breach or non-complence of a further Works Contract or a function of the Property of the Works Contract or and the breach or into hear failed to comply with the Works Contract or a to the breach or non-complence, and in accordance with the temporyment of the Works Contractor under the Works Contractor who as in breach or into the Works Contractor under the Works Contractor who as in breach or who has failed to complexity. It meet any claims broomly made under the Works Contractor under the Works Contractor who as in breach or who has failed to complexity. It meet any claims broomly made under the Works Contractor on the subth breach or who has failed to complexity. It meet any claims broomly made under the Works Contractor in the Bard to complexity of the Works Contractor who as in breach or who has failed to complexity and the Monagement Contractor who as in breach or who has failed to complexity of the Works Contractor who as in breach or who has failed to complexity or claims 21 12 but subject to the right or deducted or recovered under claims 21 12 but subject to the right or deducted or recovered under claims 21 12 but subject to the right or deducted or recovered under claims 21 12 but subject to the right or deducted or recovered to risson of the breach or mon-comple	122 commend Information in Contract Documen Information not in Contract Documen Resconschery of Erroloyer Effect of Ind of antiquetes found	3-23 3-24 3-25 3-25 3-27	 stolect is any instructions the Management Contractor shall sele at such action in excitating of such advect juries after any one and on the obsamed of such advect juries after the obsamed of such advect juries after any one and on the obsamed of such advect juries after the any or and supported and the parts the Management Contractor in a mound any settement and in clause 3.22 but only is the entert, and on luttine or omen-sus that the oog parts amound the base been neutred of one function of the disposed for the standard of the function of the disposed for the standard of the function of the disposed of the Management Contractor in discharging the clause 3.22 but only is the entert, and on luttine or omen-sus that the oog parts and mounts the basen contracts of an discharging the based area of the Management Contractor in discharging the based area of the Management Contractor in discharging the based area of the discuss. Works by Employer and persons employed or engaged by Employer (3.23 to 3.28). Mare the Contract Documents, in regard to any work not formation an exclusion or contractor of the function. Mare the Contract Documents, an regard to any work not formation of the Contractor of contract to secure the cannot of the mound of the function of the Contractor of contractor of the function. Mare the Contract Documents, an regard to any work not formation at according to a function. Mare the Contract Documents on the problem of the Contractor by the functions. Mare the Contract Documents, an regard to any work not formation at a second the contractor of work and formation of the function of the Contractor of the contractor of the function of the Contractor of the distance of the Contractor of the contractor of the distance of the Contractor of the distanconter of the contractor of the distance of the Contractor of t
11 2000-00	, 		122 commend Information ind in Contract Documen Information not in Contract Documen Responsebility of Employer Effect of find of antiquities	3-23 3-24 3 25 3-26 3-27	
11 2000-00			122 connect Information In Contract Documen Momention rol in Contract Documen Responseduity of Erroloyer Effect of Ind of antiquities	3-223 3-24 3-25 3-26 3-27	

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- 2 In the presence of any rates of leaves roots in coloring to a second and the Management Contractor what pay rates of leages and observe hours and conditions of leabour which are not less lancurable than the general what of wages, nour and conditions observed by other employees wrokes general incrementations in the trade or industry in which the Management Contractor is engaged are territier.
- The Management Contractor shell in respect of all persons employed by Nm (whether in carrying out the Contract or otherwise) in every factory, workshop of other piece accupied or used by hem for the carrying out of this Contract (including the Protect) controly with the general conditions required by cleares 3 28. The Management Contractor hereby vertraits that to the best of his knowledge and bekel he has complied with the general conditions required by cleares 3 28 for all least 3 months prior to the date of his tender for the Contract.
- The Management Contractor shall recognise the freedom of his workpeople to be members of trade unions, -1
- The Management Contractor shall at all times during the continuance of this Contract display, for the information of his workbacopie, in avery factory, workange or place occupied or used by him for the carrying out of this Contract (including the Project) a sopy of clause 3.28. Where relies of wayes, hours or condition's of work have been established either by regonation or arbitration as described in clause 3.28.11 or by any governet commonly recognised by employees and workers in the describ award agreement or other document spectrym or recording such raises, hours or concleans that and be enhanded by the Management Contractor or made evaluable by him for inspection in any such place as eloresaid.
- The Menagement Convector shall be responsible for the observance of cleuse 3.28 by Works Contractors employed in the carrying out of the Contract, and shell if required notify the Employer of the nerves and addresses of all such Works Contractors. 6
- The Management Contractor shall keep proper wages books and sine sheets showing the wages paid to and the time worked by the workpeople in his employ in and about the canying out of the Contract, and such wages books and time sheets table be produced whenever required for the inspection of any official sufforced by the Employer. The Mana
- If the Employer shall have reasonable ground for beforving that the requirements of of the preceding provisions of cleuxes 3 28 are not being observed, he or the Architec Contract Administrator on his behalf shall be entitled to require proof of the rates of wir peel and house and coordinate observed by the Management Contractor and W Contractors in carrying out the Project. 7

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-- . Payment (4 1 to 412) The Employer shall pay the Managament Contractor in accordance with the provisio clauses 4 1 to 4 12 41 rt by нутналі почоув the Prime Cost of the Project secentained in accordance with the Second Schedule, an rt Fee. The Architect/the Contract Administrator shall insue Interim Centricates stating the amount to the Management Contractor from the Employer at the following times or periods. sue of inte 4.2 Cenfcatesduring the Pre-Construction Period: at the period stated in the Appendix under -1 nce to clause 4 2 1; on the Date of Possession up to and including the end of the period during which indicate of Practical Completion is issued, at the period of interve certificates state a Appendix under the reference to clause 4.2.2; the App after the and of the period of interm certificates during which the certificate of Prac Completion is issued; as and when further amounts are escenared as parable to Management Contractor by the Employer provided always that the Archivectifte Con Administrator shall not be required to instead an term Cartificate within one cale month of hering issued a previous Interm Certificate. 3 at the time referred to in clause 4.11 (final amounts - Works Con 43 -1 The Management Constactor shall be anothed to payment of the amounts stated at in Inform Canificates within 14 days from the date of issue of each interm Canificate Payment of amounts: due in interm Caraficates

- Notwithstanding the following interest of the Employee in the Reference as stated in c 4.8.1 the Employee is enstead to exercise any right under the Contexct of oeductors monest due or to become due to the Managament Constractor against any amount s under an Intern Cartificate interest of not Resention is included in that interim Cartif 2
- Where the Encloyer exercises any right under this Contract of deduction from in due or to become due to the Menagement Contractor he shall more the Manag Contractor in unting of the reasons for that deduction. 3
- Interim valuations shall be made by the Quantity Surveyor for the purpose of accent amounts to be stated as due in Interim Camingates, 44 amounts due in Insurin Certifica
- during the Pre-Construction Period The amount to be stated as due in an Interm Conflicate to which clause 4.2.1 refers she appropriate instalment of the Pro-Construction Period Management Fee stated in or call by reference to the schedule assoched to. The Appendix. 44
 - The amount to be stated as due in an interim Centricate to which clauses 4.2.2, 4.2.3 an refer that be, as instead to a date not more than 7 days before the date of the interim Certifies sum of the following: 44
 - It is amounts due and payable under the respective Works Contracts, escenta accordance with Part 2 of the Second Schedule, ether the deduction of any is deductible in accordance with the entits of the Works Contract,
 - The entrement is public to the vehicle rights of deduction given to the Employee in the Co-rectiding any congetion to deduct under Clevers 5.9 to 3.17 and to the estimation of the parmet s М VALA

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Į except where the Employer is a local summity the Employer shall if the Mana-Contractor or, through the Management Contractor, any Wons Contractor so indu-the date of payment of each interm Centractor, any Wons Contractor so indu-te date of payment of each interm Centractor place the Relevance and sever-separate barring account (to designated is to deniv) the amount of Relevance the Employer on Instit as provided in classe 4.8 (1) and centrity to the Arch Contract Administrator with a copy to the Management Contractor that such and been so placed. The Management Contractor shall similary more act-Contractor in respect of whom the Employer is holding Relevance. The Employer entrated to the full benchcall relevant in any interest accoung in the separate account and shall be under no duty to account for any such interest to the Mani Contractor in te any Wonte Contractor; 48 commund 3 he amounts for she staff, general facilities etc. she facilities, services and ination recently provided by the Management Contractor ascertained in accordance with Par , 3A, 38, 4A, 4B and 4C of the Second Schedule which amounts shell be subject together with 3 the Pre-Construction Partod Management Fee, an instament of the Construction Period Management Fee adjusted, where approon in accordance with clause 4.10.2, being the ratio that the Construction Pe Management Fee bears to the Contract Cost Pain Total applied to maximum of a pro-referred to in clauses 4.8.1 and 4.8.2, subject to a maximum of 97% of the amount of Construction Period Management Fee, adjusted, where appropriate, in accordance clause 4.10.2, and

- she the Pro-Construction Period

Final Cartificate

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escentarement of Preme Cos

any expanditure incurred by the Management Contractor for which he is entitled reimbursement by the Emoloyer is accordance with clauses 3.21 and 3.22 and any oft costs incurred by the Management Contractor which are not included in clauses 4.6.1. 4.6.4 inclusives and which are cargoble by the Employer to the Management Contractor accordance with the Conditions.

less the sum of the lofo

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- any payments to or credits received by the Managemi which have amen from the carrying out of the Project, ment Contractor for m
- any payments to or credits received by the Management Contractor which the Employer is entitled to recover in accordance with clause 3.21.2.3 or any other clause in the Conditions, and .7
- 8 the sum of the amounts stated as due in all the Interim Conflicates previously its under clauses 4.2.1, 4-2.2 and 4.2.3.
- 47 The Reservices which the Employer may deduct and retain as referred to in clause 4.6.2 shall be:
 - . 3 per cent of any amount as relates to work which has not reached Practical Comple (as referred to in clauses 2.4 and 2.8.1)
 - 1.5 per cent of any smaurt as relates to work which has reached Practical Conceleton (as referred to in clauses 2.4 and 2.8.1) but in respect of which a Camicase of Completion of Making Good Detects under clause 2.6 or a centificase under clause 2.8.2 has not been issued. 2
- 48 The Resention including that held in respect of all Works Contracts shall be subject to the infinition a data
 - the Employer's Interest in the Retention is fiductary as inverse for the M Contractor and for any Works Contractor (but without obligation is invest); -1
 - at the date of each interim Contract the Architecture Contract Administrator or it too instructed by the Architect/the Contract Administrator the Quartery Surveyor shall propers a substantial setting out the total procurd of Resention hald at that date in inspect of the Managament Contractor and the total amount hald in inspect death Works Contractor, and such satement shall be issued to be Managament Contractor and by the Managament Contractor its each Works Contractor named in that statements. 2

- d the Employer evercises the right to deduct referred to in clause 4.3.3 aga Retention he shall include, in the written information to the Management Come ac-under clause 4.3.3, details of any deduction hom ether the Retention herd in it the Management Confliction or the Retention held for any Works Contractor (set the statement issued under clause 4.8.2). Not leter than 8 months after Practical Completion of the Project the Main Contractor shall provide the Quantity Surveyor, unless previously provided, documents necessary for the purposes of the ascentariment of the Prime Cost a all documents relevents to the accounts of Works Contractors.
- Not later than 3 months after receipt by the Quartery Surveyor from the Man Contractor of the documents required under clause 4.9.1, the Quartery Surve deriver to the Architecthe Contract Administrator a steement of the Prime Cost a Management Fee (including any adjustment of the Construction Period Manage under clause 4-10.3) and the Architecthe Contract Administrator shall avoid a the statement to the Management Contract Administrator and shall avoid the statement to the Management Contractor II the statement refers to any doct of any fem of cost put Toward by the Management Contractor part of the Pri-there shell be included in the statement the reasons for such disaflowence z
- No adjustment of the Construction Period Management Fee shall be an accordiance with clause 4 10 2 and 4 10 3 ۱
- It, pror to the issue of the Final Centricate, the Prime Cost succeds the Con Plan Total by more than 5% (or such other percentage as is satisfy in the App Construction Partod Management Fee shall be adjusted in accordance with th set out in clause 4-10-4. 2
- 3 If the Prime Cost exceeds or is less then the Contract Cost Plan Total by in for such other percentage as it stated in the Appendix) the Commu-Menegement Fee shell be adjusted in accordence with the lormula set 4-10.4
- 4 The formula referred to in cleuse 4 10 2 or cleuse 4 10 3 m

ACPMF = CPMF x 100 ± (0-7) 100

- is the adjusted Construction Period Manager ACPM nt Feet;
- is the Construction Period Management Fee as stated in the Ap Is the increases of decrease of the total Prime Cost when campa Contract Cost Plan Total supressed as a percentage of the Cr Plan Total;
- Is 5 of such other number as is stated in the Appendix under 5 to cloude 4 10 2 and 4 10 3.
- al be + (plus) if the lotal Phone Coal exceeds the Caminact Cc (moust) if the Phone Coal is less than the Commit Coal Pa ±

			a bettype the date of result of the Final Centricate referred to in clause 4.12 and non-th-				
		pla Co	doing that a panod of one month may not have elapsed since the issue of a previous interm				Statulary Requirements (5-1 to 5 5)
		inc.	de line amounts in respect of Works Contractors payeole to the Managament Contractor		Companya with	£1	Subject to clause 5.5 the Management Contractor shall secure compliance with, and give all
		840	enamed in accordance with Part 2 of the Second Schedule		Slatury	•••	nonces required by, any Act of Panlament, any instrument, rule or order made under any Act
nice	4-12	-1	The Architect/the Contract Administrator shall issue the Final Certificate not later then 2 months from whichever of the following events occurs the latest:		hedrauente		which has any prediction with regard to the Project or with whose systems the same are or and
							be connected (all requirements to be so complied with being referred to it the Conditions as The Statutory Requirements].
			Pe and of the Delects Dalowy rando,		A		I and Management Consistent shall find any chaptering between the Stationy Recurrences
			the issue of the Camilicate of Completion of Making Good Defects under clause 2 &;	*	Slatury	**	and all or any of the documents referred to in clauses 1.9 and 1.10 or between the Statutory
			the delivery by the Quantity Surveyor to the Architect/the Contract Administrator of the elemented referred to in clause 4.9.2		 Requirements and documents referred 		Administrator a written notice specifying the divergence.
				•	10 m clauses		(
		2	The Finel Centricate shell state:				The Management Contracts along and a state of the State of the Archaeolithe Contract
			the sum of the amounts already stated as due in Interim Caroficates, and		Instructions		Administrator shall otherwise discover or receive nonce of a divergence between the Statutory
			It is sum of the Prime Cost and the Management Fee as set out in the statement to which clause 4.9.2 refers.				Requirements and all or any of the documents refered to in causes 1.9 and 1.10 or demonstration the Statutory Requirements and any Instruction the Architectime Convect Administrator shall
							within 7 days of the discovery or receipt of a notice issue instructions in relation to the divergence. If and insclar as the instructions require the Project to be changed or any Works.
			the Management Contractor in respect of any Interim Cartificates which have not been				Contract to be varied they shall be treated as if they were instructions issued in accordance with clause 3.4.
			paid by the Employer) be expressed in the seld Certificate at a balance due to the Management Contractor from the Employer or to the Employer from the Management		6		1 If a processory completes with clause 5.1 requires the Management Contractor to
			Contractor as the case may be. Subject to any deductions authorised by these Conditions the said balance shell, as from the 28th day after the date of the seid Final		compliance with	•••	secure the supply of materials or the execution of work before receiving instructions
			Centricate, be a debi payable as the case may be by the Employer to the Management Commister or he the Management Contractor in the Employer.		Statutory Requirements		melenels or the execution of such limited work as are reasonably receivant to secure
							Immediate compliance with the Statutory Regularisments
							2 The Management Contractor shall forthwith inform the Architect/his Contract Administrator of the emergency and of the steps that he is taking under clause \$4.1.
				•			3 The securing of the supply of materials or the evecution of work under clause 5.4.1 shall
							be treated as having been so secured pursuent to an instruction requiring a Works Contract Visionary under clause 3.4, provided that the emergency areas because of a
							divergence between the Statutory Requirements and all or any of the documents referred
							to in clauses 1.9 and 1.10 or between the Statutory inducements and any Handchon requiring a Works Contract Variation issued in accordance with clause 3.4 and the
							Managament Contractor has complied with clause 5.4.2.
					Project - non-	5-5	Provided that the Management Contractor complets with clause 5.2 the Management Con- tractor shat not be liable to the Employee under this Contract / the Project does not comply with
					Statutory		The Statutory Requirements where and to the extent that such non-complemes of the Prosed
					Pequirements - position of		provided or secured are lacities and services in accordance with the documents referred to
					Management Convector		In clauses 1 8 and 1-10 or with any instruction issued in accordance with clause 3 4,
				•			
							Marken & Andre of Tang and a strangented and defined of the distribution of the last of the
				•			
					Definitions - VAT Agreement	4	In clauses 5.6 to 5.8 and in the subplemental provisions pursuant hereto (narranews clause we "VAT Agreement"), "tat," means the value added tax introduced by the Finance Act 1972 which
					•		 is under the care and management of the Commissioners of Customs and Excelle (hereineter and in the VAT Agreement cared "the Commissioners").
					Star Carl	L.7	Any relevance in the Conditions to the Prime Coal of the "Menegement Fee" shell be received
					Management Fee	-	as such cost or Fee exclusive of any tax and recovery by the Management Contractor from the
					gucture of VAI		under or by virue of the Finance Act 1972 or any amendment thereof on the subbly of goods
							and services under this Contract shell be under the provisions of this clause and or the val- Agreement.
							m ,
			×				~
l		-					- <u></u>
[•			
					6.13	,	
24	н	יי	o the entert that after the clare of the Contract the suboly of goods and services to the		Cancelation of		 The Management Contractor shall immediately inform the Employer in unring if hell output for contractor is concreted and must be date of each contraction.
WAT			mouse equal to the loss of credit (input tax) on the subory to the Management Contractor of		IST CRANCING		
		1	code and services which contribute exclusively to the Project.		Vouchent	9 -1:	shand Revenue any voucher which, is completice with the hegulations, sind providing to the shand Revenue any voucher which, is completice with the Managament Correlators
		1	inence (No.2) Ast 1975 - statutory tax deduction acheme (5 8 to 6-17)				 obigations as a 'sub-contractor' under the Regulations, the Management Contractor (Invested the Employer.
Hore	н) (I this Condition the Act' means the Finance Act (No 2) Act 1975, the Reputations' means the source Tax (5-b) Contactors in the Contactors industry) Remulators (975, S.L. No. 1980 of				
					51	£ 1	1 If at any lime the Employer is of the convol (whether because of the information over)
		1	ny amendment or re-enactment thereof, "contractor" means a perion who is a contractor for		Statutory deduction - dree	5-1- 2	I If at any line the Employer is of the opnion (whether bacause of the information given under clause § 11.1.2 or of the expiry or cancellation of the Management Contractor sites of the Management (state and the and the second the Management (state at the option of the second site of the second the second site of the Management (state at the option of the second site of the second site of the second site of the second site of the option of the second site of the second site of the second site of the second site of the option of the second site of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site of the second site of the second site of the second site of the option of the second site of the second site of the second site of the second site of the option of the second site of the second site of the second site of the option of the second site
			ny anandment or ne-exectivent livereon, "contractor" means a perion who is a contractor for is purposes of the Act and the Requisitions; "evidence imeans such evidence as a required by le Requisitions to be produced to a "contractor" for the ventication of a "sub-contractor s" tax		Staturory deduction – direc cost of meterials	\$-1- H	I is any time the Employee is of the opnion (whether bacause of the information given under clauses 5111 2 or of the expiry or canceleration of the Manegement Contractor site certificate or otherwise) that he will be required by the Act to measure a statustory deduction from any payment due to be medie the Employee shat immediately so notify the
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Process Processes	Wactor a		Manage	ners Contractor shall forthwith give nonce in writing both to the Architectine				Contractor, for himself and for all Works Contractors who are, pursuant to clause 6.3.
bore Employer. bore Employer. bore Employer. bore Employer. bore Employer. Contractor, produce documentary enderced to do so by the Management in computing any amounts payable to in clause 6.4.4 shall be deregarded in computing any amounts payable to in clause 6.4.4 shall be deregarded in computing any amounts payable to in clause 6.4.4 shall be deregarded on the clause 6.4.4.4 shall be deregarded to do so by the Management Contractor, produce documentary endence and recepts showing that the Joint Names Procy required to do to by the Management Contractor, produce documentary endence and recepts showing that the Joint Names Procy required to do in clause 6.4.1.1 or clause 6.4.3.1 has been completed the Procey reserved to the Management Contractor with due differic on theme a sont Amere Procy referred to in clause 6.4.1.1 or clause 6.4.3.1 has been completed the Procey referred to in clause 6.4.1.1 or clause 6.4.3.1 has been completed the Procey referred to the differic on theme default that have occurred and differic on the differic on the operation of work deregisting 4.8.8 where the purpose shell have such right of entry and meterion as my be required to make a approximation of work deregisting 4.8.8 where the purpose shell have such right of entry and meterion as my be required to make a approximate the relevant contents. Management Contractor with due differic on the pole of amoged, the relevant or repared 18 and been deal and to be the pole of amoged, the relevant or repared of and been deal and disposal of any debris and percenters and process and inversion of the disposal of any debris and percenters and process and inversion of work deal and disposal of any debris and percenters and percenters and the process.	Prest by		and the	reveals and to see circlely or the entert, nature and location thereof; proveals of clause \$ 4 \$ to clause \$ 4 \$ shall apply.	i i			recognised as an insured under the Joint Names Policy referred to in clause 6.5.2 shall authorise the insurers to pay all monies from auch insurance in respect of loss or diamage
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After any repaction required by the insurers in respect of a claim under the Joint Names Criticate a 5.2 the Management Contractor may these to bark stands Policy returned under Policy referred to in clause a 6.4.1.1 or clause a 6.4.3.1 has been completed the Policy referred to in clause a 5.2 the Management Contractor with due defence, shall subject to clause a 4.8 where Management Contractor with due defence, shall subject to clause a 4.8 where approximate the subject to repare of any 58e approximate the subject to clause a 4.8 where approximate for the subject to clause a 4.8 where approximate the subject to clause a 4.8 where approximate the subject to clause a 4.8 where approximate for the subject to clause a 4.8 where approximate t			IN COME	any any annume payable to the Management Contractor, whether or hot in If work executed by a Works Contractor, under or by virtue of ithis Contract.				Contractor, produce documentary endence and recepts showing that the Joint Names Policy required under clause 6.5, has been taken out and is being maintained. It the
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Materies which have been bet or damaged, the removal and disposal of any debris and proceed with securing the camying out and completion of the Project.			appine at	reme Contractor with due cangence, shall subject to clause 6.4.8 where te, secure the restoration of work damaged, the replacement or repair of any SHe				that purpose shall have such right of entry and inspection as may be required to make a survey and inventory of the existing structures and the relevant contents.
			Proceed	which have been lost or damaged, the removal and disposal of any debra and with securing the camping out and completion of the Project.				

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- 7 The Management Contractor, for himself and for all Works Contractors who are, pursuant to clause 6.3, recognised as an insured under the Joint Names Policy referred to in clause 6.4.1 or clause 6.4.3.1, shall extrome the relativers to pey air momes from such insurance in respect of the loss or damage referred to in clause 6.4.4 to the Employer.
- 8 Clause 6.4.8 applies only where the Project comprises elterations of or extensions to assiming situatives.
 - 1 If it is just and equivable so to do the employment of the Management Contractor under the Contract may, within 28 days of the occurrence of the loss or damage referred to in clause 6.4.4, be determined at the option of either party by nonce by rejustend post or recorded detway from either party to the other. Whith T days by recovering such a nonce (but not thereafter) either party new york to the other a written request to concourt in the aboutment of a Atomator under section 9 is order that it may be determined whether such determination will be just and equivable;
 - 2 voon the griving or receiving by the Employer of such a notice of determination or, where a reference to arbitration is mode as alovasaid, upon the Arbitrator uphoting the notice of deterministion, the provisions of clause 7.6.2 escept clause 7.6.2.5 shall apply.
- If where the restoration, replacement or repair of the bass or demage and (when required) the removal and deposal of debins is canned out by a Works Contractor or Works Contractors aready erroped upon the Project such restoration replacement or repair end, when required, the removal and deposal of debins that be thesets as if they were the subject of a Works Contract Vention required by an instruction under clause 3.4.
 - 2 Where clause 6.4.9.1 Is not applicable the Managament Contractor shaf secure the readoution, reolectment or repair of the bas or demage and, when reduced, the removel and deposal of debra, by a Works Contractor who shall be abounted in accordance with an instruction under clause 6-1 and resited in all respects as a Works Contractor.

[1-1] In some cases it may not be possible for insurance to be taken but aparet censer of the neta converted by the derivation of "AB Perta Insurance," This matter should be energical between the parties prior to the Architective Contract Administration contriving the Employae under clause 2 1 and in exolute be procecular to commence the construction of the Protect and similar the derivation of "AB Peter amounted by procecular to commence the construction of the Protect and similar the derivation of "AB Peter amounted" (your in clause 8.2 similar due to the construction of the Protect and similar the derivation of "AB Peter amounted" (you in clause 8.3 similar due to the construction of the Protect and similar the derivation of a sub-section of the derivation and amounted at the match the derivation "AB Peter amounted" is used should be anumoded to include the world used to relations the technique "AB Peter amounted" is used should be anounded to include the world used to relation the technique "AB Peter amounted" is used should be anounded to include the world used to relations the technique "AB Peter amounted" is used should be anounded to include the world used to relation the technique the technique to be technique and amount and an Remarked Remarked to the second to the constant of the Remarked Remarked to the second technique the second technique the second technique the second technique technicite technique technicite technique technique technique tech

Clave 6.4 is applicable to Projects whether they consist of the erection of new buildings at comprise ale atoms of or entering sincharse. For where land of hosect the Management Contractor lategring out a loci hermet Policy for AI fines immunece for the hosect set ordinate on clause 6.2 (at the such oney epithnion as the Emotype may maincil), and for hosect whet comprise attentions of or enterinons to entering surcharse. The Emotype lates out a Joint Names Policy to insure the several surcharse are the content of the Emotype and the company attention of the enterinon is entering surcharse. The Emotype lates out a Joint Names Policy to insure the several surcharse are the contents one do by the Emotype or for which the Emotype is responde signant to ser do may fravere by the Specified Pents cituate 6.3. The permittin baid by the Management Contenttor for the Joint Names Policy for AI finas. That and on the Protect is treated as Prive Cost and reindured by the Emotype (see Second Schedule Pent 38 paragraph 11).

The definition of AB first insurance in clause § 2 defines the relation insurance a resurred (subword to the circle of the Employer in clause § 4.1.1 or 6.4.2.1 is promult that is defined definition of course a solution). Policies exceed by insurance to relate and theredeteed and there we have not insurance to to show new expression in the way maximize to show new expression. See the Process have 22 and Guide PMA.

In any pocy for AAI Relats Insurancy, Islam out and/or clause 6.4 gover should not be real-cool by the series of any enclosed written in the policy beyout the terms of clause 6.2 gersynam 2, thut an inclusion in terms. The Rocy encludes all test of or demaps to the property neurod due to deficience design pertypencheton, writtened to workness the approach perturbation of the deficience design pertypencheton, writtened to workness the approach to terms of the enclusion in persystem 2 and the definition of AAI Relats Insurance.² Gover since gover to building work have continued to the short of the major de resident Procych not period and the deficient test as a consequence of the publication of the terms of the definition of an effect of the state of the section of the processing of the section resident through not an work of the section of the section of the publication of these 6.4 and being may be resident to the descent of building work have continued that where such monored cover a building over a work of the auto-test mation and the section of the publication of the terms of the definition in plause 8.2 of AR Relate building work have continued the terms of the definition in plause 8.2 of AR Relate building work (terms).

[b 2] In some cases it may not be possible for insurance to be taken and against civilian of the Bosched Purit. The matter should be stranged between the parties prov to the Archecther Caresol Administration reality the Englisher under class 2: 1 when it should be prodictable to commone the quadratication of the Project and either the derivation of Spached Paris for the purpose of class 8: 5 answeded or the new power young should replace the should be answeded to include the service investment classes on unich the derivation Spached Paris, is used should be answeded to include the works used to replace the generation.

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- prevent allows 2 19-3 Where It is stated in the Appendix that the insurance to which clause 8 6 refers may be required by the Employer than, not later than the date of the written nonce of the Employer inder clause 2 1 to the Management Contractor to the concerd, the Acchitectine Contract Administration of the Internet the Management Contractor that no such insurance is required or state instruct the Management Contractor that no such insurance is then out and maintained by the Management Contractor that no such insurance is then out and maintained by the Management Contractor that no such insurance then out and maintained by the Management Contractor with the dete of Practical Completion and which will provide the payment to the Employer of a sum estandared by reference to chause 6 8 3 in the event of loss or dismage to the Prospet, which bear or damage requires in the Anthesiz/Mic Contract Administrator of the sum estandared by reference to chause 6 8 3 in respect of the Relevant Event referred to in connection with and an *et allecterit* to the Proyect by any one or more of the Specified Payms and which bear indiameter Economics and chause 2 13 2. The Anthesiz the Connection with and an *et allecterit* to character and the specific Administrator that dotten from the Employee any turber information which the Management Contractor the dotten from the Employee any turber information which the Management Contractor to accept the Qualition and such instructions that more the Management Contractor to accept the Qualition and such instruction shall not be unseedered by while do be accept the Management Contractor and and management Contractor to accept the Administrator while the accept the qualition the Management Contractor whether on the Employee whether the Management Contractor to accept the Management Contractor is instructed to accept the qualition the Management Contractor and such instructions that and be unseedered within date and all the Achtector and such instructions and manage 44
 - 2 The sum insured by the relevant policy shall be a sum calculated at the rate stated in the Appendix as figurdated and ascertained damages for the period of time stated in the
 - Payment in respect of line insurance shall be calculated at the rate referred to in clause 6.6.2 (or any revealed rate produced by the application of clause 2.6.4) for the period of any extension of time finally given by the Architectific Contract Administration as referred to in clause 6.6 to for the pend of time stated in the Appendix, whichever is the test. а.
 - If the Managament Contractor defaults in taking out or in meintaining the insurance referred to in clause 6-1 the Employer may homsel insure against any tisk in respect of which the default shall have occurred. 4

Injury to parsons and property and indemnity to Employer (6-7 to 6-9)

- 67 The Management Contractor shall be liable for, and shall indemnify the Emplo The Managament Contractor shall be Boble for, and shall indemnify the Employer spanist, any expense, labeling, loss, clean or proceedings whetsoever among under any statute or at common live in respect of personal injury to or the deam of any person whomsoever among out of or in the course of or claused by the carrying out of the Project, except to the assert that the same is due to any act or negrect of the Employer or of any person whom the Employer is resconside including the persons employed or omenwes angaged by the Employer to whom clauses 3 23 to 3 23 refer.
- The Management Contractor shall, subject to clause 6.9 and, where applicable, clause 6.5, be lable for, and shall indemnify the Employer spainst, any expense, labitity, loss, claim or proceedings in respect of any injury or damage whatsoarer to any property real or personal to to lar as such injury or damage annees out of or in the course of or thy researed or the environ out of the Project, and to the entent that the same is due to any negfigence, breach of statutory duty, ommeans or detaul of the Management Contractor, his servants or agents of of any person employed or engaged upon or in connection with the Project or any peri thereof, its servants or agents, or of any other person who may properly be on the set upon or in connection with the Project or any part thereof, his servants or agents, order then the Employer or any person employed, angaged or sufforced by him or by any local authority or standory undertaker securing work soler in pursuance of its statutory rights or obligations. persent rictor — inju inage to any -may to
 - tenence to an agreed value to intended to avoid any depute over the amount of payment due under united office the policy is equived insures on receiving a proposal for the neutrinois to which charge any will formely tenence the nght to be satisfied that the size intendence to underset be \$2 hind more genuines (pre-service) and the damages which the Encloser bore bore to be an enclosers performed connects, the will safet as a result of any data. 1 n e qe
 - which it is the responsibility of the Employer to share under clause 8.5.2 (if accheablelt
 - -5 arising from war risks or the Excepted Risks
 - Any such insurance as is referred to in clause 6.11.1 shall be placed with insurers to be approved by the Employer, and the Management Contractor shall send to the Architeck the Contract Administrator for deposit with the Employer the policy or policies and the 2 premium receipts therefor.
 - If the Managament Contractor defaults in taking out or in maintaining the Joint Na Policy as provided in clause 8-11-1 the Employer may humael insure against any in respect of which the default shall have occurred, -3
 - withstanding the provisions of clauses 8.7, 8.8 and 8.10.1, the Contractor that not be table at to indemnity the Employer or to insure spanal any personal injury to or the death of any tion of thirty fermiopi, loss or injury claused to the Project or Site Materials, work executed, the , or any property, by the effect of an Excepted Real, either to inde Me, or any p

Wir Demage (8-13 to 6-16)

- In the event of the Project or any part thereof or any unified materials or goods intended to defined to and placed on or adjacent to the Project sustaining we demage as defined (states 8-15 than notwithstancing anything expressed or model deservation in the Contract 613
 - •1 the occurrence of such wer damage shall be disregarded in computing a psysble to the Management Contractor under or by virtue of this Contract;
 - the Architect/the Contract Administrator mey issue instructions requiring the Manage-ment Contractor to secure the removal and/or orspose of any debrie and/or dameged work and/or to execute such protective work as shall be specified; .2
 - the Management Contractor shall secure the reinstatement or making good of such war demage and shall proceed to secure the carrying out and completion of the Project, and the Architectifte Contract (Aniversities shall in writing fit such later Completion Date sa, in his opmon, is fair and reasonable; -3
 - the removal and disposal of debrie or damaged work, the execution of protective work and the reinstatement and making good of such war demage shat be inseled as it it was a Project Charge and as Works Contract Varietons leaved under clauve 3.4 and/or addition to items of work to be carried out by Works Contractors as referred to in clau--4 300 8-1.
- Employer shell be entitled to any compensation which may all any time become payable out nonise provided by Parliament in respect of war damage sustained by the Project or any part restor any united materials or goods intended for the Project which shall all any time have zome the property of the Employer. 614 The Emple
- 6-18 The expression wer demage' as used in clauses 6-13 and 6-14 means wer damage as defined by 8.2 of the War Demage Act 1943 or any emdendment or re-exectment thereof. The engine

- Subject to cleare 8.9.7 the interency in cleare 6.8 to "property red or personal" does not include the Project work executed protor. See Materials up to and including the does of each of the contracter of the factors. Comparison or up to and including the does of determination of the emotynamic of the Management Contractor (whenever or not the watching of the determination a deputed) under clauses 7.1 to 7.13 or, where clause 6.4.8 appress, under clause 8.4.8 or clauses 7.1 to 7.13, which work is the early of the determination of the series of the determination of the early of the determination and deputed purport clauses 7.1 to 7.13, which work is the early of the determination of the determination of the early of the determination of the determination of the deputed purport clauses 7.1 to 7.13, which work is the early of the determination of the deter 1
 - It closes 2.8 has been operated then, in respect of the relevant part and as tho relevant date, such relevant part shall not be regarded as "the Project" of executed" to the purpose of closes 6.9 \pm 2

ust injury to persons or property (6-10 to 6-12) ne agai

- Whow preudice to his obligation to indemnify the Employer under clauses 8 and 6 8 the Management Contractor shall take out and martian and shall cau any Wong Contractor to lake out and martian industrice which shall comply wi clause 8 10 1 2 in respect of claims arring out of his habitity referred to in clause 1 1 8-10 Clause 6 10 ' 6 7 and 6 8.
- The insurance in respect of clears for personal many to or the death of any person under a contract of service or apprenenceshop with the Manupernent Contractor as whichs Contractor as the case may be, and arising out of and in the course of tuch person's simployment, shell comply with the Employers 5 Labely (Computing the surgery and any statutory orders made therewheet or any amendment or re-encoment thereof. For all other cleans to unich cleans 6 10.11 sockets to and by each Works Comparison and maintained by the Manupernet Contractor and by each Works Comparison shall be on less than the relevant sums stated in the Appoints to any one occurrence or series of occurrences arising out of one award table. 2 one event (m)
 - As and when he is reasonably required to do so by the Employer the Managament Convector shall send and shall cause any Works Contector to send to the Archeectme Contect Administrator for inspection by the Employer documentary endance that the instrumes recurred by clause 61.01.11 have been taken out and are being martaned, but at any time the Employer may (but not unreasonably or vesationably) require to have sent to the Archeectme Context Administrator or inspection by the Employer the relevant policy or policies and premium receipts therefor 2
 - If the Management Contractor detaults in laking out or in mentaning, or in causing siny Works Contractor to bake out and maintain, mou since as provided in clause 4.10.1.1 the Employer may himsell insure against any leability or expense which he may nour arrang out of such detaul and it sum or sum equivalent to the amount paid or payable by him in respect of premumes therefor may be deducted by him from any mores due or to become due to the Management Contractor under this Contractor such amount may be recoverable by the Employer from the Management Contractor as a debt 3
- Where it is stated in the Appendix that the insurance to which clause 8.11.1 relies may be required by the Employer the Management Contractor shall, it as instructed by the Architect/the Contract Administrator, late out and memitian a bort Nenes Policy for such amount of homemity as a sitted in the Appendix in respect of any expense, tabler, load, claim or proceedings which the Employer may includ or suitain by reason of insury or demege to any property nome than the Protocet and Stee Marienti Causand by roles of ground wells among to all or in the ocurse of or by reason of its canying out of the Protect and other any or damage: **6-11 1** Insurance -Sability etc. of Employe
 - -1 for which the Management Contractor is hable under clause 6 8;
 - 2 attributable to errors or omissions in the designing of the Project,
 - NCh can reasonably be foreseen to be inevitable having regard to the nature of a work to be executed or the manner of its execution,

The Managament Contractor or any Works Contractor may 4 they so with, mains for a sum grower than their stated in the Appandix m

SECTION 7: Determination

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Detault by Management Contractor - Deta nation by Employer (7 1 to 7-4) Without preudice to any other rights which the Employer may possess, if the Manager Contractor shall make default in any one or more of the following respects, that is to say

Default by 7-1 Contracto

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- if whout reasonable cause he wholly suspends or fails to proceed regularly and dispently with the carrying out of his obligations referred to in Article 1 before the completion of the Project of 1
- If he reluses or neglects to comply with 8 written nonce from the Architect/the Contract Administrator requiring from to remove or secure the removal of detective work or improper materials or goods and by such relusal or neglect the Project is mesonally effected, or 2
- -3 If he fails to comply with the provisions of either clause 3 19 or, if applicable, clause 3 28

then the Architect/the Contract Administration may give to him a nonce by registered post or recorded delivery specifying the default. If the Management Contractor when shall convinue auch optical for 14 days after receipt of such nonce or shell at any time threater repeat such optical (insteam previously reposited or not) him the Employer may writing 10 days after such continuence or repetition by nonce by registered post or isconded delivery forthwell determine the employment of the Management Conversion under this Contract, provided that such nonce shell not be given unsesonably or vesationary.

In the event of the Management Contractor making a composition or arrangement with his creditors of herving a proposal in respect of his company for a voluniary anrangement for a composition of debts or achieve of arrangement tecroround in accordance with the histohercy Act 1996 of herving an application mode under the insolvency Act 1996 in respect of his company to the court of the appointment of an administratio, or herving a windry to do div medio or (encept for the purposes of amelgamentian or reconstruction) is resolution for voluniary windring to preset or herving a promoval fluctuation, receiver or receiver and menager of the business or understang duly appointed or herving an addressing the receiver, as defined in the listohercy Act. 1996, appointed or herving an addressing receiver, as defined in the hosting charge, the smoothered or herving an addressing the receiver, as defined in the hosting charge, the smoothered or herving an addressing the receiver and menager of the hosting charge, the amounted of herving potenties construct the Contract to the bothwest automatically determined but the and employment may be rentated and continued if the Employee and the Management Contactor, the loculator, provisional the Carls of receiver and manager or dominative receiver is the Carls of administration, receiver or receiver and manager or dominative receiver is the Carls of administration, receiver or receiver and manager or dominative receiver is the Carls of administration process. (n) Management 7-2 Contractor ecoming insciver

> The Employer shall be antified to determine the simployment of the Management Contractor under the or any other contract, if the Management Contractor shall have offered or given or agreed to give to any person any git or consideration of any lind is an inducement or re-end for cong of totheamy to do or for heving given or forbane to do any science in research to the obtaining of securities of a first end of the origination of the totheam or any other obtaining of securities and the heving dones or forbane to do any science in research to the obtaining of securities and the heving dones or forbane to do any science in the obtaining of securities and the level dones of the birth of the totheam of the donesgement Contractor or a scherg on the band "inferter with or whole the induced of the Management Contractor or any person employed by heving and the birth the birth and the committed any offence under the Prevention of Concentrol with the Birth of the scherg on the bands under the Prevention of Concentrol and the scherg of where the Management Contractor or any person employed by heving and the birth and where committed any offence under the Prevention of Concentrol and the through and the protokyn is a local suborty shall heve given any here or reserved the restept of service is an offence under sub-action (2) of section 117 of the Local Covernment Act 1972 at any re-inscriment intered. 7.3

In the event of the employment of the Management Contractor under this Contract being determined under clause 7-1, 7-2 or 7-3 and to long as a hiss not been remained and contract the setting projection in the accrued rights or remedies of either party or to any labeling of the classes memoried in clauses 8.7 and 8.8 which may accrue series before the Management Contractor or any Works Contractor shall have removed his or their temporary budging, plant, took, equipment, measing or goods or by reason of their temporary pages, the following shall be the respective rights and duries of the Employer and the landownerstill Contractor. n Contractor:

- The Employer may employ and pay other persons to carry out and complete the Manage-ment Contractor's obligations under this Contract and he or they may enter upon the set of the Project and use all temporary buildings, plynt, tools, exclument, goods and materials intended for, detreted to and placed on or adjectent to the Project, and may purchase all materials and goods necessary for the carrying out and completion of the Project. -1
- except where the determination occurs by reason of the Management Contractor having 8 winding up order made or (other then for the purpose of amagamenion or reconstruction) 8 resolution for voluntary winding up passed. The Management Contractor shell it so negured by the Employer or by the Architectrine Contract Administration on behalf of the Employer within 14 days of the date of determination. Administration on behalf of the Employer within 14 days of the date of determination, assign to the Employer without payment the benefit of any agreement to the support of materials of goods and/or the execution of any work for the purposes of this Dontract to the entent their the same is assignable, but on the terms that is supplier in Works Contractor shall be entitled to make any reasonable objection is any further assignment thereof by the Employer; -2 -1
 - subject to the exception to the operation of clause 7-4.2-1, the Employer may pay any supplier or Works Contractor for any materials or goods detivered or works executed for the purposes of the Contract (whether before or alter the date of determination) in so far alls the price interior has not stready been paid by the Management Contractor; payments made under clause 7.4.2.2 may be deducted from any sum due or to become due to the Management Contractor or shall be recoverable by the Employer from the Management Contractor as a deot. -2
- the Management Contractor shell, as and when required in writing by the Architect/the Contract Administrator so to do (but not before), remove from the site any temporery building, plent, loots, equivalent, goods and materials beforingin (b, hered or leased by him, if within a resonable time after any such requirement, has been made the Management Contractor has not completed interestint, then the Employer may (but wroug) being resonable for any loss or damage) remove and sell any such property of the Management Contractor, holding the proceeds less all costs incurred to the credit of the Management Contractor, holding the proceeds less all costs incurred to the credit of the Management Contractory. .9
- We Management Contractor theil allow or pay to the Emotoyer in the manner herematter accessing the terround of any direct loss and/or damage caused to the Emotoyer by the deterministicul, that after completion of the Project Lunder Caused T-4-1. The Emotoyer to the here bound by any provision of the Contract to make any luthine payment to the Management Contractor, but upon such completion and the vertication within a reasonable time of the accounts therefor the Architective Contract Administrations and a carity the strought divisions properly incurred by the Emotyper and the smouth of any direct loss another divisions properly incurred by the Emotyper and the smouth of any direct loss another divisions caused in the Emotyper the division and, if such amounts when added to the mones paid to the Management Contractor before the date of deterministion ancordance with the Contract, the difference shall be reconnexite by the Employer from the Management Contractor is a doit; and the said amounts when added to the said mones be less than the said loss a mount. The difference shall be reconvertible by the Management Contractor from the Employer as a debt. -4

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The Employer makes 8 composition or arrangement with his creditors or has a proposal in respect of his company for a voluntary arrangement for a composition of decisis or scheme of arrangement approved in accordance with the insolvency Act 1996 or has an application mode under the insolvency Act 1996 in respect of his company to the court for the appointment of an administrator or has a winding up order made or (arcept for the purposes of an amalgamentor or reconstruction) has a resolution for voluntary winding up presed or a provisional liquidator, receiver or inceiver and manager of his business or understaining is duly appointed, or has an administrative receiver, as defined in the tempolecy Act 1996, appointed or possission in taken, by or on bend of the holders of any determines secured by a floating charge, of any property comprised in or subject to the floating charge; p+27-4

- Upon determination under clause 7-5, then without prejudice to the accrued rights or remedies of entire party or to any labelity of the classes memorical in clauses 6.7 and 6.8 which may accrue enter before the Management Contractor or sny Works Contractors and heve removed the or their temporary buildings, plant, loots, equipment, meteriets or goods or by reason of his of their to removing the same, the lobowing shall be the respective rights and leastines of the Management Contractor and the Employer;
 - the Management Contractor shall with all reasonable dispatch and in such memor and with such precautore as will prevent injury, death of damage of the classes in respect of which before the date of determination he was fable to indemnity the Employer under clause 8.7 or 6.8, remove from the site all hit temporary buildings, plant, tools, equipment, metenals and goode beforging to or hired by him and shall one facatives for his works. Contractors to do the same but subject always to the provisions of clause 7.6-2.2;
 - after taking into account amounts previously paid under this Contract the Manage Contractor shall be paid by the Employer; 2
 - -1 the Prime Cost; and
 - the Prime Cost as defined in Pari 48 of the Second Schedule of meteriets and goods not detered to or adjacent to the Project but for which the Management Contractor is leasely board to pay and on such payment by the Employee any such meteriets or goods so paid for shall become the property of the Employer, and -2
 - a Management Fee calculated as follows: the Pre-Construction Period Management Fee para & proportion of the Construction Period Management Fee stated in the Appandix adjusted, where & portionate, in according with clause 4.10.2, being the ratio that the Construction Period Management Fee beers to the Construct Cont Pen Total applied to the sum of the emounts referred to in clause 7.6-2.1 and 7.6-2.2; and
 - the rea nable cost of removal under clause 7.6.1; and
 - any direct loss and/or demage caused to the Management Contractor by the determination. -8

in by Employer or Management Contractor (7-7 to 7-9) Whout prejudice to any other rights or remedies which the Employer or the Management Contractor may posses if the conving out of the whole or tubetanessy he whole of the uncontrasted Project (other than the second on divect required under clause 2.5) is suspended for a continuous period of the length named in the Appendix by reason of:

- Iorce mejeure; or -2
 - loss or damage to the Project occasioned by any one or more of the Specified Perfec or
 - -3

then the Employer or the Management Contractor may thereupon by notice by reprisered post or recorded derivery to the Management Contractor or to the Employer forthwell determine the employment of the Management Contractor under the Contract provided that such notice shall and the main excession statute.

Default of Empl (7-5 and 7-8) in al Project – de

si

Without prejudice to any other rights and remedies which the Management Contractor possess, if any of the matters referred to in clauses 7.5.1 to 7.5.4 occur then the Manager Contractor may thereupon by notice by registered post or recorded dew-sty to the Error or the Archite Contract Administratio Institute distemme the errorbyment of the Man-ment Contractor under the Contract, provided that such notice shall not be given unreason

- the Employer doet not pay the smouth property due to the Managment Contesctor on any cantificate (othermes that as a result of the operation of the VAT Agreement) when 14 derys from the insue of that canficate and communes such default for 7 days shere record by registered post or recorded detiving of a notice from the Management Contescent stating that notice of determination under clause 7 \$ will be served if payment is not made within 7 days from records thered, or 1
- -2 the Employer interferes with or obstructs the issue of any certificate due to Contract; or
- the carrying out of the whole or substantially the whole of the uncompleted Project (on-than the execution of work required under clause 2.5) is subpended for a continuou period of the length named in the Appendix by reason of 3
 - Instructione issued under clauses 3.4 or 3.5, unless caused by reason of some negligence or default of the Management Contractor, his servents or agents or of any period emologied or engaged upon air in connection with the Project or emplored thereof, his servents or agents other than the Employer or any period emologied, engaged or submerse by timor or by any local automay or stankory undersate secouring work solely in pursuance of its stankory obligations; or -1
 - the Management Contractor not having received in due time necessary specifications or bits of quantities for Works Contract, Instructions, drawings, details or twelle from the Architecture Contract Advinuestions or which he specifically applied in writing provided that such application was made on a date which having regard to the Completion Date was nerve investeeneby detain from for uncessionaby costs to be date on which it was necessary for tims receives the -2
 - delay in the execution of work not forming part of this Contract by the Employee himself or by parsons imployed or otherwise engaged by the Employee is referred to in clauses 3 23 and 3 24 or the feature to execute such work or orkey in the supphy by the Employee of meanes and goods which the Employee has agreed it provide for the Project or the feature so to suppry, or 3
 - the opening up to inspection of any work covered up or the testing of any of the work, metenate or goods in accordance with clause 3.10 (including making good in consequence of auch opening up or testing) integers the inspection or test showed that the work, melenate or goods were not in accordance with the
 - Takine of the Employer to give in due time ingress to or egress from the set of the Project or any part thereof through or over any tand, buildings, way or passage schoring or connected with the set and in the potension and control of the Employer, in accordance with the carried Documents after recent by the Architecthe Constant Ammentation or such notice, if any, as the Connector is inclused to over or lative of the Employer to pre-such nories or signers otherwise agreed between the Architecthe Context Administration and the hearagement Context, Ammentation or such as the Architecthe Context Administration and the hearagement Context, and the Architecthe Context Administration and the hearagement Context, and the Architecthe Context. -5
- negligence etc. by Management Comm

NOY IF AND

The Management Contractor shall not be writted to give notice under clause 7-7 2 where the loss or demage to the Project accelerational by one or more of the Specified Parls was caused by some negligence or default of the Management Contractor, his servents or spents or of any perion employed or entraped upon or is connection with the Project or any part thereof, his servents or spents other than the Employer or any perion employed, engaged or authorised by him or by any local authority or statutory undertaker executing work solely in pursuance of its statutory obligations.

Upon such determineron under clause 7.7 the provisions of clause 7.6 shell apply with the exception of clause 7.6.2.5.

on at will by Employer (7-10 to 7-13)

Without prejudice to any other rights or remedies which the Emoloyer or the Mena Contractor may possess, the Emoloyer may at any time by notice in writing to the Mena Contractor forthwith determine the employment of the Management Contractor un Contract.

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In the event of the employment of the Managament Contractor under this Contract being determined under clause 7.10 then without presudice to the accrued rights or tennedes of employ or to any labelity of the classes mannohed in clauses 6.7 and 8.8 which may accrue am before the Managament Contractor or any Works Contractors shall have removed the or the temporary buildings, blant, tools, ecucoment, meterater or options or by reason of he or the temporary buildings, blant, tools, ecucoment, meterater or options and hapitiles of the Employ and the Management Contractor: 7-11

- the Employer shall indemnify the Management Contractor against any valid claims made against him by Works Constitutions and others in relation to the Project, such noamwry to be limited to the stret of taxing properly due to such Works Contractors and others all shall not have been paid to the Management Contractor by the Employer, -1
- the Management Contractor shall if so required by the Employer or by the Architect/Ne Contract Administrator on bahall of the Employer within 14 days of the date of the determination, assign to the Employer within bigment the banell of any sgreement for the supply of metenals or goods and/or to the execution of any work for the purpose of thes Contract to the estent that the same is assignable, but on the terms that a supplier or Works Contractor shall be enrified to make any treasonable objection to any further assignment thereof by the Employer. 2
- In the event of deterministion under clause 7.10 Jaking place before the ristue by the Erm of a written notice to proceed under clause 2.1 then the Employer shall pay to the Manage Contractor in respect of the op-operation with the Professional Team as referred to in Ar and clause 2.1 an appropriate proportion of the Pro-Construction Penod Management Fa any amount paid under an interm Carsficate issued in accordance with clause 4.2.1 7-12 Faq lags
- In the event of detarministion under clause 7.10 taking place sher the visue by the Emolog of the written notice to proceed under clause 2.1 then upon such deterministion the proviso of clause 7.6 shell apply. 7-13

7-8

SECTION 8: Works Contractors

Parks Contractors (8-1 to 8-5)

- Clausee 8-1 to 8.5 shell apply in respect of the rients of work to be carried out by Works Contractors which are identified in the Contract Cost Plan or in Instructions n d work -61 a Contractors The Works Contractors to carry out the items of work so identified shall be selected by apreament in writing between the Management Contractor and the Architect/the Contract Administrator and that selection shall be confirmed in an instruction. Provided that, seve where the Employer of the Architect/the Contract Administrator on the behalf and the Management Contractor otherwise spree, the Management Contractor shall only employ -1 on of Works 8-2 awactors -ans of Worl ersons as Works Contractors who will an enter into a contract on the current unemended standard Form of Works Contract (Works Contract/1 and Works Contract/2) issued by the Joint Contracts Thounel with the Management Contractor and execute that contract under sail where the Contract is under seet, and -1
 - so required (as recorded in Works Contract/1) enter into an Employer/Works contractor Agreement (Works Contract/3) with the Employer and execute that greement under seal where the Works Contract is under seal. Agre
 - The Management Contractor shall send to the Architect/the Contract Administrator any submissions by a Works Contractor under clause 8.4.1 of the Works Contract Conditione in respect of restrictions, limitations or exclusions in a proposed contract of sale between such Works Contractor and a Nominated Suppler, and the Management Contractor shall not be required to instruct a Works Contractor to enter into a contract of sale such works of the required or unless and under the three contract Administrator hell specifically approved in writing to the Management Contractor the said restrictions, Bmitetions or exclusions Such approval shall be immediately continent and names and Contractor to the Works Contractor. There any teblity of a Works Contractor to the Management Contractor to the Works Contractor to an event of the Management Contractor to the Works Contractor. There any teblity of a Works Contractor to the Management Contractor to the Bability of the Management Contractor to the Employer shall be immed to the same extent. .2 here to Works
 - -1 The Management Contractor shall fulfill all the duties required from him under each Works Contract.
 - The Architect/the Contract Administrator shell on the Issue of each Interim Certificate rect the Management Contractor as to the amounts in respect of each Works Contractor Not are included in the amount stated as due in such Interim Certificate.
 - here any Works Contractor requests the Management Contractor, who shall forthe nd such requests to the Architectritle Contract Administrator, has he be inform worky by the Architectrine Contract Administrator of the amount included for him in ee every "intern Centicate, the Architectrike Contract Administrator shall be inform a n Com
 - Management: Contractor shall invinediately inform the Architect/the Contract interator of all nonficiations from Works Contractors under clause 2-13 of the Work and Conditions of the practical completion of their work together with the generat Contractor's observations thereion. When in the control of the Architect/th ned Administrator practical completion of the Works Contractor's work is achieve and context to the Management Contractor issuing a certificate of practici-pterion to the Works Contractor in accordance with clause 2-14 of the Works Contract 4 The Managama Contract Con Management he shall co
- blowing a request by a Works Contractor II is desired by the Employer or by the Architeck' a Contract Administrator on his bahali to secure final payment to such Works Contractor after the issue of the centricate reterned to in classe 4-11, and if such Works Contractor has militacity indemnisted the Management Contractor spansit any latent defects, their extractorities Contract Administration may in an interim Centricate direct an amount to cover the school the Contract Administration may in an interim Centricate direct an amount to cover the tel payment to Ione Cantractar

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SECTION 9: Settlement of disputes -Arbitration

nt of disputes - Arbitration (9-1 to 9-7)

- 81 If a chipute or difference as referred to in Article 8 has areen including a dispute or difference
 - any meter or thing left by the Contract to the decretion of the Architect/the Contract Administrator or
 - the withholding by the Architect/the Contract Administrator of any certificate to which the Management Contractor may claim to be entitled or
 - the rights and flabilities of the parties under section 4, clauses 6 13 and 6 14, or 7-1 to 7-13 or -
 - the unreasonable withholding of consent or agreement by the Employer or the Architect/ the Contract Administrator on his behall or by the Managament Contractor or
 - the adjustment of the Management Fee under clause 4-10 2 or 4-10 3 or as to any rate or any addition which has to be agreed under the Second Schedule or
 - the refusal by the Architect/the Contract Administrator to include an item as Prime Cost

fren such discute or deference shall be referred to the arbitration and linal decision of a perion to be agreed between the parties to act as Arbitrator, or, laving agreement within 14 days after effect party has given to the other a winten request to concur in the accounters of an Arbitrator, a person to be appointed on the request of effect party by the person named in the Annexetie

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1.0----

- that if the dispute or difference to be referred to arbitration under this Contract raises tuch are substantially the same as or connected with issues raised in a related dispute
 - the Employer and any Works Contractor under an Employer/Works Contractor Agreement, (Morks Contract/3), or
 - the Management Contractor and any Works Contractor under a Works Contract; or

the Works Contractor and any Nomineted Supplier to whork section 8 of the Works Contract Conditions applies

- and if the related discute has already been referred for determination to an Arbitrator, the Employer and the Management Contractor hereby agree that
- the dispute of difference under this Contract shall be referred to the Arbitrator appoint determine the related dispute; and 1
- such Arbitrator shall have power to make such directions and all necessary awards is same way as if the procedure of the High Court is to paring one or more defendan joining co-defendants or third parties was available to the parties and to him; and -2
- Igneement and consent referred to in clause 8 6 on appeals or applications to Court on any question of law shall sock to any question of law aneng out of of of such reference in respect of al refered decutes referred to him or aneng in the of the reference of all the refated discutes referred to him; -3
- that the Employee or the Management Contractor n

Loss and expanse caused by matters materially effecting requise progress - Warks Contracts

Upon recent of a written application property made by a Works Contractor under clause 4.45 d the Works Contract Conditions in respect of matters affecting require progress of the Works by matters referred to in clauses 4.46.1 to 4.66.7 of the Works Contract Conditions in which a therapement Contract status parts to the Architectifie Contract Administration accord and the application together with Ns commans upon the application. Thereafter, 4 and as acon as the Architectifie Contract Administration a core to restart and thereafter and the application together with Ns commans upon the application. Thereafter, 4 and as acon as the Architectifie Contract Administrator is derived the materially attacted as referred to in the abortact data and the architectifies Contract Administrator is lakely to the materially attacted as referred to in the abortact clause 4.45 and is set out in the application of the Works Contractor than the Architectifie Contract Administrator shall himsed ascertain, or shall instruct the Quarkey Source) and instruct the Contract Contractor and the Architectifies Contract of the amount of such toss and/or experime in cotaboration we are Management Contractor.

on article 3 or article 4, or on the questions whether or not the make of an estituction is empowered by the Condex whether or not a centricate neak been moreopenty withhed, or whether is centricate is not in accordance with the Conditions or whether is centermation under clause 8.4.8 webe just and equitable. 2 3 on any dispute or difference under clauses 2 12 to 2 14 and 6 13 and 6 14 or on any disbute or difference under clause 2 3 4 or clause 2 8 in regard to a withholding of consent by the Contractor, under clause 3 3 3, under clause 3 6 4 in regard to any objection by the Management Contractor weater for himself or on behald of a Wons 4 Contracto shall not be opened until after Practical Completion or alleged Practical Completion Project or lemmestion or alleged semination of the Management Consector's emotio under this Contract or abandonment of the Project, unless with the written consent Employer or the Architect/the Contract Administrator on his benaft and the Manage Contractor Subject to the provisions of clause 1.14 and clause 3.7 of the Works Contract Conditions the Arbitrator shall, without prejudice to the generality of his powers, have power to direct such measuraments and/or valuations as may in his opinion be destable in order to determine the rights of the parties and to ascentan and leveld any sum which ought to have been the subject of or included in any certificate and to opin up, review and revies any certificate, opinion, decrision, requirement or notice and to opinion, nevers and revies that be submitted to him in the same menner as if no such certificate, opinion, decision, requirement or notice had here norm. Powers of Arbitrator 14 heren or Award linal 5.5 Subject to clause \$ 6 the award of such Arbitrator shell be final and binding on the pa and binding Appeals ...

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Such reference, except

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- The parties hereby spree and consent pursuant to sections 1(3)(a) and 2(1)(b) of the Arbitration Act 1979, that either party munering of law 1
 - may appeal to the High Court on any question of law arrang out of an award made in an arbitration under this Arbitration Agreement and
 - may apply to the High Court to determine any question of law ansing in the course of the reference. 2

and the parties agree that the High Court should have purisdiction to determine any such questions of law

Whelever the nationality, residence or domicile of the Employer, the Management Contractor, any Works Contractor or supplier or the Arbitrator, and wherever the Project or any part theread is studied, the time of English shall be the proper few of the Contract and on pancular (but not so as to derogate from the generality of the toregoing) the provisions of the Arbitration Act 1950 (notwithertending anything in \$3.4 thereof) to 1979 their apoly to any protestion under the Contract wherever the same, or any part of a, shall be conducted [a] 97 Proper law of the Contract

10 Where the parties do not with the proper law of the Connect to be the Law of England and/or do not with

APPENDIX FOUR®

MANAGEMENT CONTRACTING - THE CLIENTS' VIEW

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SOURCE : COPY OF AUTHOR'S PUBLICATION

TO THE ACSE (1987)

Management Contracting—The Client's View	By Shamil G. Naoum ¹ and David Langford ²	Asstruct: One of the features of the construction industry of the late 1970s and the early 1980s has been the emergence of a diversity of building procurement ment methods. Among the most popular has been "management contracting, (WC), and this has assumed a prominent place in the battery of procurement (MC), and this has assumed a prominent place in the battery of procurement contracting as the "process whereby a contractors to employed to undertake the co-ordination of speciality sub-contractors to complete a project. The management for the services offered. The management contractor relies upon a pertentage fee or a lunp sum to be remunerated the dient team of professional advisors and in common with other professional advisors and in common with other professional advisors and in common with other professional service." It is paper presents some research findings from the Construction Study Unit at Brunel University. It summarizes the development of and the market for management contracting who are asked to compare management contracting with the traditional method of project procurement.	MANAGEMENT CONTRACTING PRACTICE	The U.S. Experience "Management contracting" is similar to "construction management," which first originated in the U.S., where it is also known as professional construction management (PCM). PCM was a rather informal method until the late 1960s, but as construction costs increased during the early 70s and delayed projects became more frequent, the need for new ap- proaches and techniques for managing the total construction program became more evident (Heery 1978). In PCM, a contractor performs a management function under a profes- sional services contract with the client (Barrie 1976), treating project planning, design and the construction plan as integrated tasks. Figs. 1(b) and 1(c) show two typical organizational forms of PCM practice in the U.S. As the professional of the construction team, the construction man- ager works with the designers and the client, from the brief through the completion of construction, providing leadership in regard to time and use. The construction manager can be a firm or an individual and is paid a fixed fee based on the value of the work. Where organizations undertake this role, a large number of contract- ing and architecture-engineering firms offer this serive. This practice has been mirrored in the United Kingdom, and some of the early pioneers of the CM approach have independently or in conjunction with con- tractors, established themselves there. The early experiences of the U.K. industry have been encouraging, and much can be learned from the analyses of trends in the United States. ¹ Crad. Student, Brunel Univ., Uxbridge, Middlesex, England. NoteDiscusion open until February 1, 1988. To extend the folsing date on noth, a written request must be filed with the ASCE Manager of Journals. The manuscrint for this noner was submitted for review and possible publication on the analyses of trends with the design date on the noneth and the noner was submitted for review and possible publication on
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tal turnover, the results of which are shown in Table 2. concer The

a management fee contract, which may be identified as a hybrid form of man-agement contracting. The management contractors were then ques-agement contracting. The management contractors were then gues-"Although firm] stated that 100% of its turnover was obtained through a management contract, much of this work was in the form of a man-

3.5-4.5 2.5-4 2.0-3.0

4-6

Less than 2 million 2-5 million

1.5-2.5

over 20 million 10-20 million 5–10 million

ntracting (in 1983 Prices)	Number of projects (3)	83	110	154
Output of Management Coi	Total output (2)	£338 million	£580 million	£740 million
TABLE 4(Year (1)	1982	1983	1984

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li

By the end of 1984, a survey (Centre of Construction Market Information 1985) established a figure of £890 million of management contracting output for 1984 (U.K. only). But it was stated that some contractors find it difficult—if not impossible—to separate output to the various packages they offer. This is particularly true of management fee contracts.

Management Contracting Projects

Some of the management contractors interviewed were able to provide details of projects completed using "pure" management contracting. An analysis of 170 building projects showed that MC was applied to all types of projects and clients. The building types were offices, health facilities, factories, schools, public premises and general buildings.

Fig. 3 shows the percentage of MC by value of projects and indicates that the majority of management contracting is applied to fairly large



FIG. 3.-Percentage of Management Contracting by Value of Projects



ero a __ Parcantage of Management Contracting by Building Type



FIG. 5.—Percentage of Management FIG. 6.—Percentage of Contracting by Construction Type Contracting by Sectors

and, presumably, complex buildings. Fig. 4 divides the value of projects by building type and shows that about 50% of those surveyed MC were

by building type and shows that about 50% of those surveyed MC were commercial buildings and offices and 27% were industrial buildings. The industrial sector could be further subdivided into 60% factories and 40% warehouses and others. The rest of the work was accounted for by banks, houses, and other public premises. Fig. 5 shows that 63% of the MC were used for new types of construction and 37% for other than new, i.e., refurbishment, remedial work, modernization, etc.

Fig. 6 indicates that 68% of the projects have been commissioned by private-sector clients and 27% by the public sector.

CLIENTS AND MANAGEMENT CONTRACTING

Introduction

The research sought to examine and compare the attitudes of client organizations to management contracting. Although MC has grown in popularity, clients are still uncertain about the precise role of the management contractor. Therefore, in different ways, one of the aims of the study was to examine the client organizations to try to answer the following questions: (1) Who are the clients that used MC? (2) how do client organizations view MC? (3) why have clients used MC? (4) what is the level of client satisfaction with MC? (5) what were the clients' criteria of satisfaction? (6) why is MC favored above traditional contracting? and (7) what are the problems associated with MC?

Again, structured interviews were used to supplement data collected by questionnaire. The questionnaire was divided into seven section headings to correspond to the questions posed above. The questionnaire was sent to 10 client organizations prior to the interview. Interviews were carried out by running through the questionnaire to comment on the answers of each section heading, and were documented using a mini tape recorder.

	Clients for Management Contracting	TABLE 5.—Attitudes toward A	IC In Future	
	According to lists provided by the management contractors, the anal- ysis of the projects showed that the number of clients using a manage-	Statement (1)	Number (2)	ldentifier (3)
	ment contract amounted to 175 organizations and a further 38 organi-	Not devided	-	V
	zations were identified by the CCMI (1985) report.	Not ar maiority of our projects	. •••	8
	33% of the clients used management contracting only once, 30% used	Definitely for all our projects	e	С, F, H
	ule system twice and 15% were considered very specialized users of	Definitely for our large complex projects	-4	۵
		Fewer but definitely the MFS	-	ш
	ror purposes of analysis the clients for managements contracting were classified as follows:	Depends on our criteria	1	U
	1. Fifty percent of the clients sought purpose-built premises, and can			:
	be segmented into the following markets: (1) Department stores, 6%; (2)	Clients A and B had a negative attitude to	wards the sys	item, basically
	bankers/merchant bankers, 7%; (3) industrial and commercial facilities,	because management contractors are seen	as contributi	ng to aiready
	16%; (4) government clients building premises for their own use, 5%;	complex organizational structures and proce	edures.	
	and (5) other numses-huilt clients 15%	Client A is an extremely large public org	anization and	forms part of
	The nerrost wave within a start who commission nem-	a povernmental department. The role of the	e organization	is to provide,
		manage maintain and furnish the propert	v used bv the	government.
	tes to continuerual or public use.	The section doint and the building with	r aither its nro	fessional staff
·	3. Eighteen percent were property developers.	I ne organization designs tis putututies	s ciuici ilo piu	11-221-01141 21411
	4. Nine percent were investment companies.	or consultants. It also supervises the constr	ucnon.	•
	5. Thirteen percent were council boroush or public health authori-	All construction work is done by private c	ontractors. Cl	ient A wanted
	tion in the second s	to find the best way to improve its perfor	mance in mee	sting different
		requirements on major projects. Despite the	e fact that clie	nt Å has con-
	::;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	tequations on molecular projects on an MC the organ	nization hasn'	t made un its
		Siturtied fittie projects on an integration b_{ab}	the she sustand	hoomed of the
	Introduction.—Details provided by the clients interviewed indicate that	collective mind yet regarding satisfaction with	in the system	
	all organizations participating were very event and undertaking	following reasons: (1) The uncertainty of the	ne ultimate co	st; (2) the lia-
		bility of the management contractor is not 1	vell defined; ((3) it is an ex-
	uniterin types of work under different types of contractual arrange-	nensive method when spending tax pavers'	money: (4) th	e complex or-
	ments. The percentage of management contracting work ranged be-	contrastication which approximate the provident may	have influence	ed contractor
	tween 3% and 8% of their total construction portfolio. Only one client	g_{a_1}		
	had commissioned 50% of his work to MC and 50% to the traditional	pertormance.		•
	method. All clients stated that they started using MC as an alternative	Client B is a large national and internation	al banker. I he	type of work
	to the traditional method with a signification particular to	the organization undertakes is mainly refur	bishment of e	xisting prem-
	The international include while a view to evaluating perioritative.	ises costing between £100,000 and £1.2 mil	lion. The org	anization em-
	the to partucipating organizations were asked to identify and signify	plovs about 200 professionals in its property	service depar	tment. Client
	their reasons for choosing the management contracting method. Prom-	Bused management contracting as part of 0	neoine researc	ch to evaluate
	inent criteria were the following: Minimizing the overall time of the	its variance arainst the traditional meth	od After usir	or an MC the
	building process; obtaining reliable time estimates for the project; and	its perioritiance against ure trautional inclusion of periodical provided of	out that hacie we	aulen hoon an
	suiting large and complex projects. Surprisingly, clients did not see the	\mathbf{v}_{1}	har bodiom	te good value
	minimizing of the overall huilding cost as an important criterion. Naoum	for money put not petter than the traditional		Selicially with
	and Laneford (1984) recorded the following rank for clients, criteria when	an equal quality. Chent b did not hnd mana		
	monifications (1/2011) tepolited die 100000018 Jains 101 control of cost and	method for the majority of its work mainly	y because of 1	IS VIEWS That
	the science a cumule project (1) intreasing its renarmity of cost and the science of the science	management contracting is definitely not s	ultable for sir	iall refurbish-
		ment jobs. In the case of Client B, the premi	ses must be o	ccupied while
	construction periods; (3) increasing management contractors involve-	construction is in progress. So, with little J	oackages, the	job would be
	ment during the design stage; (4) more flexibility during construction;	too messy (i.e., interaction between the su	ibcontractors).	Client B ad-
	(5) reduced maintenance costs; (6) suitability; (7) providing a high degree	mitted that it would use a management con	itract in cases	where timely
	of personal control over specialized work; (8) lower costs in use; (9)	completion is vital. The organization might s	uffer a 10% in	crease on cost
	cheapest cost; and (10) aesthetic appeal.	to save time		
	Clients' Attitude Toward MC Having established the miteria by which	Client C is a large national and internation	nal property d	eveloper and
	dients choose a management contract is account of the first	List in the second seco	aven professi	onals It con-
	METRINS CHOUSE & MAIABERHENIL CURITACT, JE IN MERESSARY TO TEVIEW WITH A MARKAN PARAMAN PARAMAN MARKAN A MARKAN	nas a simple organizational structure with s	יייייי אין עייייייי	Ullion Client
		Structs flats and othces costing between Low		runon. Chent
	responses to the question of whether they will use MC again.	L used MC as an alternative to in-house cons	ננחרווסט זווקזוק	לבווובווני זאוזע-

000,000. Management Contracting versus Traditional Contracting.—So far the over discussions have focused basically upon management contracting. is section will compare MC and the traditional form of contract from	e standpoint of the client, having in mind his needs in terms of func- in, economy, speed and aesthetics. Eight clients were interviewed and two postal responses received. All are asked questions that sought to compare MC with the traditional	etnod (1 able 0). As can be seen, there is a conflict of opinion concerning the risk to be sorbed by clients when dealing with a management contractor. Clients B and D saw the principal risk arising from the absence of a tendered	mp sum price from the main contractor prior to construction. Client claimed that clients are subject to a greater risk in respect to costs cause of the staggering and phasing of orders for specific work over ong period. While in the traditional method it was the main contractor	no was taking that risk by putting a lump sum bid out at the outset, e contractors' perception of risk was also different for management d traditional contracting. With MC the contractor is likely to settle for smaller guaranteed profit and abandon a higher potential profit through	e management of implicit risks. This balance between profit and risk s implications for clients. Larger clients may be better placed to take ks and consequently have a cheaper project. A simple equation may ustrate the situation:	anagement contractors' profit = contractors' traditional profit potential risk profit	BLE 8.—Responses to Questions on Management Contracting versus Tradi- nal Method	Response	Question/statement Yes Same No (1) (2) (3) (4)	1. MC is riskier to clients.	2. Is MC more prontable to the contractors? 10	4. 15 MC more flexible? 5. Does MC allow an earlier start on site? 10	6. Is MC quicker?	struction time?	9. Is MC more reliable in estimating construct	0. Does MC provide more control for subcon-	1. Does MC exercise more control over opera-	tions?
It is the construction time is Cuent C is first priority for project suc- It is the construction stage during which the organization starts to fit money with no return. In general, client C was satisfied with gement contracting but was looking for improvement in areas that we contract documentation.	It U is a public authority that constructs buildings for public use. The ganization employs a large number of in-house professionals but tion change its structure to simplify its procedures when using man- the contracting. Client D has built only two large complex projects we	the last 10 years. One was built using management contracting me other using the construction management concept. Those two A is cost £400 million. Management contracting was used to achieve abs e scale and because flexibility in the design was necessary. Ac-	bility was another factor that was fairly important. Client D was $F c$ this field in terms of time and fairly satisfied in terms of cost and $F c$. The organization has now commissioned a third major project be construction management concert. All other small projects were a lo	wh acted using the traditional form of contract. It E is a private manufacturer and retailer and constructs buildings r England and overseas. Client E has been involved with "pure" and	rement contracting since 1980, after having used the fee system the 1928. This change of direction came as a result of meeting with has rement contractors to introduce the system and to make use of risk ubcontractors. Their current management contracts were for a illu	cuse, intee new stores, and an extension to an existing pulliquig. ganization has never considered the cheapest cost as its primary on. Time was always the most important factor because a com- e advantage was gained from a short construction period. Client	satisfied with MC but its future developments will focus on the TA ^E ement fee system. t F is a property developer with worldwide interests and has	ssioned 20 projects on a management contract basis within two	Dissatisfaction with conventional lump sum contracting was the ason client F was attracted to management contracting. Like client	pressing construction time was the main criterion for adopting	s was client F's greatest concern. Quality was equally important	s that clients should achieve greater control of time and cost. To	3. management contracting is the best way of exercising project 5. that view is strengthened when the project is complex or if the	vants to start on-site work quickly.	it G is an industrialist and retailer. The organization employs a sumber of in-house professionals but, like client D, had to change	cture to obtain full advantage of MC. After meeting with man- th contractors and cetting recommendations from other clients.	adopted MC. The reliability of the estimated cost and time was	in reason for choosing an MC. Client C was saushed with MC.

An official report by Wood (1977), have shown this view to be for "although in the selection of the contractor competition on privery useful, it is not necessarily an essential means to the end of aching value for money. We suspect that value for money is largely so in the wrong place, it often seems to be looked for primarily at the ting of the construction contract" (Wood 1977). Client B stated that there is a tendency for greater involvement o	professional consultants: 'The architect and Q.S. [Quantity Surve get involved more than they should in some work which is the ragement contractor's job.'' This overlapping responsibility was refle in higher fees being paid. Most of the staff members have long involved with the traditional system and their roles are frequently the posed when management contracting is used. In an internal cost is ysis, client B found that under a management contract the client more than in the traditional system because of a less competitive the ering situation and partly because of the higher costs of preliminan Clients C, E, F and G have a fairly positive atfibude toward the performance of management contracting. One distincuishing charaction and system contracting.	 istic among this group is that low costs were not considered as esser for client satisfaction. Clients C and F stated that as developers, cheapest cost solution did not always provide the appropriate buildi For example, if the client spends more money on the mechanical electrical installation, the running and maintenance costs would be low with consequent benefits for the life-cycle costs of the development. Clients confirmed that a management contract enables greater con of subcontractors than does the traditional method; moreover, it p vides more control to the construction operations. With a management contract there is one professional builder totally responsible for ma aging a particular project, thus confirming this relationship (Sidwell 198 Sidwell used 32 cases studies to investigate the relationship betwee contractual arrangements and project surcess. The essential elements 	brought about success was the level of managerial contracting. None of the clients interviewed felt that management contracting p duced a better design than the traditional method, but they did not choc a management contract for that reason in the first place. This eviden refutes the (Construction Industry Research and Information Association 1982) conclusion that clients who use management contracting fr quently want the management contracting does not provid a better design because of conflict between the management contracting one the design. Client C said that management contracting does not provid a better design because of conflict may come from the commercial one tation of management contractors being countered by the profession attitudes held by other client advisers. There is also the problem of wh has to decide quality standards (unlike the traditional method where th architect is responsible). Client B commented that with management contracting "there can be an element of jealousy by the professional architect is responsible). Client B commented that with management contracting "there can be an element of jealousy by the professional cor- sultants by the fact that the management contractor is taking their role and authority as a team leader." The issue of dominance within the pro-
implications of an M.C. If the management contractors proint is equate to their management fee, then higher fees may be recommended fc higher risks. This is perhaps why some clients were more alert to th risks that may be assumed by MC. However, care should be taken exert the appropriate amount of pressure to assume risk because high risks by the MC may limit the number of organizations prepared to tende All clients studied agreed that management contracting is flexible i	that it enables variations on the original design and specification throughout the course of construction; they added that cost can be con trolled by changes in the design but without affecting project perfo- mance. Client H stated that "with the amount of changes our organ zation made for the last management contract, it could have been a disaste if we had used the traditional form of contract." However, not all clients reacted positively regarding the assertion tha fewer claims arose with an MC. Client D, while generally satisfied with MC, was unconvinced that MCs were less claims-conscious than tradi- tional contractors. Clients A. B. F. H and I did not experience any differences in claim.	between the JCT traditional form of contract and MC. This was unex pected because, at stage one of the study, the management contractor stressed that the system involved fewer claims and could run an MC without a form of contract. It is seen more as a philosophy, an attitude. Frequenly the time factor was seen as one of the major advantages of management contracting; none of the clients sampled commented un- favorably about the MC's time performance. All clients agreed that an MC reduces the precontract period by overlapping the design and con- struction processes; this enabled the project to be completed in a shorter period than for a traditional method. However, some clients added that their experience with past management contracts counted very much in considering the contract and the network.	Conflicting attitudes about the cost factor were observed. Client A is a large public organization with a commitment to public body and the procedures of MC, with uncertain final costs, could be observed. It also seemed to cost the organization a lot more in "resource costs," i.e., in- house monitoring and control and consultants' fees. Because of the way client A is organized it is naturally biased toward caution in committing itself to spending taxpayers' money and ensuring that its accounting of- fices (i.e., the chief executive) have good answers to critical questions that might be put to them by the public accounts committees. On the other hand, although client D was a public organization, it did not feel constrained in using MC because of public accountability. The public sector has experienced cost reimbursement contracts for many years. This particular form of contract would certainly seem to be far more in con- flict with the concept of public accountability than a "pure" management contract would, simply because the contractor carries out the work him- self with little provision for realistic and comprehensive competition (Chartered Institute of Building 1982). Traditionally, the public sector (Chartered Institute of Building 1982). Traditionally, the public sector

ect team is often the most vexatious and is the subject ot ongoing re- search.	I ne main criteria for choosing a management contractor were minimiz- ing the overall construction time and automical of
	projects.
CONCLUSIONS	The clients interviewed scored the performances of MC and traditional
Management contracting evolved as an alternative to traditional con-	economy, time, and exceptional size and for complexity, all the
tracting in circumstances where projects are large and/or complex and	discussed. Scoring was on a 1-5 scale with "1" indicating the minimum
where clients want their building quickly. However, it seeks to supple-	and "5" indicating the maximum capacity to meet the requirements Roth
ment rather than supplant traditional contracting.	management contracting and traditional contracting were scored The
Since management contracting was created around 1969, there is now	results showed that both systems' rates were "4" for projects with high
much competition among large construction firms to stay in the man-	technical complexity. However, the traditional system's rates were higher
agement contracting market. The pilot study with management contrac-	for projects requiring a high aesthetic/prestige value. This is because the
tors provided a picture of the development of management contracting	Preconstruction time is long enough to optimize design. The rating for
and its market share. The following conclusions are summarized from	"economy" was expected to be higher for the traditional method but,
ure analysis:	since most of the clients studied had a strong emphasis upon early com-
1. The use of management contracting is growing throughout the	Were Darticularly emphatic about the immediate sector clients
building industry. The number of contractors offering a management	Performances for time, size and complexity due to the pattern of the
contract service has increased by 50% between 1979 and 1983. The num-	project were scored higher for management contracting. This might also
ber of principal management contractors was estimated at 20 in 1983	convince other clients that management contracting can be a valid al.
with a market share of £580 million. There is also a tendency in the U.K.	ternative to the traditional method when these factors are of the essence.
for a design and consultants him to offer management contracting ser-	The difference between clients' criteria and their organizational struc-
	tures has influenced their views and attitudes toward management con-
2. In practice, no firm in the U.K. specializes 100% in "pure" man-	tracting. These views have, in one way, prevented the long-term use of
Agement contracts. The percentage of traditional contracting is still greater	management contracting by some clients but led other clients toward
contractor's construction outhout with 35% for management	continuous use of the system. For example, client A is a sophisticated
contraction s construction output, with 20% for intanagement contracting and 35% other types of provincement methods a g maxima maximum of	hum and is very much concerned about public accountability and finan-
and works of deal	cial control. Client A agrees that management contracting saves time and
3. An analysis of 170 management contracts indicated that 63% of the	sible in the multiplication of the quantify that saving is impos-
projects were new buildings, 27% refurbishment work and 10% a mix	phishipated organization with and also has a so-
of both.	Construction projects Client R stand that is its accorded to manage its
4. Results of the market distribution showed that 68% of the projects	Contracting projects are shorter in durition Bur At 6 filling a
have been commissioned by private sector clients, 27% for those in the	On any advantages that management controping on a file is a file of the file o
public sector, and 5% by a public enterprise in conjunction with a pri-	Within the client's organization of its own providence and make
vate organization. When analyzed by type of construction, 60% of the	to project requirements, the client may lose the advantages of managed
private projects were new buildings and 35% refurbishment projects. In	ment contracting. The client could delay progress if his approximate and
the public sector, 67% were new buildings, 15% returbishments and 18%	not matched to the speed of the management contractor's work. More-
a mux of both. E Mhaa the anciente mare divided hy value 32% of the manual	over, the type of work client B commissions is not seen as appropriate
J. Mileii ule projectis were divided by value, J4 % UL die Sulveyed management contraction projects were offices 28% commercial com-	for the long-term use of management contracting.
management contracture projects mere different contraction contraction before 27% industrial work and 13% residential mublic memises etc	VII the other hand, clients C-G, having smaller organizational struc-
k The number of clients using management contracting was esti-	utes with simple procedures, had a more positive attitude towards
o. The humber of the fifty hereaft were humber to be 213 around the Fifty hereaft were humber h	for the section of th
18% property developers, 9% investment companies and 33% accounted	shaping how they will not the antice is the factor of the strength of the stre
for other forms of public and private clients.	towards management contracting could be shared by how the building
	team performed on the last job. From this, clients may oscillate between
len clients' experiences were reviewed. Ine results of the clients stud- ind in this prover channed that management contractions work accounted	Waunonal and management procurement methods.
for between 3% and 8% of the firms' total expenditures on construction	Organizations for entries and clients have criticized many contracting
work. Management contracting was used mainly for office block jobs.	Personnel. Client C noted that "although from the client's point of vious

the proceedings to gain the advantage of their know-how within the the proceedings to gain the advantage of their understood or chosen to building industry, many have not yet either understood or chosen to building industry, many have not yet either understood or chosen to understand this change in status and merely regrard themselves as ad- understand this change in status and merely regrard themselves as ad- ministrative middle-men in between the sub-contractors and the client ministrative middle-men in between the sub-contractors and the client ministrative middle-men in between the sub-contractors and the client ministrative middle-men in between the sub-contractors and is indeed the reason is one of the principle objects of the exercise and is indeed the reason why certainly in our case, after a careful selection process, we bring them why certainly in our case, after a careful selection process, we bring them tho the proceeding at the earliest possible stage." into the proceeding at the earliest possible stage." Teven though attitudes are influenced by the experiences of individual Even though attitudes are influenced by the experiences of individual teres it seems that there is room for improvement in the management contracting system itself. One such shift would be for management con- clients it seems that there is room for improvement in the requirements of this change may be shaped by clients who can do much to fashion events tractors to adopt a professional—as opposed to commercial—role. Yet by matching their own management procedures to the requirements of by matching their own management procedures to the requirements of by matching their own management procedures to the requirements of sive but the appropriate mix of client control and procurement method sive but the appropriate mix of client control and procurement method sive but the spropriate mix of client control and procurement method	 APPENDIX.—REFERENCE Barrie, D. S., and Paulson, B. C., 1(17)6). "Professional construction management." ment.", I. Constr., Div., ASCE, 102(2), 425–436. Barrie, D. S. (1979). "The trade contractor's view of construction management." Barrie, D. S. (1979). "Construction programme management." J. Constr. Div., ASCE, 103(4), 381–387. Berliang Technology and Management. London, U.K. 22–26. Heery, G. T. and Darsio, E. (1932). "Clast red Institute of Building, England. Bioling Technology and Management. London, U.K. 22–26. Management contracting." (1932). Clastered Institute of Building, England. "Management contracting." (1932). Clastered Institute of Building, England. Science, S.G., and Langford, D. A. (1984). "Management contracting a review Naoum." S.G. and Langford, D. A. (1984). "Management contracting a review Naoum." S.G. and Langford, D. A. (1984). "Management contracting a review Naoum." S.G. and Hangord, D. A. (1984). "Management contracting a review Naoum." S.G. and Hangord, D. A. (1984). "Management in use of construction management." Rad, P. F. Millet, M.C. (1979). "Trends in use of construction management." Pad, P. F. Millet, M. C. (1974). Silvel in use of construction management." Pad, P. F. Millet, M. C. (1982). "Grant in use of Construction Matket fin in partial fulfiltment of the requirements for the degree of Doctor of Philoso- in partial fulfiltment of the requirements for the degree of Doctor of Philoso- in partial fulfiltment of the requirements for the degree of Doctor of Philoso- in partial fulfiltment of the requirements for the degree of Doctor of Philoso- in partial fulfiltment of the requirements for the degree of Doctor of Philoso- in partial fulfiltment of the requirements for the degree of Doctor of Philoso- dody. K. B. (1977). "The public client and the construction industry." Buildin 141–153. Mood, K. B. (1977). "The public client and the construction industry." Buildin and Civ. Engre. Economic Development Committee, NEDO

APPENDIX FIVE

PREVIOUS RESEARCH MODELS

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SOURCE - MORRIS, P.W. 1972 - PHD THESIS (SEE REF.)

MODEL - 1



SOURCE - NAHAPIET, H. & J. 1985 (SEE REF.)

MODEL - 2





SOURCE - NEWCOMBE, R. 1988 - UNPUBLISHED WORK (SEE REF.) MODEL - 4



SOURCE - SIDWELL, A. 1982 - PHD THESIS (SEE REF.)

MODEL - 5

APPENDIX SIX

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PILOT STUDY QUESTIONNAIRE

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THE INTERVIEW QUESTIONS

1)YOUR ORGANIZATION

:

A)Approximate turnover for your organization?

B)Percentage(by value) of your work done for the following forms of contracts:

TRADITIONAL: MANAGEMENT CONTRACTING: OTHERS:

C)Percentage(by value)of management contracts work done for the following type of clients:

Private: Public :

D)Approximate breakdown of your management contract work into building types liste below:

a)WORK DOWN FOR PRIVATE SECTOR

Building type

NEW HOUSING : INDUSTRIAL: OFFICES: SHOPS: OTHERS:

b)WORK DONE FOR PRIVATE SECTOR:

.

NEW HOUSING: PUBLIC CORPORATION : SCHOOLS: HEALTH: OFFICES;FACTORIES;SHOPS: CIVIL ENGINEERING WORK: OTHERS: E)Percentage of project procedure adopted when appointing the management contracto

.

NEGOTIATED: COMPETITIVE: COST REINBURESEMENT: OTHERS:

2)MANAGEMENR CONTRACTING WITHIN YOUR ORGANIZATION:

- A)How long has your organization been involved as an architect in management contracts and why?
- B)List of the projects with client name that your organization been appointed for management contracts:
- C)What is the procedure for the selection and appointment of the management contractor?
- D)What form of contract used in management contracting?

.

E)On what basis is the management fee charged and how are payment made?

F)Details of your staffing personal:

3) CLIENT SATISFACTION

Allocate a mark out of 10 to each of the factors listed below according to the magnitude of importance each factor wuold be to different client:

t

CLIENT CRITERIA	HOUSING	INDUST.	COMMERC	HEALTH	C.E.
A-SFEED					
a-The minimization of preconstraction time.					
b-Reliability of estimated preconstraction time.					
c-Your lack of involvement during the design and const. stage(i.e. the minimization of client time spent in consultation with the architect.)					
d-reliability of the estimated cost and time.					
e-Others					
B-COST					
a-Cheapest cost					
b-Reliability of original price	<u> </u>				
o-Mantinance cost			l		
d-Cost in use					
e-Finance arrangements offerd.			l		
f-Others	ļ				
<u>C-QUALITY</u>					
a-Aesthatic					
<u>b-Suitability</u>		 			
c-Flexibility enabiling the client			1	· ·	
to change his mind concerning the		ł			
outlaing layout etc. during the					
d-Management consultance service			<u> </u>		
afford during the descent stage	1		1		
(1 a advice concerning production	1]			
inchang lavout problems etc.			1	1	
andrelating them to the new	ł	ł .			
building design.	1				
e-A high degree of personal	1				
control over specialised work		1		1	1
peculiar to project requirement.			ļ	l	
f-Others.	1		1	1	

4)MANAGEMENT CONTRACTING UTILITY:

- A)During what stages in the design/constraction process does the management contractor get involve?
- B)How involve is the management contractor with regards to advice to the client and/or to you?

C)What is the procedure for the selection and appointment of sub-contractors?

D)What form of contract is used with sub-contractors?

E)How are sub-contractors supervised and controlled?

5) ADVANTAGES AND DISADVANTAGES

- A)Are ther deficincies apparent to you,as an architect,on the traditional process?If yes,what are they?
- B)The areas in which management contracting can or does it's greatest contribution:

C)What are the benefits to the client associated with management contracting?

D)What are the limits for the application of management contracting?

E)Why the management contractor does not directly undertake any of the work?

F)Which of the following problems do you think need to be overcome?

1)No universally accepted definition of management contracting.
2)Acceptance of the management contractor as part of the project team.
3)No standard form of management contract and sub-contract.
4)Defining duties and responsib-livies of members of the project team.
5)Defining and agreeing work packages.
6)Associated problems of communication.
7)High liquidated and ascertained damages;
8)Agreeing the E.P.C. at an early stage.
9)Lack of exposure to management contracting.
10)Program control.
11)Attitude of personnel.
12)Abortive effort and cost of preparing submissions.

13)Later work packages suffer as a consequence of overexpenditure on early work packages.

14)Others.

CASE STUDY QUESTIONNAIRE

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APPENDIX SEVEN

- Note : Assurance is given that the answers to the questionnaire will be used for statistical purposes only. The anonymity of the respondents will be respected, and names of organizations or individuals will not be published, if they so request.
- SECTION I. GENERAL PARTICULARS OF ORGANIZATION
- I.I. Name of organization
- I.2. Address

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I.3. Name of respondent and position within organization.

SECTION 2. ORGANIZATION PARTICULARS

- 2.I. Approximate annual turnover.
- 2.2. Please state an approximate breakdown of your organization's turnover into the following contractual arrangements. (BY VALUE)

	•/_
Traditional contracting	
Management Contracting	
Design & Construct	
Project, Management	
Others (please state)	

2.3. What type of projects does your organization specialised in ?

(please circle response)

Industrial projects / Commercial / Housing / Hospitals / Airport /
Others (please state)

SECTION 3. PROJECT DATA

- 3.1. Name of project
- 3.2. Client name
- 3.3. Project type

4

Factory building / Warehouse / Shope / Office / House / School / Hospital / Airport / Others (please state)_____

- 3.4. Gross floor area
- 3.5. Please give brief discription of project. (e.g. location, construction method, purpose of building etc.)

.

3.6. How was the project financed by

	Public Funding
	Private funding
3.7.	How experianced was the client with that type of construction
	Very experianced
	Moderatly experianced
	Not experianced at all
3.8.	What was the client category
	Speculative developer
	Developer of projects for the primary use of the company
	Others (please state)
3.9.	Did the client employ any professional personnel solely concerned with planning, design etc. of the building work ? YES / NO
	if YES, were they Architect Please state numbers
	Engineers
	Quantity Surveyors
	Building Surveyors
	Others (please state)

	How specialised	were th	he building	designers	with	that type	e of pro	ject :	?
--	-----------------	---------	-------------	-----------	------	-----------	----------	--------	---

Very specialised	
Moderatly specialised	
Not specialised at all	

3.II. What basis was the contract let by ?

Traditional method / Management Contracting Method

3.12 Date the main contractor was appointed ?

3.13. How was the main contractor appointed ? (please circle response)

Open Tender / Selected Tender / Direct Negotiation / Two Stage Tender /

3.14. What form of contract was used ? (please circle response)

Others (please state)

JCT / Client's Own / Contractors Own / Others (please state)

3.15. Please give duration or dates (AS STATED) of the following stages. Please complete as fully as possible, although partially completed may still be of use.

	PROGRAMMED	ACTUAL
Brief development in weeks.		
Date the design started.		
Date the design completed. (in case of MC. the date of last package been designed)		
Tender period for main contractor.		
Date the construction start on site.		
Date the construction completed.		

3.16. Please give the overall contractual price tender accepted for the building ?

Pounds

3.17. Please give the actual price on completion of building ?

Pounds

3.18. Please give an approximate percentage of services cost out of the overall price of the building ?

.

_____ Percent

3.19. If there was overrun on time please state reasons ?

3.20. If there was overrun on cost please state reasons ?

3.21. How complex was the project ? (if complex please state factors that made complex)

High	
Medium	
low (simple)	

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SECTION 4 : CLIENT CRITERIA

4.1. The following are a number of criteria which commonly applied by clients of the building industry in assessing the performance of their projects.

At the outset of this project, please tick the column which best describes the client's initial level of importance at the commencement of the building process.

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		Very	Fairly	Partly	Not	Not
		important	important	important	really	at a
			; :	<u>بن</u> ے	<u>نــــــــــــــــــــــــــــــــــــ</u>	•
·a)	Reliability of the estimated design time.					
• ъ)	Reliability of the estimated const. time.					1
c)	Minimizing the overall time of building.					1
d)	Reliability of the estimated const. cost.					1
. e)	To obtain a building at the cheapest cost.					1
/ f)	To obtain a building with low maintinance cost.					
_g)	To obtain a building with low running cost					1
h)]	To obtain knowledge of exactly how much to pay each period during construction.					1
i)	To obtain a building with high aesthetic quality.					1
(; j)	To obtain a building with idealy fit's it' purpose.	s				1
; k)	Management consultancy services from the contractor during the design stage.					-
1)	To have flexibility enabling the client to change his mind during construction.			<u> </u>		-
, m)	To have confidence in the design.)	<u>}</u> {	\	4
<u>n</u>)	To have confidence in the main contractor.					-{·
i o) į	Input of contractor's expertise in refinin solution and buildability.	a				1
p)	To have an early start on site.					7
q)	Minimizing the construction time.		<u>├</u> ──┥			1
		<u>اا</u>	↓		↓	-1

4.2. How well were the following criteria acheived after the project been completed. (please tick the column which best describe the level of success).

		Very successful	Fairly	Partly · Not really	Not at all
a)	The actual design time when compared with the estimated it was considered as	n			
b)	The actual construction time when compare with the estimated it was considered as	ed			
c)	The overall time of the project was performed		·		
d)	The actual construction cost when compare with estimated it was considered as	ed			
e)	When the building was completed the cost the building as to be the cheapest was	of			
f)	When the building was occupied the acheivement of having a low maintenance of	cost			
g)	When the building was occupied the acheivement of having a low running cost	was			
h)	The actual payment at each stage during the construction compared with the expected to	the Nas			
i)	The aesthetic of the building was perform	ned			
j)	The idea of having a building which fits it's purpose was acheived				
k)	The management consultancy services offer by the contractor at the design stage we	ced ce			
1)	Although there were a number of variation during construction the flexibility to co with the changes was	ns ope			•
m)	The client's confidence in the design was	3			
n)	The client's confidence in the contractor	was			
0)	The idea of getting an input of contractor expertise in refining solution and buildability was aveived	pr's			
p)	An early start on site was acheived				
q)	The construction time was performed				
4.3	Are there any other criteria that the other project, if so , what are they, what and what was the level of success when	client consid at level of i the project	mportance been com	the commencemen e would you giv pleted.	t of e them
F)	CRITERIA CONSIDERED	Level of	importa	nce Level of s	uccess
g)					
6 3	· · · · · · · · · · · · · · · · · · ·				
£)					

4.4. From the criteria on 4.1 & 4.3, Please rank the TEN most important criteria in the table in order of importance to the client concerned.

i.e. if the cheapest cost was most important , place (e) under I in the table.

I	2	3	4	5	6	7	8	9	IO

4.5. CLIENT SATISFACTION

HOW	SATISFIED	WAS	THE	CLIENT	ON	COST	н/м/	L
но₩	SATISFIED	WAS	THE	CLIENT	ON	TIME	H/ M /	L
HOW	SATISFIED	WAS	THE	CLIENT	ON	BUILDINS AESTHETIC	H / M /	L
HOE	FUNCTIONAL	. WAS	5 THE	E BUILDI	[NG	ON COMPLETION	н/м/	L

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ANY FURTHER COMMENTS

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THANK YOU FOR YOUR ATTENTION

APPENDIX EIGHT

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THE RESEARCH DATA

CLIENT CHARACTERISTICS

C1 = CLIENT TYPE C2 = CLIENT EXPERIENCE C3 = CLIENT BUSINESS C4 = CLIENT CRITERIA		1 1 3 1 1 3		PRIVATE, 2 = PUBLIC HIGHLY EXPERIENCED, 2 = MODERATE, NOT EXPERIENCED BESPOKE, 2 = SPECULATIVE CLIENT HIGHLY IMPORTANT, 2 = MODERATELY, NOT IMPORTANT
DESIGNER CHARACTERISTICS				
C5 = DESIGN SOURCE C6 = DESIGNER EXPERIENCE	-	1 1 3	11 11 11	INHOUSE DESIGN INPUT, 2 = OUTSIDE HIGHLY EXPERIENCED, 2 = MODERATE, NOT EXPERIENCED
PROJECT CHARACTERISTICS				
C7 = BUILDING TYPE C8 = CONSTRUCTION TYPE C9 = BUILDING COST C10= GROSS FLOOR AREA C11= PROJECT COMPLEXITY C12= BUILDING RATE CONTRACT PROCEDURE		1 1 1 1 3 1	и и и и и и	COMMERCIAL, 2 = INDUSTRIAL NEW CONSTRUCTION, 2 = REFURBISH LOW, 2 = AVERAGE, 3 = HIGH LOW, 2 = AVERAGE, 3 = HIGH HIGHLY COMPLEX, 2 = MODERATELY LOW COMPLEXITY HIGH, 2 = MODERATE, 3 = LOW
C13= CONTRACT PROCEDURE		1 3	N N	SELECTED TENDER, 2 = OPEN TENDER DIRECT NEGOTIATION
PROCUREMENT METHOD				
C14= PROCUREMENT METHOD	_	1 2	11 11	MANAGEMENT CONTRACT TRADITIONAL CONTRACT
PROJECT PERFORMANCE				
C15= PRE-CONSTRUCTION TIN C16= BUILDING TIME C17= TOTAL TIME C18= SPEED SQM/WEEK C19= UNIT COST £/SQM C20= TIME OVERRUN C21= COST OVERRUN C22= TIME SATISFACTION C23= COST SATISFACTION C24= QUALITY SATISFACTION		1 1 1 1 1 1 1 1 1		LONG TIME, 2 = AVERAGE, 3 = SHORT LONG TIME, 2 = AVERAGE, 3 = SHORT LONG TIME, 2 = AVERAGE, 3 = SHORT LOW SPEED, 2 = AVERAGE, 3 = HIGH LOW COST, 2 = AVERAGE, 3 = HIGH UNDERRUN, 2 = AVERAGE, 3 = HIGH UNDERRUN, 2 = AVERAGE, 3 = HIGH HIGH LEVEL, 2 = MODERATE, 3 = LOW HIGH LEVEL, 2 = MODERATE, 3 = LOW

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			C 1	C 2	C 3	C4A	C4B	C4C	C4D
R	OW		CLIENT	CLIENT	CLIENT	TIME	CERTAINTY	CHEAP	QUALITY
			TYP	EXP	BUSINESS	CRITERIA		COST	
	1		2	2	7	7	7	3	3
	2		1	1	1	1	1	2	3
	3		1	1	2	1	2	3	2
	4		2	2	2	3	1	2	3
	5		2	1	1	1	2	2	1
	6		2	1	1	1	1	2	3
	7		1	1	1	1	1	3	3
	8		1	2	1	1	1	3	2
	9		1	2	1	2	1	3	3
	10		1	2	2	1	2	2	. 1
	11		1	2	2	1	1	3	3
	12		1	2	2	2	1	3	1
	13		1	3	2	2	1	3	3
	14		1	2	2	1	2	3	1
	15		1	1	1	2	1	2	3
	16		1	2	2	1	2	3	3
	17		1	3	2	2	1	1	3
	18		1	2	2	1	1	3	3
	19		1	2	2	1	1	3	2
	20		2	2	2	1	1	2	2 '
	21		1	1	2	1	1	3	2
	22		1	1	2	2	1	3	3
	23		2	2	1	1	1	2	3
	24		1	1	1	1	1	3	3
	25		2	1	2	2	1	1	3
	26		2	2	1	1	1	3	3
	27		1	2	1	1	1	3	3
	28		1	1	2	1	1	3	3
	29		1	3	1	1	1	3	2
	30		1	1	2	1	1	3	2
	31		1	2	2	1	1	3	3
	32		1	3	1	2	1	3	1
	33		1	2	2	2	1	3	3
	34		1	1	1	1	1	2	g
	35		1	1.	1	2	1	3	3
	36		1	*	1	1	1	2	3
	37		1	*	1	7-	*	*	τ. -
	38		*	*	1	1	1	3	2
	39		*	*	1	1	1	3	3
T	40	1	1	3	1	2	1	1	2
R	41	2	1	1	2	3	1	2	
'A	42	3	1	2	1	Z	Z	1	1
D	43	4	1	1	1	۲ ۲	1	4	1
I m	44	5	6	4	4	J	1	1	4
Т									

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A L CONTRACTS

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	C 1	C 2	C 3	C 4 A	C 4 B	C4C	C 4 D
ROW	CLIENT	CLIENT	CLIENT	TIME	CERTAINTY	CHEAP	QUALITY
	ΤΥΡ	EXP	BUSINESS	CRITERIA		COST	
45	1	1	2	1	1	2	3
46	1	1	2	2	1	1	3
47	1	2	1	2	1	1	2
48	2	1	2	1	2	1	3
49	1	2	2	2	1	2	1
50	2	*	*	1	1	2	2
51	1	1	1	2	1	1	2
5 Z	1	1	1	3	1	1	2
53	2	3	1	1	2	2	1
54	1	1	1	2	1	1	2
55	1	1	1	2	1	1	2
56	1	2	*	2	2	1	2
57	1	*	1	2	1	1	2
58	*	3	1	3	1	2	1
59	*	*	*	2	1	1	3
60	*	*	1	2	1	1	2
61	2	*	2	2	1	1	2
62	*	*	1	*	+	*	*
63	*	*	1	2	1	1	2
64	1	2	2	2	1	2	3
65	1	3	2	3	1	2	1
66	1	2	1	2	1	1	2
67	1	2	2	2	1	1	2
+ 68	1	2	1	2	1	1	2
69	*	*	1	2	1	1	2
2.5							

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ROW	VARIATION	MANAGE	DESIGN SOURCE	C6 DESIGNER EXP.	C7* BULDING TYP.	C8 CONSTUCT TYP.
1	2	2	2	1	1	1
2	3	2	1	2	1	2
3	3	1	2	2	1	2
4	2	1	1	3	1	1
5	3	3	1	3	1	1
6	3	2	2	1	1	1
7	2	2	1	1	1	2
8	2	3	2	1	1	i Q
9	2	1	1	1	1	2
10	3	3	2	2	1	2
11	2	2	1	1	1	1
12	2	3	2	2	1	1
13	2	1	1	1	1	1
14	3	2	1	7 -	1	1
15	1	3	1	1	1	1
16	2	1	2	1	1	1
17	2	3	2	2	1	1
18	2	2	2	2	1	1
19	3	2	1	2	1	2
20	3	3	2	2	1	1
21	3	2	2	1	1	1
22	2	1	2	2	1	1
23	2	3	1	1	1	1
24	2	2	1	1	1	1
25	3	2	1	2	1	1
26	2	2	1	1	1	1
27	2	2	1	3 7	2	1
28	2	2	1	3	2	1
29	2	3	2	1	2	1
30	3	2	2	2	2	· 1 7
31	2	2	2	2	6	1 7
32	2	3	1	3 *	۲ ۲	1 *
33	2	1	1	-	9	7
34	3	3	1	1	2	1
35	2	1 •	1	1	2	1
36	2	<i>১</i>	-	1 *	2	1
37	*	*	1	7	2	1 *
38	3	2	*	1 *	<u>ດ</u>	. *
39	2	2				1
T 40 1	3	3	2	2	1 7	1
R 41 2	చ	2	1	⊥ ⊁	1	7
A 42 3	ა 7	స 7	6	*	1	1
p 43 4	ა ი	ు 7	1	3	1	7
I 44 5	2	ა	4	J	1	1

CONTRACTS

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	C 4 E	C 4 F	C 5	C 6	C 7	СЗ
ROW	VARIATION	MANAGE	DESIGN	DESIGNER	BUILDING	CONSTRUCT
45	2	3	2	1	1	2
46	3	2	1	1	1	1
47	3	3	1	2	1	<u>7</u>
48	2	3,	2	2	2	2
49	3	3	2	3	2	*
50	3	3	*	*	2	*
51	3	3	2	1	2	2
52	2	3	1	1	2	1
53	3	3	2	3	2	2
54	3	3	2	3	2	2
55	3	3	2	1	2	7
56	3	3	2	3	2	2
52	3	3	2	*	2	1
58	2	3	2	*	2	7
50	2	.3	*	*	2	1
53 60	3	3	*	*	*	*
61	3	.3	1	3	2	2
62	*	*	*	*	2	*
67	3	3	*	*	2	*
61	2	3	1	2	1	1
62	2	3	1	2	1	2
66	3	3	2	1	1	
00 67	3	3	1	2	1	-
07 69	3	3	2	2	1	1
69	3	3	1	- *	2	*

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		C 9	C10	C 1 1	C12	C 1 3	CII
	RO₩	BUILDING	GROSS	COMPLEXITY	VALUE PER WEEK	PROCEDURE	PROCURE
		COST	AERA				METHOD
	1	6.40	9259	1	68500	1	1
	2	6.50	7000	1	84400	7 1	1
	3	7.90	4400	1	179545	1	1
	4	30.50	35000	2	231000	1	1
	5	7.40	10185	3	97000	1	-
	. 6	1.80	1500	2	32200	I	ī
	7	4.10	6350	1	73200	1	-
	8	2.10	3305	2	40400	1	-
	9	31.80	36800	1	179000	1	-
	10	1.60	5600	1	12300	1	-
	11	11.00	11000	1	211500	1	Ī
	12	6.50	5250	ĩ	90300	1	1
	13	4.00	10000	1	55600	1	1
	14	21.50	35000	1	233700	1	1
	15	3.80	4500	1	105500	1	1
	16	8.50	3900	2	100000	1	ĩ
	17	6.80	7680	2	65400	1	1
	18	15.00	11111	1	134000	1	1
	19	8.00 :	9345	1	94200	3	1
	20	5.10	3900	2	43600	1	1
	21	4.00	4800	2	48800	1	2
	22	31.00	45737	1	199000	3	1
	23	2.30	2560	3	57500	2	2
	24	8.50	17150	1	80950	1	<u>7</u>
	25	50.00	29000	1	179000	2	1
	26	31.00	46300	1	221500	3	1
•	27	1.90	8333	3	47500	2	Ĩ
	2.8	11.80	24148	2	128260	2	1
	29	5.60	5500	1	82333	2	1
	30	7.50	6000	2	83333	3	ĩ
	31	3.50	6000	2	67300	3	1
	32	3.00	5600	3	42800	3	1
	33	9.50	30000	2	115850	3	ī
	34	1.50	7685	3	26800	3	1
	35	10.50	16720	• 2	91000	3	1
	00			-			

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RO₩		C9 BUILDING COST	C10 GROSS AERA	CII Complexity	C12 Value Per Week	C13 PROCEDURE	C14 PROCUREME METHCD
36		1.80	5680	3	34615	3	1
37		3.00	6600	1	85700	2	- 1
38		2.50	1440	*	56818	2	1
39		1.00	1765	*	38461	2	1
40	1	5.50	9808	2	47400	2	2
41	2	8.40	15794	2	123600	2	2,
42	3	2.30	2691	3	27400	2	2 1
43	4	40.00	102005	3	196100	2	2
44	5	2.00	2584	2	27000	2	2
45		2.95	3000	-	73700	1	2
46		14.20	12000	2	142000	1	2
47		6.00	11160	2	115400	1	2
48		7.20	14163	2	64285	2	2
49		3.30	6140	3	28448	2	2
50	•	1.90	6140	3	40428	2	2
51		0.50	2370	3	19230	1	2
52		1.80	12000	3	30000	2	2
53		2.20	1768	3	39285	2	2
54		0.70	2087	2	14285	1	2
55		0.60	759	3	24000	2	2
56		0.90	1505	3	28125	3	2
57		0.90	4391	3	17307	3	2
58		1.70	4087	3	30357	3	2
59		1.00	2676	3	17857	2	2
60		1.00	3136	2	26315	1	2
61		5.90	14000	2	80821	1	2
62		1.20	4273	3	23076	3	2
63		1.40	3000	2	31818	3	2
64		10.20	16385	1	89500	3	2
65		4.80	11071	1	39500	*	3
66		0.90	1162	3	11500	1	2
67		9.50	18245	1	91400	3	2
68		8.80	17783	2	44000	3	2
69		0.70	5420	3	23333	3	2

	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24
RCW	DESIGN	BUILDING	TOTAL	AREA/WEK	COST/SQM	OVERRUN	OVERRUN	TME SATS	CST SATS	OLT SATS
	ΤΠÆ	TIME	TIME			ON TIME	ON COST			v
1	17	92	109	101	690	1	1	2	2	1
2	17	77	94	91	923	1	1	1	2	2
3	33	44	77	100	1806	3	3	3	3	2
4	20	132	152	165	879	1	1	1	1	1
5	20	76	96	134	728	1	1	1	1	1
6	10	52	62	29	1200	1	1	1	3	3
7	12	56	68	114	652	1	1	1	1	1
8	15	52	67	64	655	1	1	1	2	1
9	*	178	*	222	864	3	1	1	1	2
10	52	130	182	43	283	3	1	3	1	1
11	24	52	76	211	1000	1	1	1	2	3
12	*	55	*	73	1238	1	1	1	2	1
13	*	72	*	138	403	2	1	1	1	1
14	*	*	*	380	614	*	*	*	3	2
15	20	36	56	125	810	1	1	1	2	1
16	20	<i>32</i>	102	114	883	1	1	1	2	1
17	24	104	128	74	885	1	1	2	2	2
18	30	112	142	100	1350	2	2	1	3	2
19	20	68	88	137	856	1	3	1	2	1
20	30	117	147	33	1307	1	2	1	3	3
21	25	82	107	58	8.33	1	2	1	1	3
22	26	156	182	293	679	1	3	1	2	1
23	20	40	60	64	893	1	1	1	1	1
24	15	105	120	163	500	1	1	1	1	1
25	100	280	340	103	1724	1	3	1	3	1
26	20	140	160	330	670	1	3	1	2	1
27	20	40	60	208	228	3	1	1	1	I
28	*	92	*	252	509	1	1	1	2	2
29	*	68	*	80	1018	1	1	1	1	1
30	16	74	90	100	1250	3	1	2	3	1
31	10	52	62	115	583	1	1	1	1	2
32	15	70	85	80	535	1	1	2	1	1
33	?	82	89	366	316	1	1	1	1	1
34	9	56	65	137	195	1	1	1	1	1
35	10	112	132	150	610	1	1	1	1	1
36	9	52	61	109	317	1	1	1	1	1

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		C15	C16	C17	C18	C19	C20	C21	C22	C23	C24
W		DESIGN	BUILDING	TOTAL	AREA/WEK	COST/SQM	OVERRUN	OVERRUN	TME SATS	CST SATS	QLT SATS
		ΤΤΛΈ	TIME	TIME			CN TIME	ON COST			-
		-	26	70	100	1007	-	-	7	-	-
57		5	35	38	188	1063	1	1	1	1	i 7
38		4	44	48	32	1736	1	1	1	1	1
39		9	26		68	566	*				
40	1	24	116	140	84	560	3	ن -	3	3	$\frac{1}{2}$
41	2	56	68	124	232	531	1	1	1	1	$\frac{1}{2}$ Y
42	3	168	84	252	32	827	1	1	1	2	1
43	4	316	204	520	500	393	3	2	2	2	i
44	5	104	74	178	35	740	1	3	1	2	1
4 5	•	52	40	92	75	989	1	1	1	1	1
46	•	52	200	152	120	1180	1	2	1	1	1
47		40	52	92	215	537	1	1	1	1	2
4 8		92	112	204	126	475	3	3	2	1	1
4 9		26	116	132	65	433	3	1	3	1	2
50		6	47	53	42	309	1	1	1	2	1
51		8	26	34	91	210	1	1	1	1	2
2		18	60	78	200	150	1	1	1	1	1
53		39	56	95	32	1244	1	3	3	3	2
4		25	49	74	43	335	3	3	1	2	2
S		24	25	<u>49</u>	30	790	1	1	1	1	3
6		61	32	93	47	205	3	2	3	1	1
7		58	52	110	85	205	3	2	2	1	1
8		16	56	72	73	416	3	3	2	2	3
9		73	56	129	48	373	1	3	1	2	2
b		29	38	67	83	318	1	1	1	1	1
6		40	73	113	192	421	3	3	2	3	2
6		22	52	74	83	280	1	1	1	1	1
k		24	44	68	68	466	3	1	2	1	1
6		78	774	192	143	624	1	2	1	2	1
k		50	122	172	90	430	1	2	1	2	3
6		*	78	*	15	774	3	3	3	3	1
6		70	104	174	176	521	2	3	2	3	1
k		100	182	282	98	460	3	2	3	2	2
6		24	30	54	180	129	2	1	1	1	1
F											
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APPENDIX NINE SIEGEL'S AND GREENE'S STATISTICAL CHARTS

			-+- 	بور بور			
		· NONPARAM	AETRIC STATISTICAL	· TEST*		NONPAPAMETRIC MEASI IPE	
П OF		Two-sam	ple case	: k-sc	mple case	OF CORRELATION	
LENT	· One-sample case (Chap. 4)	Related samples	Independent samples	Related samples (Chap. 7)	Independent samples (Chap. 8)	(Chap. 9)	
			Fisher exact proba-				
	Binomial test, pp. 35–42	McNemar test for the	bility test, pp. 96- 104 😤 🖓	Cochran Q test,	x: test for Kindependent v	Contingency coefficient: C, pp. 。	
ominal	x ² one-sample test, , pp. 42–47	changes, pp. 63- 67	x ² test for two inde- pendent samples, i pp. 104-111. 5	рр. 161-166	samples, pp. 175–179	196-202	
			Median test, pp. 111-116		·		
			Mann-Whitney U test			Spearman rank correlation coefficient: rs, pp. 202–213	
	Kolmogorov-Smirnov	Sign test, pp. 68–75 -	Kolmogorov-Smirrov	Friedman two-way ~	extension of me median test, pp. 179–184	Kendall rank correlation	
rdinal	, pp. 47–52	Wilcoxon matchea- pairs signed-ranks	pp. 127–136	analysis of variance, pp.	Kruskal-Wallis one-way analysis of variance,	Kendall partial rank correlation	
	One-sample runs test, pp. 52–58	test,† pp. 75–83	Wald-Wolfowitz hins test, pp. 130-145	166-172	pp. 184-193	coefficient: تعريبه pp. 223–229 Kendall coefficient of con-	
	· · ·		Moses test of extronge			cordance: W, pp. 229–238	
		• • • •	reactions, pp. 4	A			
		Walsh test, pp. 83–87	Randomization Tost to		•		
iterval		Randomization test for	hwo independent	4,52,°			
•		matched pairs, pp. 88–92	156 University	r - De Richard			
. Eac	th column lists, cumulatively down	rard, the tests applicable to the g complet when ordinal measurer	jiven level of measure-	The Wilcoxon res	t requires ordinal measurement not only a differences between pairs. See the	r within pairs, as is required for the discussion on pp. 75–76.	

• ment. For example, in the case of k related samples, when ordinal measurement has been to both the friedman two-way analysis of variance and the Cochran Q test are applicable.



APPENDIX TEN

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CHI-SQUARE TEST RESULTS

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CHI-SQUARE NO. 1 - PROCUREMENT METHOD V CLIENT TYPE

CHI-SQUARE NO. 1 - PROCUREMENT METHOD V CLIENI TYPE										
	MANAGEMENT CONTRACTS (1)	TRADITIONAL CONTRACTS (2)	TOTALS							
PUBLIC SECTOR (2)	8	5	1.3							
PRIVATE SECTOR (1)	31	25	56							
TOTALS	39	30	69							

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 $X^2 = .17$ D.F. = 1 P < NOT SIGN. R = -.154

CHI-SQUARE NO. 2 - PROCUREMENT METHOD V CLIENT EXPERIENCE

.

	MANAGEMENT CONTRACTS (1)	TRADITIONAL CONTRACTS (2)	TOTALS
HIGHLY EXPERIENCE (1)	14	9	23
NORMAL EXPERIENCE (2) & (3)	21	13	34
TOTALS	35	22	57

 $x^2 = .12$ D.F. = 1 P < NOT SIGN. R = .041

CHI-SQUARE NO. 3 - PROCUREMENT METHOD V CLIENT BUISINESS

	MANAGEMENT CONTRACTS (1)	TRADITIONAL CONTRACTS (2)	TOTALS
BESPOKE CLIENTS (1)	19	16	35
SPECULATIVE (2)	20	14	44
TOTALS	39	30	69

 χ^2 = . 15 D.F. = 1 P < NOT SIGN. R = . 187

CHI-SQUARE NO. 4 -	CLIENT	EXPERIENCE	V	CLIENT	SATISFACTION	ON	TIME
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	HIGHLY EXPERIENCED (1)	MEDIUM & LOW (2) & (3)	TOTALS
HIGHLY SATISFIED (1)	19	15	34
OTHERS (2) & (3)	4	14	18
TOTALS	23	29	52

 $x^2 = 4.5$ D.F. = 1 P < .05 R = .308

CHI-SQUARE NO. 5 - CLIENT EXPERIENCE V CLIENT SATISFACTION ON COST

	HIGHLY EXPERIENCED	MEDIUM.:&LOW (2) & (3)	TOTALS
HIGHLY SATISFIED (1)	20	12	32
OTHERS (2) & (3)	5	15	20
TOTALS	25	27	52

 $X^{2} = 8.2$ D.F. = 1 P \lt .01 R = .360

CHI-SQUARE NO. 6 - CLIENT TYPE V CONSTRUCTION PERFORMANCE UNDER MC

	LONG (1)	AVERAGE(2)	SHORT (3)	TOTAL
PRIVATE CLIENT(1)	20	58	27	105
PUBLIC CLIENT (2)	21	12	5	38
TOTALS	41	70	32	143

CHI-	SQUARE	NO.	7	-	PROCUREMENT	METHOD	V	DESIGNER	EXPERIENCE
------	--------	-----	---	---	-------------	--------	---	----------	------------

	MANAGEMENT CONTRACTS (1)	TRADITIONAL CONTRACTS (2)	TOTALS
HIGHLY EXPERIENCED (1)	18	7	25
OTHERS (2) & (3)	. 17	13	30
TOTALS	35	20	55

X = 1.2 D.F. = 1 P < NOT SIGNF. R = .201

CHI-SQUARE NO. 8 - PROCUREMENT METHOD V SOURCE OF DESIGN

	MANAGEMENT CONTRACTS(1)	TRADITIONAL CONTRACTS(2)	TOTALS
IN-HOUSE DESIGN INPUT (1)	13	11	24
OUT-SIDE DESIGN INPUT (2)	15	14	29
TOTALS	28	25	53

X² = .92 D.F. = 1 P < NOT SIGNF. R = .141

CHI-SQUARE NO. 9 - DESIGN EXOERIENCE V PRE-CONSTRUCTION TIME

	SHORT (3) PREBLD TIME	LONG & AVG. PREBLD TIME (1) & (2)	TOTALS
HIGHLY EXPERIENCE DESIGNERS (1)	20	5	25
OTHERS (2) & (3)	16	14	30
TOTALS	36	19	55

 $X^2 = 4.48$ D.F. = 1 P< .05 R = .306

	WITHIN EST. TIME (1) & (2)	HIGH OVERRUN (3)	TOTALS
HIGHLY EXPERIENCED DESIGNERS (1)	18	8	26
OTHERS (2) & (3)	10	16	26
TOTALS	28	24	52

CHI-SQUARE NO.10 - DESIGNER EXPERIENCE V TIME OVERRUN

•

 $X^2 = 4.8$ D.F. = 1 P < .05 · R = .345

CHI-SQUARE NO. 11_ DESIGNER EXPERIENCE V COST OVERRUN

	WITHIN EST. BUDGET (1) & (2)	HIGH OVERRUN (3)	TOTALS	
HIGHLY EXPERIENCED DESIGNERS (1)	15	10	25	
OTHERS (2) & (3)	9	18	27	
TOTALS	24	28	52	•

 $x^{2} = 3.85$ D.F. = 1 P \checkmark .05 R = .273

CHI-SQUARE NO.12 - DESIGNER EXPERIENCE V CLIENT SATISFACTION ON TIME

	HIGHLY (1) SATISFIED	OTHERS (2) & (3)	TOTALS
HIGHLY EXPERIENCED (1)	20	3	23
OTHERS (2) & (3)	14	12	26
TOTALS	34	15	49

 $X^2 = 5.64$ D.F. = 1

 $P < \cdot 02$ R = .331

CHI-SQUARE NO. 13 _ DESIGNERS EXPERIENCE AND CLIENT SATISFACTION ON QUALITY

.

	HIGHLY SATISFIED (1)	OTHERS (2)&(3)	TOTALS
HIGHLY EXPERIENCED (1)	20	3	23
OTHERS (2) & (3)	13	10	23
TOTALS	33	13	46

X = 5.1 D.F. = 1 P \lt .025 R = .357

CHI-SQUARE NO. 14- SOURCE OF DESIGN AND SPEED DURING CONSTRUCTION

	IN-HOUSE DESIGNERS(1)	OTHERS (2)	TOTALS
HIGH SPEED (3)	15	4	19
OTHERS (1) & (2)	9	15	24
TOTALS	24	19	43

 $x^{2} = 5.1$ D.F. = 1 P \lt .01 R = .571

CHI-SQUARE NO. 15- PROCUREMENT METHOD V BUILDING COST

	MORE THAN £5 MILLION (3)	£2M - £5M (2)	LESS THAN £2 MILLION (1)	TOTALS
MANAGEMENT CONTRACTS (1)	23	10	6	39
TRADITIONAL CONTRACTS (2)	10	6	14	20
TOTALS	33	16	20	69

 $X^2 = 8.02$ D.F. = 2 P<.02 R = -.244

CHI-SQUARE NO.16 - PROCUREMENT METHOD AND PROJECT COMPLEXITY

	HIGHLY	MEDIUM	LOW	TOTALS
	(1)	(2)	(3)	ļ
MANAGEMENT CONTRACTS (1)	19	12	6	37
TRADITIONAL CONTRACTS (2)	8	6	14	28
TOTALS	27	18	20	65
CONTRACTS (1) TRADITIONAL CONTRACTS (2) TOTALS	19 8 27	12 6 18	6 14 20	3 2 6!

 $X^2 = 8.7$ D.F. = 2 P < .02 R = .441

CHI-SQUARE NO. 17 - PROCUREMENT METHOD AND BUILDING RATE £ PER WEEK

	MORE THAN £100,000 / WEEK (1)	BETWEEN (2) 50,000 AND 100,000 / WK	LESS THAN £50,000 / WEEK (3)	TOTALS
MANAGEMENT CONTRACTS (1)	13	16	10	39
TRADITIONAL CONTRACTS (2)	4	5	21	21
TOTALS	17	21	31	60

 $X^{2} = 13.7$ D.F. = 2 P \lt .001 R = -.388

CHI-SQUARE NO. 18 - PROJECT COMPLEXITY V BUILDING TIME

	HIGHLY COMPLEX(1)	(2) & (3) NORMAL COMPLEXITY	TOTALS
LONG BUILDING TIME (1)	16	9	25
AVERAGE AND SHORT TIME (2)&(3)	11	26	37
TOTALS	27	35	62

CHI-SQUARE NO. 19 - PROJECT COMPLEXITY V UNIT COST (COST / SQM)

	HIGHLY COMPLEX	NORMAL COMPLEXITY	TOTALS
HIGH UNIT COST COST / SQM	15	6	21
AVERAGE AND LOW UNIT COST	5	30	35
TOTALS	20	36	56

0			
X = 6.17	D.F. = 1	P 🗸 .025	R = .438

CHI-SQUARE NO.20 - PROCUREMENT METHOD V CONTRACT PROCEDURE

.

	MANAGEMENT CONTRACTS	TRADITIONAL CONTRACTS	TOTALS
COMPETITION	28	21	49
NEGOTIATION	11	9	20
TOTALS	39	30	69

 $x^2 = .04$ D.F. = 1 P < NOT SIGNIF. R =

CHI-SQUARE NO.21 - PROCUREMENT METHOD V PRE-CONSTRUCTION TIME

	MANAGEMENT CONTRACTS	TRADITIONAL CONTRACTS	TOTALS
LONG	3	9	12
AVERAGE	4	8	12
SHORT	24	12	36

 $X^2 = 8.28$ D.F. = 2 P < .02 R = .405

	SHORT TIME (3)	AVERAGE (2)	LONG TIME (1)	TOTAL
MANAGEMENT CONTRACTS (1)	11	14	5	30
TRADITIONAL CONTRACTS (2)	3	17	10	30
TOTALS	14	31	15	60

CHI-SQUARE NO.22 - PROCUREMENT METHOD V CONSTRUCTION TIME

.

 $X^2 = 6.53$ D.F. = 2 P \lt .05 R = -.293

CHI-SQUARE NO. 23 - CONSTRUCTION TIME V CONSTRUCTION TYPE UNDER MC TAKEN FROM 170 LIST OF MC PROJECTS

				1
	SHORT TIME (3)	AVERAGE (2)	LONG TIME (1)	TOTALS
NEW CONSTRUCTION (1)	9	31	15 .	_55
REFURBISH (2)	9	6	2	17
TOTALS	18	37	17	72
	A			

 $X^{2} = 9.39$ D.F. = 2 P \checkmark .01 R =

CHI-SQUARE NO. 24 - PROCUREMENT METHOD V TOTAL TIME

SHORT TIME	AVERAGE (2)	LONG TIME (1)	TOTALS
7	19	4	30
З	15	12	30
10	34 .	16	60 .
	SHORT TIME (3) 7 7 3 10	SHORT TIME AVERAGE (3) (2) 7 19 3 15 10 34	SHORT TIME (3) AVERAGE (2) LONG TIME (1) 7 19 4 3 15 12 10 34 16

•

 $X^2 = 7.5$ D.F. = 2 P<.025 R = -.297

-

			and the second secon	•
	HIGH SPEED (3)	AVERAGE SPEED (2)	LOW SPEED (1)	TOTAL
MANAGEMENT CONTRACTS (1)	12	21	5	38
TRADITIONAL CONTRACTS (2)	5	14	11	30
TOTALS	17	35	16	68

.

CHI-SQUARE NO.25 - PROCUREMENT METHOD V SPEED OF CONSTRUCTION

$X^2 = 6.1$ D.F. = 2 P ζ .05 R =24
--

CHI-SQUARE NO. 26- PROCUREMENT METHOD V UNIT COST (COST/SQM)

	LOW & AVG. (1) & (2)	HIGH (3)	TOTAL
MANAGEMENT CONTRACTS (1)	22	17	39
TRADITIONAL CONTRACTS (2)	23	7	30
TOTALS	45	24	69 _.

P < .05 R = -.409 $x^{2} = 4.12$ D.F. = 2

CHI-SQUARE NO. 27 - PROCUREMENT METHOD V TIME OVERRUN

	HIGH OVERUN (3)	WITHIN EST. TIME (1)&(2)	TOTALS
MANAGEMENT CONTRACTS (1)	5	28	33
TRADITIONAL CONTRACTS (2)	11	18	29
TOTALS	16	46	62

2

	HIGH (3) OVERRUN	WITHIN EST. TIME (1)&(2)	TOTALS
MANAGEMENT CONTRACTS (1)	4	33	37
TRADITIONAL CONTRACTS (2)	14	15	29
TOTALS	18	48	66

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CHI-SQUARE NO. 28 - PROCUREMENT METHOD V COST OVERRUN

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 $X^2 = 11.1$ D.F. = 1 P < .001 R = .308

CHI-SQUARE NO.29 - PROCUREMENT METHOD V CLIENT SATISFACTION ON TIME

	HIGHLY (1) SATISFIED	(2) & NORMAL (3) SATISFACTIO	TOTALS
MANAGEMENT CONTRACTS	30	8	38
TRADITIONAL CONTRACTS	15	14	29
TOTALS	45	22	67 <u>.</u>

 $X^{2} = 5.1$ D.F. = 1 P \checkmark .025 R = .323

CHI-SQUARE NO. 30 - PROCUREMENT METHOD V CLIENT SATISFACTION ON COST

	HIGHLY (1) SATISFIED	(2) & NORMAL (3) SATISFACTION	TOTALS
MANAGEMENT CONTRACTS	21	17	38
TRADITIONAL CONTRACTS	15	15	30
TOTALS	36	32	68

 γ
	HIGHLY (1) SATISFIED	(?)& NORMAL (3) SATISFACTIO	TOTALS
MANAGEMENT CONTRACTS (1)	24	13	37
TRADITIONAL CONTRACTS (2)	20	9	29
TOTALS	44	22	66

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CHI-SQUARE NO.31 - PROCUREMENT METHOD V CLIENT SATISFACTION ON QUALITY

X² = .21 D.F. = 1 P < NOT SIGNF. R = .135

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. . CHI-SQUARE NO. -

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x 2	=	D.F. =	Р 🗸	R =
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CHI-SQUARE NO. -

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AFPENDIX ELEVEN

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CORRELATION COEFFICIENT MATRIX

		C1 CLINT TYPE	C2 CLINT EXP	C3 CLINT BUSNS	C4A TIME CRIT.	C4B CERTN CRIT.	C4C CHEAP COST.	C4D QLTY CRIT.	C4E VAR. CRIT	C4F MGT. CRIT.
	PROCUREMENT	154	.041	.187	.594	043	784	381	.350	.610
c15	PRE-BLD TIME	.023	-,073	065	.279	.165	334	291	.182	.266
с <u>1</u> 6	BUILD TIME	.243	002	.064	.146	.016	.016	.064	.031	232
C17	TOTAL TIME	.146	027	199	.245	.115	192	166	.129	.053
C18	AREA/WEEK	067	161	232	.075	027	.281	.092 -	175	358
 C19	COST/SQM	.275	077	165	-,317	.161	,283	.125	.065	323
с20	+/- TIME	184	.098	.021	,142	.108	243	240	.328	. 107
C21	+/- COST	. 206	. 126	.207	,189	. 107	277	106	.187	.099
 C22	TIME SATS.	128	.308	226	.034	.276	172	384	.303	.214
 C23	COST SATS.	089	. 360	.246	.027	.132	086	079	.069	.065
 C24	QLTY SATS.	245	.168	.009	. 100	.082	086	109	.083	.018

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	C5 DESIN SORCE	C6 DESIN EXP.	C7 BUILD TYPE	C8 CONST TYPE	C9 BUILD COST	C10 GROSS AREA	C11 COMP- LEXTY	C12 VALU/ WEEK	C13 PROCE DURE	C14 - PROC- URMNT
PROCUREMEN	T .141	.201	.237	.187	244	078	. 441	.388	682	.000
PREBLD TIM	E005	,306	-,252	026	,431	.612	.104	.184	369	.405
BUILD TIME	095	.118	434	133	.825	.679	.305	.505	116	293
TOTAL TIME	028	.241	408	146	.699	.744	. 1 1 4	.381	258	297
AREA/WEEK	571	.021	178	137	. 631	.848	184	.728	.059	244
COST/SQM	.159	109	360	030	.287	069	. 438	.380	.246	409
+/- TIME	.288	.345	. 186	.353	003	. 103	.142	129	116	.311
+/- COST	.243	.348	082	.249	.229	.161	077	.081	298	.308
TIME SATS.	.455	. 331	.074	.260	123	054	.123	194	294	.323
COST SATS.	. 197	. 273	244	.041	. 133	.078	179	.145	335	.119
QLTY SATS.	.198	.357	.158	. 223	004	026	.060	.046	037	.135

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		C1 PRE- TIME	C2 BUILD TIME	C3 TOTAL TIME	C4A AREA/ WEEK	C4B COST/ SQM	C4C +/- TIME	C4D +/- COST	C4E TIME SATS	C4F COST SATS.
C16	BUILD TIME	.507								
C17	TOTAL TIME	.879	.853							
C18	AREA/WEEK	.326	.365	.399						
C19	COST/SQM	043	.178	.066	214					
с20	+/- TIME	.264	.150	.219	.016	211				
C21	+/- COST	. 283	.306	.360	018	.092	.349			
	TIME SATIS.	. 161	.112	.183	-,204	004	.659	.356		
C23	COST SATIS.	.202	.180	.246	068	.253	.179	.677	.410	
 C24	QULTY SATIS.	- . 058	.012	069	009	003	.270	.234	.217	,285

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AFPENDIX TWELEVE

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SCORING MATRIX FOR PROJECT PERFORMANCE

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	MEASUREMENTS	AVERAGE PERFORMANCE FOR PROJECT COSTING LESS THAN ES MILLION	DESIGN TIME = 34 WEEKS	BUILDING TIME = 52 WEEKS	TOTAL TIME = 96 WEEKS Speed (a/w) = 81 Area / Week	COST / SQM = 562 E/SQM	% +/- TIME = 5%	X +/- COST = 5X		AVERAGE PERFORMANCE FOR PROJECT COSTING MORE THAN ES MILLION		DESIGN TIME = 55 WEEKS Building Time = 88 weeks	TOTAL TIME = 140 WEEKS	SPEED (A/W) = 125 SQN/WEEK	COST / SQM = 775 £/SQM	X +/- TIME = 8X X +/- COST - 7X		SCORE 1 - LOW PERFORMANCE	SCORE 2 = AVERAGE PERFORMANC SCORE 3 = HIGH PERFORMANCE
		SERORES	TOT	23:	24	21	20	21	17	22	50	25	/1	24	R	19	17	315]
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LIENT AND Rolect	HARACTERISTICS			SPECULATIVE < ESM 1 = 4MC, 3TRC	SPECULATIVE > 55M 4 = 14MC, 6TRC	BESPOKE < ESM V = 12MC, 11TRC	BESPOKE > ESM N = 7MC, 4TRC	BLD RATE < 50,000 M = 10MC, 21TRC	6LD RATE > 50,000 M = 29MC, 9TRC	INDUSTRIAL < E5M M = BMC, 13TRC	INDUSTRIAL > E5M M = BMC, STRC	COMMERCIAL & ESM M = BMC, STRC	COMMERCIAL > 15M M = 18MC, BTRC	AREA < 7000 SQM M = 15MC, 18TRC	AREA > 7000 SQM N = 24MC, 12TRC	NORMAL COMPLEXITY N = 20MC, 20TRC	HIGHLY COMPLEX N = 19MC, BTRC	TOTALS	

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(herematter called the Management Contractor) of the other part

Whereas

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- First The Employer wishes to have constructed the building works described in the First Sche hereto (hereinshite: called the Project) and has appointed professional advisors (herein called the Professional Team) for the design of and otherwise in connection with the Pr who have prepared or are preparing Drawingt and a Soschication for the Project Nerver called the Project Drawings' and the Project Specification';
- Second the Project comprises works of terms of work to be carried out under Works Contract persons other than the Management Contractor in the marver hereinsflar appearing top with such site facilities and services to be provided by the Management Contractor a required by the Projessional Team and recorded in the FMth Schedule hereto in accord with Aricle 6.3.

Ind the Employer and the Management Contractor have agreed that the Management Contractor will, subject to the Conditions annexed hereto, co-operate with the Professional Team during the design stages and in the planning, programming and cost estimating for the Project, and will secure the carrying out and completion of the Project, and in so doing shall include.

in the Pre-Construction Period the services as relevant sat out in the Third Schedule hereto, and

in the Construction Period the services set out in the Third Schedule including any prestions made thereto by agreement between the Professional Team and the Management Contractor prior to the risule under clause 2.1 of the writen notification by the Architectifie Contract Administrator of the date when it will be practicable to commence the construction of the Project,

- Fourth the Employer extends subject to the Conditions to give to the Management Contractor, and the Management Contractor is writing to receive and act upon, the written notice from the Employer referred to in clause 2.1 of the Conditions requiring the Management Contractor to continue such co-operation and to proceed to set out and secure the carrying out and completion of the Project in eccontance with Article 1;
- Film the statut of the Employer for the purposes of the Statutory Tax Deduction Scheme under the Finance (No.2) Act. 1975 or any amendment or re-enactment thereof as at the date of this Agreement is stated in the Appendix.

Now is hereby agreed as follows

Article 1

For the consideration mentioned in Article 2 the Management Contractor with

- 1 subject to the Conditions co-operate with the Professional Team during the design stages and in the planning, programming and cost estimating for, and in securing the carrying out and completion of the Project and in so doing shall include the services set out in the Third. Schedule including any alterations made thereto by agreement between the Professional Team and the Management Contractor prior to the issue under clause 2.1 of the written notification by the Architect/the Contract Administrator of the date when it will be practicable to commence the construction of the Project; and
- 2 subject to receipt of the written notice from the Employer under clause 2.1 and subject to the Contract Documents, set out, menage, organise, supervise and secure the carrying out and completion of the Project on or before the Date for Completion or such other date as may be fixed under the Conditions inclusive of all such works or items of work at are to be carried out under and en accordance with the Works Contracts which the Management Contracts in equired to enter into hereunder.

Article 2

Subject to the Conditions the Employer will pay to the Management Contractor the amounts due in accordance with section 4,

Article 3A [a] [b] The lefts the Architect' in the Conditions shall mean

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or in the event of his dealth or ceasing to he the Architect for the purpose of this Contract other person as the Employer shall, within a reasonable time but in any case no later th days after such dealth or cessalion, nominale for that purpose, being a person entered use of the name. Architect and not being a person to wrom the Management Contract later than 7 days after such normation shall object for reasons considered to be sufficie an Arbitrator abdomted in accordance with Section 9 (c). Provided always that no p subsequently appointed to be the Architect under this Contract shall be entitled to dereg overrule any certificate or opinion or decision or approval or instruction given or express the Architect for the time being.

Article 38 [a] [b] The lerm the Contract Administrator' in the Conditions shall mean

Contract Lonverstrator

writh Surveyor

of_

or, in the event of his death or ceasing to be the Contract Administration for the purpose c Contract, such other person as the Employer shall, when a reasonable time but in any calater than 21 days after such death of cessation, nominate for that purpose, not being a bto whom the Management Contractor no later than 7 days after such nomination shall one reasons considered to be sufficient by an Arbitrator appointed in accordance with Section Provided always that no person subsequently appointed to be the Contract Administrators this Contract shall be entitled to disregard or overrule any certificate or cominon or decisi approval or Instruction given or expressed by the Contract Administrator for the time be

Article 4 [b] The term the Quantity Surveyor' in the Conditions shall mean

or, in the event of his deeth or ceasing to be the Quantity Surveyor for the purpose i Contract, such other person as the Employer shall, within a reasonable time but in any calleter than 21 days after such death or cessation, nominate for that purpose, not being a plo whom the Contractor no letter than 7 days after such domination shall object for in considered to be sufficient by an Arbitrator appointed in accordance with Section 9 [e].

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 Image: Image:

[4] Sinke out words in rakes in cases where the Architect. The Contract Administrate of the C Surveyor is an official of the Local Authority of in the amongment of the Empirical Professional Team

Article \$ The lerm the Professional Team' shall mean the Architect the Contract Administrator named in Article 3A/38 and the Quantity Surveyor named in Article 4 and

and such other persons as may be notified in writing to the Management Contractor by the Architect/the Contract Administrator. Article 8 The Employer will cause the Project Drawings and the Project Specification, which describe Project Drewood 61 generally the scope of the Project, to be prepared as soon as reasonably practicable after the Project date of this Contract unless previously prepared. Specification. Contract Cost The Employer will cause a Contract Cost Plan (to be annexed hereto) based upon the Project 6.2 Plan, Appendit Drawings and the Project Specification to be prepared as soon as reasonably practicable Part 2 and Third after the date of the Contract by the Quantity Surveyor in collaboration with the remainder and Fritth of the Professional Team and with the Management Contractor, Schedules 6.2 If the Management Contractor consents to: the Contract Cost Plan and to the total thereof, the entries incented in the Appendix Part 2. any attentions made to the Third Schedule the entries in the Fifth Schedule as agreed between the Professional Team and the Management Contractor and completed by the Professional Team he shall notify such consent to the Architeci/the Contract Administrator and thereupon initial any elterations made to the Third Schedule, initial the Fifth Schedule and sign the Appendix Part 2,

aterstone made to the Third Schedule, initial the Frith Schedule and sign the Appendix Pert 2, If the Employer issues the written notice to proceed under clause 2.1 the Employer shall hereupon initial any aterstone made to the Third Schedule, initial the Fifth Schedule and ager and date the Appendix Pert 2 and the Employer and the Management Contractor shall sign the Project Drewings, the Project Specification and the Contract Cost Plan.

Article 7

The Employer will cause such drawings and specifications and bills of quantities for Works. Contracts or otherwise to be prepared and issued by or under the direction of the Professional Team as are necessary and in such a way as to enable the Management Contractor property to discharge his obligations.

Article 8

If any dispute or difference as to the construction of this contract or any matter or thing of whatever nature arising thereunder or in connection therewith, shall arise between the Employer or the Architect/the Contract Administrator on his behalf and the Management Contractor enter during the progress or after the completion or abandonment of the Project, except on a decision of the Employer to state in the written notice under clause 2 1 that the Management Contractor is not to proceed or under clauses 5 9 to 5 17 (statutory tax deduction actione) to the entert provided in clause 5 17 or under clause 3 of the VAT Agreement, such dispute or difference shall be and its hereby referred to protection in accordance with section 8.

Drawings, specifications and bits of outertimes for Works Contractors or otherwise

Semanant of

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ATTESTATION

Signed by or on behall of the Employer [d1]

in the presence of

Signed by or on behalf of the Management Contractor [d1]

- in the presence of

.

Signed, sealed and delivered by [d2] The Common seal of [d3]:_____

in the presence of (d2)/wes hereunto affixed in the presence of (d3):

Signed, seeled and defivered by (d2)/The Common seal of (d2):_____

.

•

in the presence of [d2]/was hereunto affixed in the presence of [d3];

(d1) For use if Agreement is executed under hand

[62] For use if Agreement is executed under seal by an individual or time or unincorporated body

(43) For use if Agreement is executed under seal by a company or other body corporate

THE CONDITIONS hereinbefore referred to **SECTION 1: Intentions of the Parties**

Interpretation, definitions etc. (1 1 to 1 3)

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Nerrad al referenci la clauses	• * *	Universe atherwood appendix of the Schedules to any clinute at suction means that cliques at Contributing, the Appendix of the Schedules to any clinute at suction means that cliques at suction of the Continons			
LACTON OF IN THE	+2	The Process the Ambolies of Ag the read as a whole and the of gr appr as a gr anny in the Ag specifically stated the read to rectal, article or any of the cit Schedules.	provintent, the Conditions, the Appander and the Schedules are to fact or openation of any rechail, atticus or clause in the Conditions pender or is the Schedules struct therefore unless other- object to any relevant quelification or modification is any other uses in the Conditions or term in or entry in the Appander or the		
[elntone	13	United life context otherwas n on or entity in the Appendix or th and phrases in the Rectain th Schedules shell have the mea section. Appendix term or the :	equires or the Recitale or the Antickes or the Conditions or an Hanti e Schedules specifically otherwise provides, the following words e Anticles of Agreement, the Conditions, the Appandix and the range growt becaus or as ascribed in the recital, anticle, clause, Schedule to which reference is made		
		Ward or phrese	Maaning		
1		All Make Insurance	sea clause 6 2		
		Apprendic	the Appendix Parts 1 and 2 to the Conditions as complicited, and with Part 2 signed, by the Employer and the Menage- strent Contractor		
			The person appointed under section 9 to be the Arbitrator		
		Articles or Articles of Articles	the Articles of Agreement to which the Candilians are arrianed or any one of the Articles.		
		Architect	The person named in Article 3A or any successor duty appointed under Article 3A or otherwes agreed as the person to be the Architect		
		Conficate of Completion of Maining Good Defects	545 Clause 2 6		
		Completion Date:	the Date for Completion or any other date fixed under clause 2 12 or, if applicable, clause 3 6 8.		
		Condition	the clauses 1 1 to 9 7, and the Supplemental Provisions (The VAT Agreement") arraned to the Articles of Agreement		
	I	Construction Period	the period starting with the day when the Managariund Contractorie given possession of the site and ending on the day named in the conficute of Phycical Constantion.		
	(Construction Period	The emount which is part of the Management Fee and which		
	1	Waragement Fex:	is shaled as the Appandix as the Canahucilion Period Management Fee and which is adjustable, if applicable in accordance with clause 4 10 2		
		Contract Administrator	The person normed in Article 38 or any successor duly appointed under Article 38 or attenues agreed as the person to be the Contract Administrator,		
	•	Contract Cost Plan	the document referred to in Article 6.2 which is beard upon the Project Drawings and the Project Specification and provide therets		

Contract Cost Plan Total	the total of the Contract Cost Plan as stated in the Acor which lotal does not include the Management Fee
Contract Documents	the Project Drawings the Project Scincification the Ar- of Agreement, the Conditions, the Accimical the Cor Cost Plan annexed hereto and the Schedules
Date for Completion:	the date fixed and stated in the Appendix unce reference to clause 1.3
Date of Possession	the date fixed and stated in the Appendix unde reference to clause 2.3.1.
Delects Lability Pariod	the period named in the Appendix under the referer clause 2.5
Employer:	the person named as the Employer in the Anct Agreement
Escepted PieAe:	consing radiations or contamination by radioactivity tho nuclear lust or from any nuclear waste from the comb of nuclear lust, radioactive losic explosive or hazardous properties of any explosive nuclear as or nuclear component thereof, pressure waves caus arcraft or other penal devices travelling at some or some speeds.
Final Certificate:	the certificate to which clause 4 12 refers
Instruction:	an instruction to the Management Contractor issued Architect/the Contract Administrator
Interen Certificale:	any one of the certificates to which clause 4.2 refers
Joint Names Policy:	a policy of insurance which includes the Mana- Contractor and the Employer as the insured
Management Contractor	the person named as the Management Conviscto Articles of Agreement,
Management Contractor's Manager on 948;	The person named in the Appendix under the velai clause 3 13
Management Fee;	the sum of the Pre-Construction Period Managem and the Construction Period Management Fee
person.	an individual, firm (partnership), or body corporate
Practical Completion:	see clause 2.4
Pre-Construction Period	the period starting on the date of execution of this and ending on the day enmediately prior to the Possession
Pre-Construction Period Management Fee	the amount which is part of the Management Fee a is stated in, or is to be ascentained in accordance Schedule attached to, the Appendix
Preimnery Instruction:	an instruction referred to in clause 3.6.3
Prime Cost	the cost of the Project accertained in accordance Becand Schedula,
Professional Team	the persons referred to or named in Article 5
Project:	the building works briefly described in the First

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the building works briefly described in the First - and shown and described generatly in the Project and the Project Specification

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	s kriefs and internet grant and internet control of any solution of the second of the second second second secon The Project Specification
Project Orewrys:	the drawings for the Project Isled in the Fourth Schedule hereto upon which the Contract Cost Plan has been based and which have been signed by or on behall of the Employer and the Management Contractor,
Project Extension Nerne:	see clause 2 13
Project Specification:	the specification for the Project upon which the Contract Cost Plan has been based and which has been signed by or on behall of the Employer and the Management Contractor
Quantity Surveyor:	the person named in Article 4 or any successor duly appointed under Article 4 or otherwise agreed as the person to be the Quantity Surveyor,
Rechaller Recitate:	the Recitate or any one of the Recitate set out before Article 1.
Relevent Event:	any one of the events set out in clause 2.10 of the Works Contract Conditions,
Retention	see clause 4 7.
Sofecture:	the Schedules to the Conditions, that is the First and Second Schedules; the Third Schedule (including any attentions made thereto and initialed by or on behalf of the Employer and the Management Contractor), the Fourth Schedule; and the Fifth Schedule as completed and initialed by or on behalf of the Employer and the Management Contractor,
Site Materiale:	see clause 6 2.
Site Materials: Specified Perfet	see clause 6 2. fire, lightning, explosion, storm, lempest, flood, bursting or overflowing of water tanks, apparatus or pipes, earthquete, aircraft and other aerial devices or articles dropped there- from, not and civil conviction but excluding Excepted Risks.
She Matanate: Specified Parile: Statutory Requirements:	see clause 6 2. fire, lighthing, explosion, storm, tempest, flood, bursting or overflowing of water tanks, spparatus or pipes, earthqueke, arcraft and other aerial devices or articles dropped there- from, not and civil commotion but excluding Excepted Braks. see clause 5 1.
She Malanate: Specified Partie: Statutory Requirements: VAT Agreement;	see clause 6 2. Are, lightning, explosion, storm, lempest, flood, bursting or overflowing of water tanks, apparatus or pipes, earthqueke, arcraft and other serial devices or articles dropped there- from, not and civil convinction but excluding Excepted Risks. see clause 5 1. see clause 5 6.
She Matanata: Specified Perfe; Statutory Requirements: VAT Agreement; Works;	see clause 6 2. Are, lightning, explosion, storm, lempest, flood, bursting or overflowing of water tanks, apparatus or pipes, earthqueke, arcraft and other serial devices or articles dropped there- from, not and civil commotion but excluding Excepted Rieks. see clause 5 1. see clause 5 6. In respect of any Works Contract the works brief particulars of which are referred to in Section 1, and which are fully shown and described in the Numbered Documents listed in the second Rectal of Section 3, of the relevant Works Contract/1.
She Matanata: Specified Parite: Statutory Requirements: VAT Agreement: Works: Works: Contract	 see clause 6 2. Are, lightning, explosion, storm, lempest, flood, bursting or overflowing of water tanks, apparatus or pipes, earthqueke, arcraft and other aerial devices or articles dropped therefrom, not and civil conviction but excluding Excepted Risks. see clause 5 1. see clause 5 8. In respect of any Works Contract the works brief particulars drom and described in the Numbered Documents held in the second Rescal of Section 3, of the relevant Works Contract). the contract between the Management Contractor and a Works Contract or an clause 8 2-1-1 and defined in the Works Contract Conditione, clause 13 as: monitorial free Management Contractor and a stories contract Conditione 1, 2 and 3 of Works Contract) including the Numbered Documents held in Section 3 and defined in the Works Contract Conditione, clause 13 as: monitorial free Management Contractor and a floring the Numbered Documents held in Section 3 and defined in the Works Contract Conditione, clause 13 as: monitorial free Management Contractor and a floring free Numbered Documents held in Section 3 and defined in the Works Contractor and referred to miclause 8 2-1-1 and defined in the Works Contractor and referred to miclause 8 2-1-1 and defined in the Works Contractor Conditione'.

automs Ally 2014 - Zommung Controling an inclusion any implicit an Instruction of a Direction of the Management Contractor issued under the Works Contract

- the attention or modification of the design, quarty or quantity of the Works as shown in the Works Contract including.
 - the addition, omission or substitution of any work;
 - the attention of the kind or standard of any of the materials or goods to be used in the Works;
 - 3 the removal from the site of any work, materials or goods executed or brought thereon by the Works Contractor for the purposes of the Works other than work, materials or goods which are not in accordance with the Works Contract
- 2: the imposition by the Employer or by the Management Contractor of any obligations or restrictions in regard to the matters set out in paragraphs 2.1 to 2.4 or the addition to or atteration or omission of any such obligations or restrictions so imposed in imposed in the Works Contract in regard to.
 - 1 access to the site or use of any specific parts of the site,
 - 2 Imitations of working space,
 - 3 Imitations of working hours,
 - the execution or completion of the work in an specific order

Where clause 4.3 of the Works Centrect Condition applies the lerm Variation has the same meaning b in paragraph 1 of this definition delete design quakor quantity and lineart "design or quality.

Works Contractor	see clauses # 1 and 8 2
------------------	-------------------------

Obligations of Management Contractor (1.4 to 1.8)

ioneation with 1-4.

The Management Contractor shall upon and subject to the Conditions co-operate with the Professional Team as stated in Article 1.

Hold obligations 1.6 Wategement Miscler

I prepare all necessary programmes for the execution of the Project,

The Management Contractor shall during the progress of the Project-

- 2 enter into Works Contracts in authorent time to enable the Project to be duly carried c and completed on or before the Completion Date;
- 3 ensure that all items of work to be carried out by Works Contractors as referred to clause 8.1 are carried out in accordance with the Project Specification and with t Works Contracts, using materials, goods and workmanship of the quality and standar therein specified, and that where and to the extent that approval of the quality of materia or the standards of workmaniship is a matter for the opinion of the Architect/the Contra Administrator auch quality and standards are to the reasonable satisfaction of t Architect/the Contract Administrator;
- .4 provide or secure the provision of such site facilities and services as are listed in the Fi Schedule or secure such site facilities and services as may be agreed with or may instructed by, the Architect/the Contract Administrator,

		 provide continual supervision of the Project and perform and provide everything necessary for the organisation and management of the Project,
		ensure that the Project is carried out in an economical and expeditious manner and in accordance with the Contract Documents;
		7 keep and make available at necessary deterled records in a form prescribed by an agreed with the Quantity Surveyor to enable the Quantity Surveyor to verify the Prime Cost.
Obligations in Third Schedule	1-4	Without prejudice to the generality of clause 1.5 the Management Contractor shall carry out the specific obligations listed in the Third Schedule.
Management Contractor's hebility to Employer	1-7	Subject to clause 3.21 the Management Contractor shall be fully lable to the Employer for any breach of the terms of this Contract including any breach occasioned by the breach by any Works Contractor of his obligations under the relevant Works Contract,
Comphance with Instructions	1 -8	The Management Contractor shall forthwith comply or secure comphance with all instructions save that where such instruction is one requiring a Work's Contract Vanakon within the definition of Work's Contract Varietinin the Management Contractor before securing compliance shall submit to the Architectifie Contract Administrator any written objection, or where relevant any written consent or writhfolding of consent, to compliance with the instruction received by the Management Contractor from a Work's Contractor under clause 3.4.1 of the Work's Contract Conditions; and the Management Contractor need not comply or secure compliance with such Instruction to the estent that the written objection, or where relevant the written written written of consent, of the Work's Contractor to compliance with the Instruction is reasonable.
		Contract Decuments - other documents - Works Contracts (1 9 to 1-12)
Cueody and copies of Contract Documents	1.	The Contract Documents shall remain in the custody of the Employer so as to be available at all reasonable innes for the inspection of the Managament Contractor, inmediately after the execution of this Contract the Architect/the Contract Administrator without charge to the Managament Contractor shall provide him (unless he shall have been previously to provided) with one centified copy of the Contract Documents.
furner drawings and details	1-10	⁷ The Architect/The Contract Administrator without charge to the Management Contractor shall provide him with copies of such drawings and specifications and bits of quantities as referred to in Article 7 and of such further drawings, details, descriptive schedules or other like documents (in a form and by such reproduction methods as are spreed between the Architect/ the Contract Administrator and the Management Contractor in writing) as are reasonably necessary either to explain and article the Project Drawings or to enable the Project to be carried out and completed in accordance with this Contract,
Linits to use of documents	1-11	None of the Contract Documents or the documents mentioned in cleuse 1-10 shell be used by the Management Contractor for any burpose other than this Contract and neither the Employer nor any member of the Professional Team shell divulge or use except for the purpose of this Contract any of the rates or prices in any Works Contract nor the Management. Fee set out in the Appendix.
Copies of Works Contracts	1-12	Immediately after the execution of each Works Contract the Managament Contractor shall provide the Architect/the Contract Administrator (unless he shall have been previously es provided) with one certified copy of each Works Contract.
		Cardilantee — lesue — offest of Final Cardilante — offect of other certificates (1-13 and 1-15)
have of cynificatae	1-13	Except where otherwise specifically so provided any certificate to be issued by the Architect/ the Confract Administrator under the Conditions shall be issued to the Employer and a duplicate copy thereof shall be sent at the same time to the Management Contractor.
Effect of Firmal Condicate	1.14	Except as provided in clauses 1-14-2 and 1-14-3 (and save in respect of fraud) the Final Certificate shall have effect in any proceedings arising out of or in connection with this Contract (whether by arbitration under section 8 or otherwise) as
		•1 conclusive evidence that where the quarky of materials or the standard of workman, ship stated in the Project Specification and/or in a Works Contract are to be to the resemble satisfaction of the Architect/the Contract Administrator the same are to

1-14-1 continued

- 2 conclusive evidence that any necessary effect has been given to all the term this Contract with regard to payment save where there has been any accide inclusion or enclusion of any work, materials goods of figure in any computation any mathematical error in any computation in which event the Final Certificate s have effect as conclusive evidence as to all other computations, and
- 3 conclusive evidence that all and only such extensions of time if any as are under clauses 2.12 to 2.14 have been given, and
- 4 conclusive evidence that the ascertainment of direct loss and/or expensitiespect of applications by Works Contractors as referred to in clause 8.5 and inclusion of such ascertained loss and/or expense in Prime Cost is in 1 settlement of all or any claims which the Management Contractor has or may h on behalf of Works Contractors arising out of any of the matters referred to clause 4.46.10.04.46.7 of the Works Contract Conditions whether such claim for breach of contract, duty of care, statutory duty or othermise
- 2 If any arbitration or other proceedings have been commenced by either party before Final Certificate has been issued the Final Certificate shall have effect as concluevidence as provided in clause 1.14.1 after either.
 - such proceedings have been concluded, whereupon the Final Certificate shall subject to the terms of any award or judgement in or settlement of s proceedings, or
 - 2 a period of 12 months during which neither party has taken any further step in s proceedings, whereupon the Final Cartificate shall be subject to any terms agr in partial settlement.

whichever is the earlier.

- 3 If any arbitration or other proceedings have been commenced by either party within days after the Final Certificate has been issued, the Final Certificate that have effect conclusive evidence as provided in clause 1.14.1 save only in respect of all maner which those proceedings relate.
- 4 The Final Certificate shall in no circumstances be conclusive as to the sufficiency of design for which any Works Contractor is responsible to the Employer under Employer/Works Contractor Agreement (Works Contract/3) or to the Manager Contractor under clause 1.7.4 of the Works Contract Conditions.

Effect of centricates other than the Final Centricate 1-18 Save as stated in clause 1.14 no certificate of the Architect/the Contract Administrator shu itself be conclusive evidence that any work materials or goods to which it relates an accordance with this Contract.

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Employer's notice requiring Management Contractor to proceed – pessession of the she (2-1 to 2.3)

 [mmover 1 makes
 21
 When the Architect the Contract Administrator notifies the Employer is writing (with a copy to the Management Contractor) of the date when it will be practicable to commence the construction of the Project and the Management Contractor has ministed any attentione made (orthacter) to the Third Schedue, invested the Fifth Schedue and signed the Appendix Part 2, the employer, not later than the date of that writien notification (or not later than the employer, not later than the date of that writien notification (or not later than the employer, not later than the employer of such other period as may be stated in the Appendix), shall by notice is writing to the Management Contractor state whether or not he is to continue co-operation with the Professional Team and to proceed to set out and secure the carrying out and completion of the Project in accordance with Anicle 1. If the writien notice requires the Management Contractor is to proceed to the Employer shall end sign and date the Appendix Part 2.

If the Employer states in the written notice given under clause 2.1 that the Management 2-2 Vanagement Contractor not to Contractor is not to proceed or if the Employer fails to notify the Management Contractor in proceed - dee accordance with the provisions of clause 2.1, the employment of the Management Contractor personation of shall be deemed to have been determined and the Employer, within one month (or such other period as may be stared in the Appendix) calculated from the latest date when written notice by Vanagement the Employer under clause 2.1 to proceed might have been given, shall pay to the Management Contractor s Contractor the Pre-Construction Period Management Fee less any amount paid under an protoyment Interm Certificate issued in accordance with clause 4.2.1, Such payment shall be reduced to take into account the extent to which the reason why the Employer did not require the Management Contractor to proceed as referred to in clause 2.1 was because of some default, whether by act or omission, of the Management Contractor, his servents or agents, in discharging his obligations in the period prior to the date when the Employer was required to issue the notice referred to in clause 2-1,

fosséssion of Ne sile	23	1	If the Employer gives the notice to proceed under clause 2.1, then the Employer shall give possession of the site to the Menagement Contractor on the Date of Possession whereupon the Management Contractor shall secure the commencement of the Project and shall ensure the regular and difgent progress of the Project and its completion on or before the Completion Date.
Delement al Possession		Z	Where clause 2.3.2 is stated in the Appendix to apply the Employer may defer the giving of possession under clause 2.3.1 for a period not exceeding 6 weeks or such lesser period stated in the Appendix calculated from the Date of Possession.
Inisession by Varagement Concestor		t	For the purposes of the insurance of the Project, the Management Contractor shall retain possasision of the site and the Project up to and including the date of issue of the certificate of Practical Completion and, subject to clauses 2.3.4 and 2.8, the Employer shall not be emitted to take possession of any part or parts of the site or Project until that date,
Use or Attubation by Employer		4	The Employer may, with the consent in writing of the Management Contractor, use or occupy the sele or the Project or any part or parts thereof whether for the purposes of storage of he goode or otherwise before the date of issue of the certificate of Practical Completion by the Architect/the Contract Administrator. Before the Management Contractor shall give his consent to such use or occupation the Management Contractor shall notify the insures under clause 6.4-1.1 or 6.4.3.1 whichever may be applicable and obtain confirmation that such use or occupation will not prejudice the insurance. Subject to such confirmation that owners of the Management Contractor shall not be unveasonably withheld.
murers Kichtional Dismum		5	Where the visurers in giving the confirmation referred to in clause 2.3.4 have made it a condition of such confirmation that an additional premium re-required the Management Corrector shall notify the Employer of the amount of the additional premium. If the Employer continues to require use or occupation under clause 2.3.4 the Management Contractor shall pay the additional premium required and shall provide the Employer, if

so requested, with the receipt therefor,

uenticale la PiolectiCompetion	14	provide the light range of the Alphylec the count act Alphylect takes for the country provide of the Provect is achieving, the strak formwith issue a certificate to that effect and the crical Contrem is of the Provect shall be deemed for all the purposes of this Contract to have taken pace on the day named in such certificate.
Schedule of defects - securing ne making good of defects	21	Without prejudice to the operation of clause 3.12 any defects, shrink auto or littler faults affect shall access within the Defects Liability Period, stitler to the Acsistance with the bi- materials, goods or workmanship not in accordance with this Crimitact or to hust inclining before. Practical Completion of the Project, shall be specified by the Architect the Contract Administrator in a schedule of defects which he shall deriver to the Munagement Crimitact or not later than 18 days after the explosion of the Defects Liability Period. Within a resumption for after recenct of such schedule the Management Contractor shall secure the making good of the defects, shrinkages or other faults therein specified bit, subject to clause 3.21, at iso cost to the Architectifie Contractor does so otherwise instruct them an appropriate deduction in respect of any such defects, shrinkages or other faults not made good shall be made to the Prime Cost.
Certificate of Completion of Making Good Defects	2.6	When in the pownon of the Architect the Contract Administration any philects, strinkages or on w faults which he may have required to be made good under cluics 2.5 shall have been micro- good he shall issue a certificate to that effect, and compinion of mixing (unit defects shall in deemed for all the purposes of this Contract to have taken place (in the day named in such certificate (the "Certificate of Completion of Making Good Defects.)
Frost	27	In no case shall the Management Contractor be redured at no cost to the Employer to secree the making good of any damage by frost which may appear after Practical Completion, uness the Architect the Contract Administrator shall certify that such damage is due to insiry effect took place before Practical Completion
	{ • }	Pertial possession by Employer
Employer s weh – Management Contractor s consent		If all any lime or times before the date of issue by the Architect the Contract Administrator of the certificate of Practical Completion the Employer wishes to take possession of any part or times of the Project and the consent of the Management Contractor (which consent shaft null take unreasonably withheld) has been obtained, then notwithstanding anything expressed or implied elsewhere in this Contract, the Employer may take possession thereof. The Archinct the Contract Administrator shall thereupon issue to the Management Contractor (when it behalf of the Employer a writen statement identifying the part or parts of the Project taken into behalf of the and gring the date when the Employer tool possession (in clauses 2.8.6.3.6.5.2 and 6.9 referred to as "the relevant part" and "the relevant date: respectively)
Practical Completion - relevant part		For the purposes of clauses 2.5, 2.6, and 4.7 Practical Competion of the relevant part shall be deemed to have occurred and the Defects Liability Period in respect of the relevant part shall be deemed to have commenced on the relevant date.
Delects etc relevant part		2 When in the opinion of the Architect the Contract Administrator any defects, shrinkages or other lauks in the relevant part which he may have required to be marte good under clause 2.5 shall have been made good he shall issue a criticale to that effect.
hsurance - Hevant part		3 As from the relevant date the insurance taken out under clause 6.4. shall terminate in respect of the relevant part but not further or otherwise, and where clause 6.5 and with obligation of the Employer to insure under clause 6.5.2 shall from the relevant date include the relevant part.
Liquidated damages – relevant part		4 In lieu of any sum to be paid or aflowed by the Management Contractor under churses 2.9 to 2.11 in respect of any period during which the Project may remain incomplet occurring after the relevant date there shall be paid or aflowed such sum as treats the same ratio to the sum which would be paid or aflowed apart from the provisions of clause 2.8 as the Contract Cost Plan Total less the amount contained therein in respect of the relevant part bears to the Contract Cost Plan Total

Damages for non-completion (2.9 to 2-11)

pare to secure loact composition antificient ar jorrect uninstrator e gnilcele	2.0	If the Management Contractor lars to secure the completion of the Project by the Completion Date them the Architectifie Contract Administrator shall issue a certificate to that effect. In the event of an extension of time being made after the issue of such a certificate the Architect/the Contract Administrator shall issue a written cancellation of that certificate and shall issue such further certificate under clause 2.9 as may be necessary.				
andered and Kenened Kenened	210	Subject to the name of a certificate under clause 2.9 and to clause 3.21 the Management Contractor shall, as the Employer may require in writing not later than the date of the Final Certificate, pay or allow to the Employer the whole or such part as may be specified in writing by the Employer of a sum calculated at the rate stated in the Appendix as liquidated and escentianed damages for the period between the Completion Date and the date of Precise Completion of the Project, and the Employer may deduct the same from any mones due or to become due to the Management Contractor under this Contract (including any balance stated as due to the Management Contractor in the Final Certificate) or the Employer may recover the same from the Management Contractor as a debt.				
june 2 9 Infrate - Incolation	11	If after the operation of clause 2.10 the relevant certificate under clause 2.9 is cancefied the Employer shall pay or repay to the Management Contractor any amounts recovered, allowed or paid under clause 2.10 but laking into account the effect of a further certificate, if any, issued under clause 2.9.				
		Estanaion of time (2-12 to 2-14)				
(deneon of hoject (onpletion Date -	2-17	If and whenever it becomes reasonably apparent that the Completion Date is not likely to be or has not been achieved, the Management Contractor shall forthwith advise the Architectiftle Contract Administrator of the cause of the delay and if in the opinion of the Architectiftle Contract Administrator the completion of the Project is likely to be or has been delayed beyond the Contract Administrator shall as above a state of the assess the length of the delay beyond the Completion Date as an extension of the Project is likely to be or has been delayed beyond the Contract Administrator shall as able to assess the length of the delay beyond the Completion Date which he considers to be far and reasonable provided that no extension shall be made in the case of delay which the Management Contractor has not used his best endeavours to avoid or reduce. If, in the approved the Architectifte Contract Administrator, upon receipt of such advice from the Management Contractor, it is not fair and reasonable to his a fater date as a new Completion Date he shall so notify the Management Contractor.				
		2 After the first accasion on which the Architect/the Contract Administrator fixed a new Completion Date the Architect/the Contract Administrator may in writing fix a Completion Date earlier than that previously fixed under clause 2.12.1 if in the opinion the fixing of such earlier Completion Date is fair and reasonable having regard to the omission of any work or obligations instructed under clause 3.4 after the last occasion on which the Architect/the Contract Administrator fixed a new Completion Date.				
Posed Frances Barris	2-13	The Project Extension Neme referred to in cleuse 2 12 1 are				
		-1 any cause which impedies the proper discharge by the Management Contractor of his abligations under this Contract including				
		any default, whether by act or omission, of the Employer or any persons for whom the Employer is responsible, in regard to the Project or				
		the Management Contractor not having received in due time necessary specifications or bills of quantities for Works Contracts or Instructions, drawings, datable or levels from the Professional Team for which he specifically applied in writing provided that such application was made on a date which having regard to the Completion Date was neither unreasonably destard from nor unreasonably close to the date on which it was necessary for him to receive the same;				

where clause 2.3.2 is stated in the Appandix to apply, the determined of the Employer giving the possession of the site under clause 2.3.1;

1-13 continued

2 any Relevant Event, except the Relevant Event referred to in clause 2.10.7.1 of the Works Contract Conditions, which entities any Works Contractor to an extension of time under clause 2.3 and/or clause 2.7 of the Works Contract Conditions for completion of this Works.

Provided that no Project Extension Hem shall be considered to the extent that it was caused or contributed to by any default, whether by act or omission of the Management Contractor the servants or agents or of any Works Contractor his servants or agents or sub-contractors.

Etlension of 2.14 period or periods for completion of Works Confrects The Management Contractor shall in accordance with clause 2.3 of the Works Contract Conditions notify the Architectifie Contract Administrator of any proposed decision on extensions of the period or periods for comoletion of a Works Contract in sufficient time to the the Architectifie Contract Administrator can express in writing to the Management Contractor any dissent from the proposed decision before the Management Contractor is required to notify the Works Contract Conditions. If the Architectifie Contract Administrator withing to dissent from the proposed decision in accordance with the provisions of clauses 2.3 and 2.4 of the Works Contract Conditions. If the Architectifie Contract Administrator withing to dissert from the proposed decision of the Management Contractor, he shall so notify the Management Contractor in writing before the Management Contractor, he shall so notify the Management clauses of the Works Contract Conditions to notify the Works Contractor of he decision

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the Architect the Contract Arm in strator 1,197 be obtained for the replacement, addition or deterior of any such management perstinet but such consent shall not be unreasonably Managament Contractor consent of with aid Actived Contract Administration Access IO 32 To the extent necessary for the proper execution of the Project or the ascertainment of any payment due to the Management Contractor, the Quantity Surveyor and the Architectifie Management Contractor a Contract Acremistrator shall be afforded access to all documentation of the Management Contractor relating to the Project 00cumentation Instructions (3.3 to 3.6) Arciment & Contract 3 3 1 The Architect.the Contract Administrator shall issue to the Management Contractor such Administrator s Instructions as are reasonably instructions as are reasonably instruction to enable the Management Contractor property to discharge his obligations. All such instructions shall be issued in writing. Instructions 2 If the Architect the Contract Administ*9 or purports to issue an instruction otherwise than in writing it may be confirmed in writing by the Architect/the Contract Administrator to the Management Contractor or by the Management Contractor to the Architect/the Contract Administrator within 7 days of the purported issue, if not so confirmed it shell be of no effect 3 If under clause 3.7 of the Works Comiract Conditions a Works Contractor requires the Management Contractor to request the Architectifie Contract Administrator to specify in writing the provision of this Contract which empowers the issue of any instruction issued . by the Management Contractor to a V/orks Contractor, the Management Contractor shall so request the Architect/the Contract Administrator and the Architect/the Contract Administrator shall comply with any such request and the Management Contractor shall deliver to the Works Contractor a copy of the answer to that request Poeci Changes - 3-4 Without prejudice to the generality of clause 3.3.1 the Architect/the Contract Administrator may Works Contract issue to the Management Contractor Instructions which may require Project Changes of Works Venations -Contract Vanations, and shall issue instructions in regard to the expenditure of provisional provisional sums sume in Works Contracts. in Works Contractil 3-5 The Architect/the Contract Administrator may issue Instructions to the Management Contractor Postponement

SECTION 3: Control of the Project

Management Contractor's staff, operatives and documentation (3.1 and 3.2)

The Management Contractor shall error to upon the Project and working on the sile the

management personnel as instalt in an stratiment to the Second Schedule. The consent of

orement 3-8 The Anomine Contract Administrator may issue instructions to the Management Contractor in regard to the postponement of any work to be executed under the provisions of this Contract.

1 Clause 3.6 only applies where so stated in the Appendix,

Ma-agement

personnel of

3.1

2 Where the Employer desires

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a Completion Date serier than the Completion Date current at the date of a Preliminary Instruction under clause 3 6 3.

or

the cancellation of, or a reduction in the length of, any enteneon of time being fixed under clause 2.12 so that either the Completion Date current at the date of the Preliminary Instruction under clause 3.6.3 is not extended or is not extended by the length of the extension of time that would otherwise have been given under clause 2.12.

the Employer may cause the Architect the Contract Administrator to issue a Preliminary Instituction under clause 3.6.3

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continued

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- If the Employer causes the Architect the Contract Administrator to issue a Preim Instruction to the Management Contractor to accelerate the carrying out, or to artisequence or liming of, any work to be executed under the provisions of this Contra-Architect/the Contract Administrator shall in such instruction set out the exact natithe desire of the Employer in regard to the Completion Date as referred to in clause for which the Preliminary Instruction has been issued.
- 4 If the Management Contractor, or through him any Works Contractor, makes a reaso objection to compliance with such instruction. The Pre-Immary Instruction shall eith withdrawn or so varied as to meet any such objection and then re-issued by the Arci the Contract Administrator.
- 5 As soon as reasonably practicable after receipt of the Preliminary Instruction to receipt of a Preliminary Instruction re-issued under clause 3.6.4) the Manag Contractor shall inform the Architect the Contract Administrator in writing.
 - 1 in respect of each Works Contractor affected by the proposed Instruction

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the lump sum reasonably required by such Works Contractor (in response Management Contractor's inquiny made under clause 3.4.6.1 of the Contract Conditions) to be added to this Works Contract Sum or taken into ac in the computation of the Ascentained Final Works Contract Sum as a re compliance with the instruction when issued by the Management Contractor the Works Contract

or

that it is not reasonably practicable to state such a tump sum and that the the Employer of compliance by such Works Contractor will therefore have ascertained in accordance with all the relevant Works Contract Conditions

and

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the earlier Completion Date which can become the Completion Date for purposes of this Contract

or

the extent to which an extension of time that would otherwise be hind. Architect/the Contract Administrator under clause 2.12 can be avoided or h and the Completion Date which as a result will remain or become the Con-Date for all the purposes of this Contract.

If on receipt of the information given to the Archiect the Contract Administratio clause 3.6.5 the Employer wishes to pay the annunts referred to in clause 3.6. to accept the Completion Date stated by the Management Contractor pursuant ic 3.6.5.2 the Employer shell cause the Archiecthie Contract Administrator to it Instruction

> confirming the details of the acceleration or alteration of sequence or required including the change or changes to any Works Contract period or for completion of the Works Contract Works stated by Works Contra response to the Management Contractor under clause 3.4.6.2 of the Contract Conditions.

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and

hing the Completion Date

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		Materials, goods and workmanahip (3 8 to 3-12)
Matenata, gooda and workmenetig) - standarda	5-0	1 All meterials and goods shall so far as procurable be of the respective lunds and standards described in the Project Specification, or as may be required in any specification or bifs of quantifies in any Works Contract provided that meterials and goods shall be to the reasonable satisfaction of the Architect/the Contract Administrator where and to the extent that this is required in the Project Specification or as referred to in clause 1.5.3.
		2 All workmanship shall be of the standards described in the Project Specification, or as may be required in any specification or bills of quantities in any Works Contract, or, where no such standards are described or required, shall be of a standard appropriate to the Project provided that workmanship shall be to the reasonable satisfaction of the Architectifie Contract Administrator where and to the extent that this is required in the Project Specification or as referred to in clause 1.5.3.
Provision of vouchers	3-0	The Management Contractor shall upon the request of the Architect/the Contract Administrator secure the provision of vouchers to prove that the meterials and goods comply with clause 3.8.1.
Inspection – lesta	} -10	The Architect/the Contract Administrator may issue instructions requiring the Management Contractor to secure the opening up for inspection of any work covered up or secure the carrying out of any test of any materials or goods (whether or not already incorporated in the Project) or of any executed work, and such opening up or testing together with any making good in consequence thereof shell be at no cost to the Employer II the inspection or lest shows that the work, materials or goods are not in accordance with this Contract.
Removal from the ske – work etc, not in accordance with clause 3.8	3-11	The Architect/the Contract Administrator may issue instructione in regard to the removal from the site of any work, meteriate or goods which are not in accordance with the provisions of clause 3.8. The replacement of such work, meteriate or goods and their removal from the site shall, subject to clause 3.21, be at no cost to the Employer.
hanuctions on defects efc.	3-12	The Architect/the Contract Administrator may whenever he considers it necessary to do so, issue instructions requiring any defect, shinkage or other fault which shall at any time appear or be discovered and which is due to materials, goods or workmenship not in accordence with the Contract or to frost occurring before Practical Completion of the Project to be made good and the Management Contractor shall within a reasonable time after recent of such instructions comply or secure compliance with the same but, subject to clause 3.21, at no cost to the Employer.
		Managar on she (3-13 and 3-14)
Manager – Instructions by ArchiveckContract Administrator	3-13	The Management Contractor shall constantly keep upon the site a competent Manager who shall be approved by the Architect/the Contract Administrator in the Pre-Construction Period and who is named in the Appendix and who shall not be changed without the prior soproval of the Architect/the Contract Administrator which approval shall not be unreasonably withheid, Any tranuctions given to the Manager (or to his successor duly appointed) shall be deemed to heve been given to the Management Contractor.
Removal of Menager from Project	3-14	The Architec//the Contract Administrator may (but not unreasonably or variatiously) issue instructions ordering the removal from the Project of the Manager and his replacement by a suitable person proposed by the Management Contractor and approved by the Architect/the Contract Administrator which approval shall not be unreasonably wethled.

It is inverses 3.15 Unit cent in allerials and gravits nerviced to praced on or a tax entito the Project and one removed acception use upon the Project unless the Architect the Con-Administrator, has consented in writing to such removed which consent shall no unreasonably writineld. Where the value of any such materials or goods has been include any linerim Cartificate under which the amount property due to the Management Contractor shall reproperty of the Employer but (subject to clause 8.4) the Management Contractor shall reresponsible for loss or damage to the same.

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3-18 Infeed materials Where the value of any materials or goods for a Works Contract and stored off-site he accordance with the Second Schedule, Part 2 and clause 4 19 3 of the Works Core 100005 - 0fl-940 Conditions been included in the amount directed in an Interim Certificate by the Architec Contract Administrator under clause 6.3.2 as an amount included therein in respect of a W Contractor and the Employer has paid or discharged the amount property due to Management Contractor under the Interviti Certificate such materials and goods shall bec the property of the Employer; and thereafter the Management Contractor shall not except use upon the Project, remove or cause or permit the same to be moved or removed how premises where they are, but the Management Contactor shall nevertheless be responsibly any loss thereof or damage thereto and for the cost of storage, handling and insurance e same unit such time as they are delivered to and placed on or adjacent to the Project interview berefor whereupon the provisions of clause 3.15 (except the words. Where the w to the words the property of the Employer but) shall apply thereto.

Access for the Professional Team to the Project

3-17 The Professional Team shall at all reasonable times have access to the site of the Project to the workshops or other places where work is being prepared for the Project but subir such reasonable restrictions of the Management Contractor or any Works Contractor ar necessary to protect any proprietary right of the Management Contractor or any V Contractor in such work.

Clerk of works

3-18 The Employer shall be entitled to appoint a clerk of works whose duty shall be to act soliinspector on behall of the Emoloyer under the directions of the Architectifie Co-Administrator and the Management Contractor shall afford every reasonable lacety it performine of that duty.

Assignment (3-19 and 3 20)

ilignment :

3-19 Neither the Employer nor the Management Contractor shall, without the written consent other, assign this Contract,

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3:20 Where clause 3 20 is stated in the Appendix to apply then, in the event of a transier t Employer of his hearded or leasehold interest in, or of a grant by the Employer of a was interest in, the whole of the premises comprising the Project, the Employer may all any lime Proctical Completion of the Project essign to any such transfere or lease the right or proceedings (whether by arbitration or by Highation) to enforce any of the terms of this proceedings (whether by arbitration or by Highation) to enforce any of the terms of this comade to the benefit of the Employer hereunder. The assignee shall be estopped from drug any enforceable agreements reached between the Employer and the Management Core and which area out of and relate to this Contract (whether or not they are or appear to derogation from the rights assigned) and made pror to the date of any assignment.

Breech of Works Contract by Works Contractor – Management Contractor's Employer's obligations

3-21 Notwithstanding snything contained elsewhere in the Contract the following provisions apply in respect of any breach of, or non-compliance with, a Works Contract by a 1 Contractor (which shall be deemed to include a determination of the employment of a 1 Contractor under clauses 91 to 95 of the Works Contract Conditions and are engagement, as a result of such breach or non-compliance, of other persons to carry ou or the whole of the Works Contract Works in accordance with clause 7.4.1 of the 3 Contract Conditions.

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- -1 The Management Contractor shall in consultation with the Architectifte Contract Administrator and the Employer take all necessary steps
 - 1 to operate the terms of the Works Contract for dealing with such breach or non-compliance, including enforcement through arbitration or Hightion if necessary, to obtem any amount due to the Management Contractor including therein any amount for which the Management Contactor is leade to the Employer under clause 1.7, as a result of the breach or non-compliance by the Works Contractor; and
 - 2 to secure the satisfactory completion of the Project including the engagement for that purpose of a further Works Contractor II such engagement is

in accordance with the terms of the Works Contract with the Works Contractor who has larled to comply with the Works Contract or ${\bf e}$ in breach or

is necessary because the employment of the Works Contractor under that Works Contract has been determined because of a breach or noncompliance; and

- 3 to meet any claims properly made under the Works Contract Conditions, by Works Contractors, other then the Works Contractor who is in breach or who has failed to comply with the Works Contract, in respect of the consequences to them of such breach or non-compliance.
- -2 The Employer shaft
 - •1 pay to the Management Contractor in accordance with Section 4 and the Second Schedule all amounts properly incurred by the Management Contractor in fulfilling the obligations set out in clauses 3 21 1-1 and 3 21 1 2 but subject to the right of recovery by the Employer referred to in clause 3 21 2 3, and
 - 2 heep an account of any liquidated and secertained damages due, but not deducted or recovered under clauses 2.10 and 2.11 because the Completion Dele has been exceeded by reason of the breach or non-compliance by a Works Contractor but shall not, except to the extent provided in clause 3.21-2.3, recover such damages from the Management Contractor.
 - 3 be entitled to recover from the Management Contractor all amounts paid or creditied to the Management Contractor under clause 3 21-2-1 and where relevant the amount of foundated and ascertained damages referred to in clause 3 21-2 2 but only to the entient that such amounts have been recovered by the Management Contractor from the Works Contractor who is in breach or who has failed to comply with the Works Contractor.
- 3 In respect of the cleme property made by Works Contractors as referred to in clause 3.21.1.3 the Management Contractor shall be entitled to deduct from amounts in respect of the Works Contractor who is in breach or who has failed to comply with the Works Contract and which are directed under clause 8.3.2 the amount of such claime which he has peld or is liable to pay to such Works Contractors together with any costs that he has peld or is liable to pay to such Works Contractors. To the entert that the Management Contractor is not remoursed by such deduction he shall seek to recover any shortfall in that reimbursement from the Works Contractor who is in breach or who has failed to comply with the Works Contractor who is in breach or who has failed to comply with the Works Contractor who is in breach or who has failed to comply with the Works Contractor who is in breach or who has failed to comply with the Works Contractor who is in breach or who has failed to comply with the Works Contractor who is in breach or who has failed to complement Contractor is not remound of the share of clause 3.21.3, the Management Contractor the anount of the shortfall in removement Contractor is not fully remounded the intermotursement.

Alleged breach by Management Contractor of Works Contractor

- 3-22 If a Works Contractor alleges a breach of the Works Contract by the Management Contractor and as a result makes a claim against the Management Contractor then
 - -1 the Management Contractor shall immediately so morm the Architect/the Contract Administrator;

122 continued		2 subject to any Instructions the Management Contractor shall take all such action be necessary, including, on legal advice (unless the Employer decides to discen- the obtaining of such advice), either setting the claim or defending the claim in art or Migarion and shall pay to the Works Contractor the amount of any settement, a judgment, including, any costs, agreed to be paid by the Management Contra awarded against him;	
ı		3 the Employer shall reimburse the Management Contractor the amounts incurred Management Contractor in connection with setting or belending the claim as refu in clause 3.22.2 but only to the entent, and not further or othermise, that the borg pay such amounts has been incurred other then by reason of any breach of con- negligence of the Management Contractor in discharging the obligations and Contract. This immission on reimbursement to the Management Contractor in however, apply to breaches of contract to which clause 3.21 applies which is governed by that clause.	
		Works by Employer or persons employed or engaged by Employer (3.23 to 3.25)	
Hometon In Contract Documents	3-23	Where the Contract Documents, in regard to any work not forming part of this Contra- which is to be carried out by the Employer himself or by persons employed or off engaged by him, provide such information as is necessary to enable the Manac Contractor to secure the carrying out and completion of the Project in accordance - Conditions, the Management Contractor shall permit the execution of such work	
Normation not in Contract Documents	3-24	Where the Contract Documents do not provide the information referred to in clause 3 23 i Employer requires the execution of work not forming part of this Contract by the Employ self or by persons employed or otherwise engaged by the Employer, then the Employer with the consent of the Management Contractor (which consent shall not be unvess withheld), arrange for the execution of such work.	
Resoonsibility of Emoloyer	3-25	Every person employed or otherwise engaged by the Employer as referred to in clause and 3 24 shall for the purpose of clauses 6 7 and 6 8 be deemed to be a person for un Employer is responsible and not to be a Works Constractor.	
		Antiquities (3 26 and 3 27)	
Effect of find of antiquities	3-26	All lossits, antiquities and other objects of interest or value which may be found on the in excavaling the same during the progress of the Project shall become the property Employer and upon discovery of such an object the Management Contractor shall tort	*
		 use his best endeavours not to disturb the object and shall cause work if and na the continuance of work would endanger the object or prevent or impede its exc- or its removal; 	
		2 lake all steps which may be necessary to preserve the object in the exact post- condition in which it was found; and	
		3 inform the Architectithe Contract Administrator or the clerk of works of the discove precise location of the object.	
		The Architect/the Contract Administrator shall issue Instructions in regard to what is to b	
hitrochans an Intquises found	3-27	concerning an object reported by the Management Contractor under clause 3.26 and f prejudice to the generality of his power) such instructions may require the Manag Contractor to permit the exemination, accession or removal of the object by a third per- such third party shell for the purposes of clauses 6.7 and 6.8 be deemed to be a per- whom the Management Contractor is not responsible.	
heinictions on Intiquises found	3-27	concerning an object reported by the Management Contractor under clause 3.26 and f prejudice to the generality of his power) such instructions may require the Manag Contractor to permit the exemination, excavation or removal of the object by 8 third per such third party shall for the purposes of clauses 6.7 and 6.8 be deemed to be a per- whom the Management Contractor is not responsible.	
hstructions ON Intiquities found	3-27	concerning an object reported by the Management Contractor under clause 3.26 and f prejudice to the generality of his power) such instructions may require the Manag Contractor to parmit the examination, accavation or removal of the object by a third par- such third party shall for the purposes of clauses 6.7 and 6.8 be dearned to be a per- whom the Management Contractor is not responsible. Foir Wages Clause 3.28 only applies where so stated in the Appendix and the Employer is a local aut	

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1 Intermeter Contects that pay rates is were established to the term conditions of labour not less levourable than those established for the ter industry in the distinct where the work is carried out by machinery of negotie arbitration to which the parties are organisations of employers and bade representative respectively of substantial proportions of the employers and a engaged in the trade or industry in the distinct.

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- 2 In the absent 4 of any rares of wayes round to concern a summer contractor shall pay rares of wayes and observe hours and contractor shall pay rares of wayes, and observe hours and contractor are not less favourable than the general evolution wayes, hours and conditions observed by other employees whose general circumstances in the table or industry in which the Management Contractor is engaged are armée.
- 2 The Management Contractor shall in respect of all persons employed by him (whether in carrying out this Contract or otherwise) in every factory, workshop or other place accurated or used by him for the carrying out of this Contract (including the Project) comply with the general conditions required by clause 3.28. The Management Contractor hereby warrants that to the best of his knowledge and behall he has compled with the general conditions required by clause 3.28 for at least 3 months prior to the date of his tender for the Contract.
- .3 The Management Contractor shall recognise the freedom of his workpeople to be members of trade unions.
- -4 The Management Contractor shall at all times during the continuance of this Contract display, for the Information of his workpeople, in every factory, workshop or place accupied or used by him for the carrying out of this Contract (including the Project) a copy of clause 3.28. Where rates of weges, hours or conditions of work have been established either by negotilation or arbitration as described in clause 3.28. If or by any agreement commonly recognised by employers and workers in the desirct a copy of the award agreement or other document specifying or recording such rates, hours or conditions shall also be exhibited by the Management Contractor or made evaluable by him for inspection in any such place as efforesed.
- 6 The Management Convector shall be responsible for the observance of clause 3 28 by Works Convectors employed in the carrying out of this Contract, and shall if required notify the Employer of the names and addresses of all such Works Contractors.
- The Management Contractor shall keep proper weges books and time sheets showing the weges paid to and the time worked by the workpeople in his employ in and about the carrying out of this Contract, and such weges books and time sheets shall be produced whenever required for the inspection of any officer sufficienced by the Employer.

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.7 If the Employer shall have reasonable ground for befeving that the requirements of any of the preceding provisions of cleure 3.28 are not being observed, he or the Architect/the Contract Administration on his behalf shall be entitled to require proof of the rates of wages paid and hours and conditions observed by the Management Contractor and Works Contractors in carrying out the Project.

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Payment (4 1 to 4-12)

Payment by Encloyer	41	The Employer shall pay the Management Contractor in accordance with the provisions clauses 4 1 to 4 12
		the Prime Cost of the Project ascertained in accordance with the Second Schedule, an
		the Management Fee.
isue of Interim Cenficates —	4 2	The Archiect/the Contract Administrator shall issue Interim Certificates stating the amount - to the Management Contractor from the Employer at the following limes or periods:
imnge		-1 during the Pre-Construction Period; at the period stated in the Appendix under reference to clause 4.2.1;
		.2 from the Date of Possession up to and including the and of the period during which certificate of Practical Completion is issued; at the period of interim certificates state the Appendix under the reference to clause 4.2.2;
		.3 after the end of the period of interim certificates during which the certificate of Prac Completion is issued; as and when further amounts are accentanced as paveble to Management Contractor by the Employer provided always that the Architect/the Con Administrator shall not be required to issue an Interim Certificate within one cate month of having issued a previous Interim Certificate;
		4 at the time referred to in clause 4.11 (final amounts ~ Works Convactors)
fayment of mounts due in herm	43	.1 The Management Contractor shall be entitled to payment of the amounts stated at in Interm Certificates within 14 days from the date of issue of each Interm Certificate
(micoles		2 Norwithstanding the fiduciary interest of the Employer in the Retension as started in c 4.8.1 the Employer is entitled to exercise any right under the Contract of deductor monies due or to become due to the Management Contractor against any amount s under an Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate whether or not Retension is included in that Interim Certificate in the certific
		3 Where the Emoloyer exercises any right under this Contract of deduction from in due or to become due to the Management Contractor he shall inform the Manag Contractor in writing of the reasons for that deduction.
licentainment of mounts due in herm Centificates	4-4	Interve valuations shall be made by the Quantity Surveyor for the purpose of ascentario amounts to be stated as due in Interve Canificates.
-during the Phe- Construction Prod	4-6	The amount to be stated as due in an Interim Certificate to which clause 4.2.1 refers she appropriate instalment of the Pre-Construction Period Management Fee stated in or call by reference to the schedule attached to, the Appendix.
- the the Pre- Construction head	44	The amount to be stated as due in an Interim Certificate to which clauses 4.2.2, 4.2.3 an refer shall be, as related to a date not more than 2 days before the date of the interim Car the sum of the following:
		I the amounts due and payable under the respective Works Contracts escents accordance with Part 2 of the Second Schedule, sher the deduction of any it deductible in accordance with the terms of the Works Contract.
hemotor	M	This entitlement is subject to the various rights of deduction given to the Employer in the C including any obligation to deduct under clauses \$ 8 to \$ 17 and to the obligations of the serves (VAT Agreement

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2 the amounts for site staff, general facilities etc. site facilities, services and materials, properly provided by the Management Contractor ascertained in accordance with Parts 1, 3A, 3B, 4A, 4B and 4C of the Second Schedule which amounts shall be subject to Retention,

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logether with

- 3 the Pre-Construction Period Management Fee,
 - -
- 4 an instalment of the Construction Period Management Fee adjusted, where appropriate, in accordance with clause 4.10.2, being the ratio that the Construction Period Management Fee bears to the Contract Cost Plan Total applied to the sum of the smounts referred to in clauses 4.6.1 and 4.6.2, subject to a maximum of 97% of the amount of the Construction Period Management Fee, adjusted, where appropriate, in accordance with clause 4.10.2, and
- S any expenditure incurred by the Management Contractor for which he is entitled to reindursement by the Employer in accordance with clauses 3.21 and 3.22 and any other posts incurred by the Management Contractor which are not included in clauses 4.6.1 to 4.6.4 inclusive and which are payable by the Employer to the Management Contractor in accordance with the Conditione.

less the sum of the following:

- S any payments to or credits received by the Management Contractor for materials arc, which have arean from the carrying out of the Project.
- .7 any payments to an credits received by the Management Contractor which the Employer is anothed to recover in accordance with clause 3 21 2 3 or any other clause in the Conditions, and
- Be sum of the smourts stated as due in all the interim Catalizates previously issued under clauses 4 2-1, 4 2 2 and 4 2 3.

Reserved provid

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The Reservion which the Employer may deduct and retain as referred to in clause 4.6.2 shall be:

- -1 3 per cent of any amount as relates to work which has not reached Precifical Completion (as referred to in clauses 2.4 and 2.8-1)
- 2 1 \$ per cent of any amount as reletes to work which has reached Practical Completion (as referred to in clauses 2.4 and 2.8.1) but in respect of which a Conflicate of Completion of Making Good Defects under clause 2.6 or a centificate under clause 2.6.2 has not been issued.
- 40 The Retention including that held in respect of all Works Contracts shall be subject to the following rules:
 - -1 the Employer's Interest in the Relention is fourclary as studies for the Managament Contractor and for any Works Contractor (but without obligation to Invest);
 - 2 at the date of each Interim Conflictle the Architect/the Contract Administrator or, if so instructed by the Architect/the Contract Administrator, the Quantity Surveyor shall prepare a statement setting out the total amount of Anternan held at that date in respect of the Management Contractor and the total amount held in respect of each Worke Contractor, and such statement shell be issued to the Management Contractor and by the Management Contractor and by the Management Contractor is each Worke Contractor named in that statement;

I control	3	except where the Employer is a local authority the Employer shaft if the Mene Contractor or, through the Management Contractor, any Works Contractor so redu- the date of payment of each twervin Certificate place the Reference hard there separate banking account (so designated as to dentify the amount of Reference). The Employer on trust as provided in clause 4.8.13 and certify to the Arch Contract Administrator with a copy to the Management Contractor that such and been so placed. The Management Contractor shell similarly inform each Contractor in respect of whom the Employer is holding Reference. The Employer entitled to the full beneficial interest in any interest account in the separate account and shell be under no duty to account for any such interest to the Mane Contractor is only Works Contractor;
	4	If the Employer exercises the right to deduct referred to in clause 4.3.3 aga Recention he shall include, in the written information to the Management Confrac- under clause 4.3.3, details of any deduction from either the Recention herd in re- the Management Confractor or the Recention held for any Works Confractor (se t the statement resuld under clause 4.8.2).
inal Cartificate — 4-9 Iscertairvinent y Prime Cost	1	Not later than 6 months after Practical Completion of the Project the Mars Contractor shall provide the Quantity Surveyor, unless previously provided, documents necessary for the purposes of the accentainment of the Prime Cost # all documents relating to the accounts of Works Contractors.
	2	Not later than 3 months after receipt by the Quantity Surveyor from the Man Contractor of the documents required under clause 4.9.1, the Quantity Surve deliver to the Architect/the Contract Administrator a statement of the Prime Cost a Management Fee (including any addustment of the Construction Period Manage under clause 4-10.3) and the Architect/the Contract Administrator sheat send 3 the statement to the Management Contractor. If the statement refers to any druk of any dem of cost put forward by the Management Contractor part of the Pr there shall be included in the statement the reasons for such disaformence
Any adjustment of 4-18 Construction Period	-1	No adjustment of the Construction Period Management Fee shall be made accordance with clause 4 10 2 and 4 10 3.
	2	If, prior to the issue of the Final Centricate, the Prime Cost exceeds the Con Plan Total by more than 5% (or such other percentage as is stated in the App Construction Period Management Fee shall be adjusted in accordance with if set out in clause 4-10.4.
	Ĵ	If the Prime Cost exceeds or is less then the Contract Cost Plan Total by mor (or such other percentage as is stated in the Appendie) the Construct Management Fee shaft be adjusted in accordance with the formula set out 4-10.4
	-4	The formula referred to in cleves 4 10 2 or cleves 4 10 3 ac
		ACPMF = CPMF = $\frac{100 \pm (0-1)}{100}$
		where:
		ACPMF Is the adjusted Construction Period Management Fee;
		CPMF is the Construction Period Management Fee as stated in the Ap
		D is the increase or decrease of the total Prime Cost when carried Contract Cost Plan Total expressed as a percentage of the Cr Plan Total;
		T le 5 or such other number at is stated in the Appendix under 8 to clause 4 10 2 and 4 10 3.
		2 shall be + (plus) if the lotal frame Cost exceeds the Convect Cc or - (minut) if the frame Cost is less than the Contract Cost Pt

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days before the date of result of the Fruit Centricate referred to in clause 4.12 and normitstanding that a period of one month may not here elapsed since the risue of a previous interm Centricate, the Architect/the Contract Administrator shall usue an interm Centricate which shall include the amounts in respect of Works Contractors payable to the Management Contractor apparented in accordance with Part 2 of the Second Schedule.

- nd Caraticate 6-12 -1 The Architect/the Contract Administrator shell issue the Final Centificate not later than 2 months from whichever of the following events occurs the level:
 - the and of the Delects Liability Period;
 - the lasue of the Cartificate of Completion of Making Good Defects under clause 2 8;
 - the defivery by the Ouentity Surveyor to the Architect/the Contract Administrator of the examinent referred to in clause 4.9.2.
 - 2 The Final Cartificate shall state:

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- the sum of the amounts already stated as due in Intervn Carbicates, and
- the sum of the Prime Cost and the Management Fee as set out in the statement to which clause 4.9.2 refers

and the difference (II any) between the two sums shall (without prejudice to the rights of the Management Contractor in respect of any Intervm Certificates which have not been paid by the Employer) be expressed in the said Certificate as a balance due to the Management Contractor from the Employer or to the Employer from the Management Contractor as the case may be, Subject to any deductions authorised by these Conditions the said balance shall, as from the 28th day after the date of the said Final Certificate, be a debt paysole as the case may be by the Employer to the Management Contractor or by the Management Contractor to the Employer.

Statutary Requirements (S.1 to 5.5)

idmements Invola Autopents	6 -1	Subject to clause 5.5 the Management Contractor shall secure compliance with, and give all nonces required by, any Act of Parkament, any instrument, rule or order medie under any Act of Parkament or any regulation or bystew of any local authority or of any statutory undertaker which has any juncdiction with regard to the Project or with whose systems the same are or will be contracted (all requirements to be so complied with being referred to it the Conditione as "the Statutory Requirements").
Vergence – Intervention Inconnects and Inclusion I fand 1 10	5 2	If the Managament Contractor shall find any divergence between the Statutory Requirements and all or any of the documents referred to in clauses 1.9 and 1.10 or between the Statutory Requirements and any Instruction he shall immediately give to the Architectifhe Contract Administrator a written notice specifying the divergence.
Xergence - Intructione	F3	If the Management Contractor pives notice under clause \$ 2 at it the Architectifte Contract Administrator shall otherwise discover or receive notice of a divergence between the Statutory Requirements and all or any of the documents referred to in clauses 1.9 and 1.10 or between the Statutory Requirements and any instruction the Architectifte Contract Administrator shall within 7 days of the discovery or receipt of a notice issue instructions in relation to the divergence. If and insolar as the Instructions require the Project to be changed or any Works Contract to be varied they shall be treated as if they were instructions issued in accordance with clause 3.4.
(nergency gunorence with Inguremente	5 -4	-1 If, in any emergency, compliance with clause 5.1 requires the Management Contractor to secure the supply of instends or the execution of work before receiving instructions under clause 5.3 the Management Contractor shall secure the supply of such limited materials or the execution of such limited work as are reasonably necessary to secure invertence compliance with the Statutory Requirements.
		2 The Management Contractor shell forthwith inform the Architect/the Contract Administrator of the emergency and of the steps that he its taking under clause 5.4.1
		3 The securing of the supply of meterials or the execution of work under clause \$4.1 shall be treated as having been so secured pursuant to an Instruction requiring a Works Contract Vension under clause 3.4, provided that the emergency arose because of a divergence between the Statutory Requirements and all or any of the documents related to in clauses 1.9 and 1.10 or between the Statutory Requirements and all or any of the documents related to in clauses 1.9 and 1.10 or between the Statutory Requirements and all or any of the documents related to in clauses 1.9 and 1.10 or between the Statutory Requirements and any the documents related to in clauses 1.9 and 1.10 or between the Statutory Requirements and any the documents and any the documents and the test of the document of the docu
hiject - non- conclence with Saucry Nourements - poson of Upagement Consictor	5-5	Provided that the Management Contractor complex with clause 5.2 the Management Con- tractor shall not be lable to the Employer under this Contract if the Project does not comply with the Statutory Requirements where and to the extent that such non-complexics of the Project results from the Management Contractor having secured the carrying out of work at hewing provided at secured are facilities and services in accordance with the documents referred to in clauses 1.8 and 1-10 or with any instruction lesued in accordance with clause 3.4
		Value Added Tax - supplemental previaions (6-8 to 5-8)
Dyfwlone VAT Agreement	54	In closes 5.6 to 5.8 and in the supplemental provisions pursuant hereto (heremeter called the "VAT Agreement"), "tax" means the value added tax introduced by the Finance Act 1972 which is under the care and management of the Commissioners of Customs and Eucose (heremeter and in the VAT Agreement called "the Commissioners").
Mine Cost Management Fee sclame of VAT	1 -7	Any reference in the Conditions to the Thime Cost or the "Management Fee" shall be regarded as such cost or Fee exclusive of any tax and recovery by the Management Contractor from the Employer of tax properly chargeable by the Commissioners on the Management Contractor under or by votue of the Finance Act 1972 or any amendment thereof on the supply of goods and services under this Contract shall be under the provisions of this clause and of the VAT Agreement.

handhe Hendhon Ivn VAT	5-0	To Em 900	the entent that after the date of this Contract the supply of goods and services to the ployer becomes exempt from the tax there shall be paid to the Management Contractor an surt equal to the loss of credit (input tax) on the supply to the Management Contractor of de and services which contribute exclueively to the Project.
		fin	ance (Ne.1) Act 1975 - sistutory tax deduction scheme (5 9 to 5-17)
(yinitors)	50	in ff inco any fre cent cent is a cent	Ve Condition the Act means the Reserve Act (No 2) Act 1975; the Regulations' means the ome Tax (Sub-Contractors in the Construction Industry) Regulations 1975 \$1, No.1980 or amendment or re-exectment thereof; "contractor" means a person who is a contractor for purposes of the Act and the Regulations; "evidence" means such evidence as is required by Regulations to be produced to a "contractor" for the verification of a "sub-contractor's' tax dicate; "statutory deduction" means the deduction referred to in \$69(4) of the Act or such in deduction as may be in force at the relevant time; "sub-contractor" means a person who aub-contractor for the purposes of the Act and the Regulations; "tax certificate" is a ificate issuable under \$.70 of the Act,
Helter Employer 1 conrector	6-10	•1	Clauses 5-10 to 5-17 shell not apply II, in the Appendix, the Employer is stated not to be a "contractor".
		Ł	If in the Appendix the words "is a 'contractor" are devised, nevertheless if, at any time up to the issue and payment of the Final Centricate, the Employer becomes such a 'contractor', the Employer shell so inform the Contractor and the provisions of clauses 5.10 to 5-17 shall immediately thereupon become operative,
nomen of mence - text principa	6 -11	•1	Not later than 21 days before the first payment under this Contract is due to the Management Contractor or ofter clause \$-10.2 hes become operative the Management Contractor shaft.
			eiter
			 provide the Employer with the andence that the Management Contractor is antilled to be paid without the statutory deduction;
			<i>۵</i>
			2 Inform the Employer in writing, and send a duplicate copy to the Architect/the Contract Administrator, that he is not entitled to be paid without the statutory deduction.
		• 8	If the Employer is not satisfied with the velicity of the evidence submitted in accordance with clause 5 11-1-1, he shall within 14 days of the Managament Contractor submitting such evidence nostly the Managament Contractor in writing that he intends to make the statutory deduction from payments due under this Contract to the Managament Contractor who is a 'sub-contractor' and give his reasons for that decision. The Employer shall at the same time comply with clause 5-14-1
icented inspendet inscor inscor	5-12	•1	Where clause 5-11-1-2 applies, the Management Contractor shall immediately inform the Employer 2 he obtains a last certificate and thereupon clause 5-11-1-1 shall apply.
ardente any el tant artente		. 2	If the period for which the tex certificate has been leaved to the Management Contractor expires before the final payment is made to the Management Contractor under this Contract the Management Contractor shall not leter than 28 days before the date of expiry;
			•1 provide the Employer with evidence that the Management Contractor from the said data of expiny is entitled to be paid for a further period without the statutory deduction in which case the provisions of cleuse 6-11-2 shall apply if the Employer is not seatefed with the evidence;
			*
			.9 Interns the Employer in writing that he will not be entitled to be paid without the

.2 Inform the Employer in writing that he will not be entitled to be paid without the standary deduction after the said date of expiry.

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<pre>F12 continued (arceleton of gs centricate</pre>		3 The Management Contractor shall immediately inform the Employer in uniting if he current tax certificate is cancelled and give the date of such cancellation.
Youchers	£13	The Employer shell, as a 'contractor' in accordance with the Regulations, sind promotily to the Inland. Revenue any voucher which, in compliance with the Management Contractor's obligations as a 'sub-contractor' under the Regulations, the Management Contractor gives to the Employer.
Salvory (eduction – direct) coal of matematis	5-14	If at any time the Employer is of the opmion (whether because of the information given under clause 5.11.1.2 or of the expiry or cancellation of the Management Contractor state certificate or otherwise) that he will be required by the Act to make a statutory deduction hom any payment due to be made the Employer shall immediately so notify the Management Contractor in writing and require the Management Contractor to state not later than 7 days before each future payment becomes due (or writing it days before each future payment becomes due (or writing it days of such notification if that is later) the emount to be included in such payment which represents the direct cost to the Management Contractor and any other person of materials used or to be used in carrying out the Project.
		2 Where the Management Contractor complies with clause 5.14.1 he shall indemnify the Employer against loss or expense caused to the Employer by any incorrect statement of the amount of direct cost referred to in clause 5.14-1.
		.3 Where the Management Contractor does not comply with clause \$ 14.1 the Employer shall be entitled to make a fair estimate of the amount of direct cost referred to in clause \$ 14-1.
(orrection) alemanti	8-18	Where any error or omission has occurred in calculating or making the statutory deduction the Employer shall correct that error or omission by repayment to, or by deduction from payments to, the Management Contractor as the case may be subject only to any statutory obligation on the Employer not to make such correction.
Reanon 10 pher claused	\$-1 6	If compliance with clauses 5.9 to 5.17 involves the Employer or the Management Contractor in not complying with any other of the Conditions, then the provisions of clauses 5.9 to 5.17 shall prevail.
Application of rotestion greement	\$-17	The provisions of section 9 shall apply to any dispute or ofference between the Employer or the Architectifie Contract Administrator on his behall and the Management Contractor as to the operation of clauses 5.9 to 5.17 encept where the Act or the Regulations or any other Act of Parliament or statutory instrument, rule or order made under an Act of Parliament provide for some other method of resolving such dispute or difference.

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ing - Benefit to Works Contractors (6-1 to 6-3) - De

N-d-mana	61	In clause 6-4	and, so far as relevant, in other clauses of the Conditions the following physical
		shall have th	a meanings given before:
۰.	•	Al Maks Insurance:	Insurance which provides cover against any physical loss or damage to work executed and S4e Materials but excluding the cost necessary to repair, replace or rectify
			1 property which is detective due to
			1 wear and lear,
			2 obeciescence,
			-3 deterioration, rust or mildew;
		0	2 any work executed or any Site Materials lost or damaged as a result of its own defect in design, plan, specification, material or workmanship or any othe work executed which is lost or damaged in consequence thereof where such work relied for its support or stability on such work which was defective;
			3 lass or demage caused by or arising from
•			•1 any consequence of wer, investort, act of foreign enemy, hostifite (whether wer be declared or not), civil wer, rebellion, revolution insurrection, milliony or usurped power, conflication, commandeering netionalisation or requisition or loss or destruction of or damage to an property by or under the order of any government de jure or de fact or public, municipal or local authority;
			 disappearance or shortage if such disappearance or shortage is on revealed when an inventory is made or is not traceable to a identifiable event;
			-3 en Excepted Riek (se defined in clause 1 3);
			and if the Contract is carried out in Northern Ireland
			-4 dvil commotion;
			S any unlawlid, wenton or malicious act committed maliciously by person or persons acting on behalf of or in connection with an unlaw association; 'unlawlid association' shall mean any organisation which is engaged in terrorism and includes an organisation which at a relevant time is a prescribed organisation within the meaning of a Northern heated (Emergency: Provisions) Act 1973; 'terrorism' mean the use of violence for political ends and includes any use of violence for the purpose of putting the public or any section of the public in fee.
		She Materializ	all unfined materials and goods defivered to, pleced on or edjecent to t Project and intended for incorporation therein,
Benefit of Joint Harnes Policies Specified Parils Works Contractio	6.8 	The Manag ar clause (where clau	ement Contractor in respect of the Joint Names Policy referred to in clause 6-4-1 4-3-1 or, where clause 6.5 is applicable, clause 6.5.3 shell, and the Employ se 6.5 is applicable, in respect of the Joint Names Policy referred to in clause 6.5

provides for recognition of each Works Contractor iss an insured under the relevant Jone Names Policy;

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includes a warver by the relevant insurers of any right of subrogation which they may have against any such Works Contractor

In respect of loss or damage by the Specified Perits to the Project and Site Materials and, where clause 6.5 applies, in respect of loss or damage by the Specified Perits to the existing structures (which shall include from the relevant date any relevant part to which clause 2.8 releval) together with the contents thereof owned by the Employer or for which he is responsible, and that this recognition or waver shall continue up to and including the date of issue of the certificate of practical completion of the relevant Works (as referred to in clause 2.14 of the Works Contract Conditions) or, where the Project does not comprise alterations of or extensions to existing structures, the date of determination of the employment of the Management Contractor (where the Project comprises alterations to existing structures, under clauses 7.13, or, where the Project comprises to existing structures, under clauses 7.13, or, where the 10.713, whichever is the earter.

[g] All Richs Insurance of the Project – Management Contractor to take out and maintain Joint Names Policy

n Hames ky lor Alt ju Insurânce juci șes	8 -4	.1	- 1	The Management Contractor shall, prior to the commencement of any work on site for the Project, take out a Joint Nemes Policy for All Risks insurance cover no less than that defined in clause 6.2 [h][It-1] (or for such other definition of cover as the Employer may instruct) for the full remaintement value of the Project (plus the percentage, if any, to cover professional fees stated in the Appendix) and shall (subject to clause 2.8.3) maintain such Joint Names Policy up to and including the date of lissue of the certificate of Practical Completion or, where the Project does not comprise alterations of extensions to existing structures, up to and including the date of determination of the employment of the Management Contractor (whether or not the validity of that determination is contested) under clauses 7.1 to 7.13 or, where the Project comprise alterations of or extensions to existing structures, under clause 6.4.8 or clauses 7.1 to 7.13, whichever is the earlier
			2	The Management Contractor shell, before taking out the Joint Names Policy, notify the Architect who shell thereupon notify the Employer of the amount of any encess (uninsured amounts) in respect of each insurance risk stated in the Policy Subject to any elteration to such amounts of encess which the Employer may require and the insurers agree, the amounts of any encess in respect of each insurance risk insured under the Joint Names Policy shell be set out in the Appendix Part 2.
muti recenpta drokcy . wserrenta		2	The dep prer mey 6.4-	Management Contractor shall send to the Architect/the Contract Administrator for oak with the Employer the Joint Names Policy referred to in clause 6.4.1.1 and the mum receipt therefor and also any relevant endorsement or endorsements thereof as r be required to comply with the obligation to maintain that Policy set out in clause 1.1 and the premium receipts therefor,
k d smuad k y ment sined ite Managemen tisctor - metre to use clase 6-4-1 iccess	æ	. 3	•1	If the Management Contractor independently of his obligations under this Contract maintains a policy of insurance which provides [inter ske] All Resis Insurance for cover no less than that defined in clause 6.2 [h][t-1] (or for such other definition of cover as the Employer may instruct) for the full reinstatement value of the Project (plus the percentage, if any, to cover professional fees stated in the Appendix) and the Employer has given to the Management Contractor his written acceptance of the amount of any excess in respect of each insurance risk stated in the policy (which amount of any excess in respect of each insurance risk stated in the policy (which amount a fault be set out in the Appendix Part 2) the liter maintenance by the Management Contractor of such policy shell, if the policy is a Joint Names Policy in respect of the efforesed Project, be a discharge of the Management Contractor to take out and maintain a Joint Names Policy under clause 6.4-1-1.

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- 2 If and so long as the Contractor is able to send to the Architectifie Contract Administrator for inspection by the Employer as and when he is reasonably required to do so by the Employer documentary evidence that such a policy if being maintained then the Management Contractor shall be discharged from his obligetion under clause 6.4.2 to deposit the policy and the premium receipt with the Employer but on any occasion the Employer may (but not unvesionably or vessiously) require to have sent to the Architectifie Contract Administrator for inspection by the Employer the policy to which clause 6.4.3.1 refers and the premium receipts thereast.
- •3 The annual renewal data, as supplied by the Management Contractor, of the insurance referred to in clause 6.4.3.1 is stated in the Appendix.

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- .4 If any loss or damage effecting work executed or any part thereof or any Site Materials is occasioned by any one or more of the risks covered by the Joint Names Policy referred to in clause 6.4.1.1 or clause 6.4.3.1 then, upon discovering the sed loss or damage, the Management Contractor shall forthwith give nonce in writing both to the Architect/the Contract Administrator shall forthwith give nonce in writing both to the Architect/the Contract Administrator and to the Employer of the eview, networe and location thereof; and the provision of clause 6.4.8 to clause 6.4.9 shall apply.
- S The occurrence of such loss or damage referred to in clause 8.4.4 shall be disregarded in computing any amounts payable to the Management Contractor, whether or not in respect of work executed by a Works Contractor, under or by virtue of this Contract.
- 4 After any impaction required by the insurers in respect of a claim under the Joint Names Policy referred to in clause 6.4.1-1 or clause 6.4.3.1 has been completed the Management Contractor with due difugence, shall subject to clause 6.4.8 where applicable, secure the restoration of work damaged, the replacement or repair of any Sile Materials which have been lost or damaged, the removal and disposal of any debris and proceed with securing the carrying out and completion of the Project.
- -? The Management Contractor, for himself and for all Works Contractors who are, pursuant to clause 6.3, recognised as an insured under the Joint Names Policy referred to in clause 6.4.1-1 or clause 6.4.3.1, shall authorise the insurers to pay all monies from such insurance in respect of the loss or damage referred to in clause 6.4.4 to the Employer.
- 8 Clause 6.4.8 applies only where the Project comprises attentions of or extensions to asisting structures.
 - 1 If it is just and equilable so to do the employment of the Management Contractor under the Contract may, within 28 days of the occurrence of the loss or damage referred to in clause 6.4.4, be determined at the option of either party by nonce by registered post or recorded detivery from either party to the other. Writen 7 days by receiving such a nonce (but not thereafter) either party may prive to the other a writen request to concur in the appointment of an Arbitrator under section 9 in erder thet it may be determined whether such determination will be just and equilable;
 - 2 upon the giving or receiving by the Employer of such a notice of determination or, where a reference to arbitration is made as aloressid, upon the Arbitrator upholding the notice of determination, the provisions of clause 7.6.2 succept clause 7.8.2.5 shall apply.
 - •1 Where the restoration, replacement or repair of the loss or demage and (when required) the removal and disposal of debrie is carried out by a Works Contractor at Works Contractors sheedy anguged upon the Project such restoration replacement or repair and, when required, the removal and disposal of debrie shell be beasted as if they were the subject of a Works Contract Venation required by an instruction under clause 3.4.
 - 2 Where clause 6.4.9.1 is not applicable the Management Contractor shall secure the restoration, replacement or repart of the loss or demage and, when required, the removal and disposal of debris, by a Works Contractor who shall be appointed in accordance with an instruction under clause 8.1 and treated in all respects 86.8 Works Contractor

see page 20

Specified Perso - Insurance of existing structures and contents - Employer to take out and metmain Joint Names Policy

- 6.6 E Clauses 6.5.2 and 6.5.3 apply only where the Project comprises prevalure of or entensions to eviding structures.
 - 2 The Employer shall, pror to the commencement of any work on site to see Project sine out a Joint Names Policy in respect of the existing structures (which shall include from the relevant date sity relevant part to which cleare 2.8 refers) togener with the powers thereof owned by the Employer or for which he is responsible, for the full cost of remeasurement, repart or replacement of tots or damage due to one of more of the Specified Perils [8-2] and mainteen such insurance up to and including the date of visual of the employment of the Managament Contractor under clause 3.4 8 or clauses 7.1 to 7.4 or clauses 7.5 and 7.8 or clauses 7.7 to 7.9 or clauses 7.1 to 7.9 or clauses 7.5 and 7.8 or clauses 7.7 to 7.9 or clauses 7.1 to 7.9 or clauses 7.6 in the Managament Contractors who are, pursuant to clause 6.3, recognised as an insured under the Joint Names Policy referred to in clause 6.5 2 mill automate the ansurement to be set of the data of 3, recognised as an insured under the Joint Names Policy referred to in clause 6.5 2 mill automate to power.
 - 3 The Employer shall, as and when reasonably required to do so by the Management Contractor, produce documentary evidence and recepts showing that the John Names Policy required under clause 6.5 has been taken out and is being mantamed. If the Employer defaults in taking out or in maintaining the John Names Policy required under clause 6.5.2 the Management Contactor may himself lake out and marken a John Names Policy against any risk in respect of which the default shall have occurred and for that ourpose shall have such right of entry and impection as may be required to marke a survey and inventory of the evision structures and the relevant contents.
- (g) Clause 6.4 is applicable to Projects whether they conest of the erection of new buildings or comprise allerations of or entension to evering structures. For enten tand of Project the Management Contractor lange and a Joint Hernes Policy for AR these insurance for the Project events and in plause 6.2 (or for such erem definition as the Emotoyer may instruct), and for Projects which comprise alreations of or eventions to eventing structures the Emotoyer and cut. I and for Projects which comprises alreations of or eventions to eventing structures the Emotoyer and all a Joint Hernes Policy to neare the events and entended the consents owned by the Emotoyer or for which the Emotoyer is responsible against loss an damage herne by the Socied Parks, chause 6.5. The premium part by the Management Contractor for the Joint Hernes Policy for AR these their for Project a treated as herne Cast and remounded by the Emotoyer (see Second Schedule Part 38 perspiration 11).
- [N] The definition of "All field insurance" in clause 8.2 defines the rate for which insurance is resurred (subject is the rapit of the Employer in clause 6.4.1.1 or 6.4.3.1.10 means) that a different definition of cover 4, action of Tholeses exercitly insures are not plantandward and there will be come insurant in the way insurance for these needs or improved. See site thetpencies and there 2.2 and Quade first 4.
- In any policy for A8 fields insurance, latert and under clause 6.4 cover shauld not be reduced by the terms of any exclusion written in the policy beyond the terms of clause 6.2 paragraph 2, thus an anchore in terms. This Policy excludes all loss of or demage to the paratry mound due to a factorie design, per synchroniz, meaning an exclusion in the policy beyond the terms of the clause term of the terms of terms of the terms of terms of the terms of terms of the terms of terms terms of the terms of terms of terms of terms of the terms of terms
- [6-1] In some cases it may not be possible for memory: It be taken and against center of the next centerate by the derivation of "All Reduc Insurance". This matter should be provided between the particle part to the Architecture Centract Account within nativing the Endotype under clause 2.1 and 4 would be processing with the particle of the Centract Account of the Process and other the derivation of "All Reductive Centract Account of the Process and other the derivation of "All Reductive Centract" (success 6.2 provided to process) (successing the derivation of the Inductive Centract Centract 6.4 and after revised or whether the derivation "All Reductive Centract 6.4 and after revised or whether the derivation".
- [6 3] In some cases it may not be preside for insurance to be blen out against contain of the Straphed Panit. This maker should be prompted between the panies president to the Anthonysting Contract Administration notifying the Employee under clause 3. I when it would be presidente to an animory the destruction of the Protect and attime the devices of Standard because the presidente of the animal data and include the the device of Standard and the president of clause 6.5 and other research devices its which the administration devices the devices, in the latter case clause 6.5 and other research devices its which the administration devices the deviced be president to include the under the appreciation administration of Standard Panits, is used plaused be prevented in the under the appreciation of the devices.

Insurance for Employer's loss of Hyddelad demogra - cloues 2 13 2 and Works Contract Conditions alouse 2 18-3

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- -1 Where It is stated in the Appendix that the insurance to which clause \$ \$ refers may be required by the Employer then, not later than the date of the written notice of the Employer e 2.1 to the Management Contractor to proceed, the Architectrike Contract Administrator shall either Inform the Management Contractor that no such insurance is required or shall instruct the Managament Contractor to obtain a quotation for such meanance. This quotation shall be for an insurance on an agreed value basis [1] to be en out and mentamed by the Management Contractor until the date of Practical Completion and which will provide for payment to the Employer of a sum calculated by nce to clause 6.6.3 in the event of loss or damage to the Project, work executed, Ste Meteriale, temporary buildings, plant and equipment for use in connection with and on or adjacent to the Project by any one or more of the Speched Pents and which lose mage results in the Architect/the Contract Administrator giving an entit er de n of tend under clouce 2 13 2 in respect of the Relevant Event referred to in clouce 2 10 3 of the Works Contract Conditions and clause 2 13 2. The Architect/the Contract Adm shall obtain from the Employer any further information which the Management Contractor sonably requires to obtain such quotation. The Management Contractor shall sand to The Architectifie Contract Administrator as soon as practicable the quotation which he has obtained and the Architectifie Contract Administrator shall thereafter instruct the regeneral Contractor whether or not the Employer wishes the Management Contractor to accept that quotation and such instruction shall not be unreasonably withheid at deleyed. If the Managament Contractor is instructed to accept the quotation the Managament Contractor shall forthwith take out and maintain the relevant policy and send it to the Architect/the Contract Administrator for deposit with the Employer, logerher h the premium receipt therefor and also any relevant endorsement or endorsements thereal and the premium receipts therefor,
- 2 The sum insured by the relevant policy shall be a sum calculated at the rate stated in the Appendix as Roudmad and accurance, damages for the period of time stated in the Accende.
- 3 Payment in respect of this insurance shall be calculated at the rate referred to in clause 8.6.2 for any nursed rate produced by the application of clause 2.8.4) for the period of any extension of time finally given by the Arctificctifie Contract Administrator as referred to in clause \$ \$1 or for the period of time stated in the Appendix, whichever is the less.
- 4 If the Managament Contractor defaults in taking out or in maintaining the insurance med to in clause 6.8-1 the Employer may honself insure against any risk litt respect of which the default shall have accurred.

Injury to persons and property and Indemnity to Employer (6.7 to 6.9)

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67 The Menagement Contractor shell be liable for, and shell indemnify the Employer against, any expense. Rebilly, loss, clean or proceedings whersomer arrang under any statule or all common law in respect of personal injury to at the death of any person whomesever sharing out of or in the course of or caused by the camping out of the Project, except to the entert that the same is due to any act or neglect of the Employer or of any person for whom the Employer is nes angeged by the Employer to whe e linch ling the persons amployed or other clinates 3 23 to 3 25 refer.

... The Management Contractor shell subject to cloude 6.9 and, where applicable clause 6.5, be hable for, and shall indemnify the Employer against, any expanse heavily, loss, claim or proceedings in respect of any injury or demoge whereas in any property real or personal if Unegement Conscion - Injury as her as such injury or comage proof out of or in the course of or by reason of the compiling out of the Property, and to the anient that the same is due to any negligence, breach of statutory duty, 100**01**7 energiation or default of the Managament Contractor, the servents or agains or of any parasit amployed or organized upon or in connection with the Project or any part the soil, the serverie or prenty in againite, of all any gather persons who may property be on the one-spon of the convection with the Propect of any part thereod, this serverie or againts, other than the Employer of any person and the second ed, angeged or authorized by hirt or by any local authority or stabili scaling work askey in pursuance of its statutory rights or colligations.

The reference to an agreed value is intended to avoid any depute over the privat of payment due with The entered and the party is taken in the second second of the second for the interview is which distance is a property for the transition of the second se we Cornect he wit safer as a read of any delay

operty - yean of the ici and Materiate	••	include the Project, work executed and/or Ste Materials up to and including the date of result of the certificate of Practical Completion or up to and including the date of determination of the employment of the Management Contractor (whether or not the validity of the determination is disputed) under clauses 7.1 to 7.13 or, where clause 6.4.8 applies, under clause 6.4.8 or clauses 7.1 to 7.13, whichever is the earlier.					
		2 If clause 2.8 has been operated then, in respect of the relevant part and as from the relevant clase, such relevant part shall not be regarded as "the Project" or "work executed" for the purpose of clause 6.9.1.					
		Insurance against Injury to persons or property (9-10 to 6-12)					
ugement Hactor's Works Hactors' Jance - Wal Inkary	8-10	-1 -1 Without prejudice to his obligation to indemnify the Employer under clauses 8.7 and 6.8 the Management Contractor shall take out and maintain and shall cause any Works Contractor to take out and maintain insurance which shall comply with clause 6.10.1.2 in respect of claims arising out of his lability referred to it clauses 6.7 and 6.8.					
inede hoberth		•2 The insurance in respect of claims for personal injury to, or the death of any person under a contract of service or apprenticeship with the Management Contractor or a Works Contractor as the case may be, and ansing out of and in the course of such person's employment, shell comply with the Employer's Lubbity (Computory Insurance) Act 1969 and any statutory orders made thereunder or any amendment or re-enactment thereof. For all other claims to which clause 6.10.11 sophes the insurance cover to be taken out and mentiamed by the Management Contractor and by each Works Contractor shall be not less than the relevant sums stated in the Appendix for any one occurrence or series of occurrences arising out of one event. [m]					
		2 As and when he is reasonably required to do so by the Employer the Managamere Contractor shall send and shall cause any Works Contractor to send to the Architectme Contract Administrator for inspection by the Employer documentary evidence that the insurances required by clause 8 10 1 1 have been taken out and are being mantamed, but at any time the Employer may (but not unreasonably or veratiously) require to have sent to the Architect/the Contract Administrator for inspection by the Employer the relevant policy or policies and premium receipts therefor.					
		•3 If the Management Contractor defaults in laking out or in mentarising, or in causing any Works Contractor to take out and maintain, insurance as provided in clause 6 10 1.1 the Emotoyer may himself insure against any kability or expense which he may incur arising out of such default and a sum or sums equivalent to the amount paid or payable by him in respect of premium therefor may be deducted by him from any mories due of to become due to the Management Contractor under this Contract or such amount may be recoverable by the Employer from the Management Contractor as a debt.					
unce - Ny sic. Syloyes	6-11	1 Where it is stated in the Appendix that the insurance to which clause 6.11.1 refers may be required by the Employer the Management Contractor shall, if so instructed by the Architect/the Contract Administration; take out and meintain a Joint Names Policy for such amount of Indemnity as its stated in the Appendix in respect of any expense, tablity, lota, claim or proceedings which the Employer may incur or sustein by reason of incury or demage to any property other than the Project and Site Materials caused by collapse, subsidence, heave, whistion, weakening or removal of support or lowering of ground weter arriving out of or in the course of or by reason of the canying out of the Project excepting injury or demage;					
		-1 for which the Management Contractor is hable under clause 6 8;					
		 attributable to errors or onvisions in the designing of the Project; which can reasonably be foreseen to be inevitable having regard to the nature of the work to be executed or the manner of its execution; 					
	[m]	The Managament Contractor of any Works Contractor may if they so with, make torio sum groater than that stated in the Appandix					
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fill-1 continued		4 which it is the responsibility of the Employer to insure under clease 8.5.2 (# applicable);
		.5 arising from war risks or the Excepted Risks
		.2 Any such insurance as is referred to in clause 6.11.1 shall be placed with insurers to be approved by the Employer, and the Managament Contractor shall send to the Architect/ the Contract Administrator for deposit with the Employer the policy or policies and the premium receipte therefor.
		-3 If the Management Contractor defaults in taking out or in maintaining the Joint Names Policy as provided in clause 6-11-1 the Employer may timeeff insure against any risk in respect of which the default shall have occurred.
Excepted Phates	₽ 12	Nonwithetending the provisions of clauses 6.7, 8.8 and 5.10.1, the Contractor shell not be fieble either to indemnify the Employer or to insure against any personal injury to or the death of any person or any damage, loss or injury caused to the Project or S4e Materials, work executed, the site, or any property, by the effect of an Excepted Risk.
		War Damage (6-13 to 6-15)
(lect of us derringe	6 13	In the event of the Project or any part thereof or any unfixed materials or goods intended for, delivered to and placed on or adjacent to the Project sustaining war damage as defined in clause 8-15 then notwithstanding anything expressed or implied elsewhere in this Contract:
		It accurrence of such wer damage shell be disregarded in computing any amounts payable to the Management Contractor under or by write of this Contract;
		It a Architect/the Contract Administrator may issue instructions requiring the Management Contractor to secure the removal and/or dispose of any debrie and/or diameged work and/or to execute such protective work as shell be specified;
		.9 the Management Contractor shall secure the reinstatement or making good of such war damage and shall proceed to secure the carrying out and completion of the Project, and the Architectithe Contract Administrator shall in writing fix such later Completion Date as, in his opinion, is fair and reasonable;
		-4 the removal and disposal of debris or damaged work, the execution of protective works and the reinstatement and metring good of such war demage shall be inseted as if it were a Project Change and as Works Contract Varietions issued under clause 3.4 and/or an addition to items of work to be carried out by Works Contractors as referred to in clause 8-1.
Composensation Is wer dernage	6-14	The Employer shall be entitled to any compensation which may at any time become payable out all monies provided by Parliament in respect of war damage sustained by the Project or any part thereof or any unified materials or goods intended for the Project which shall at any time have become the property of the Employer.
behalian af He demege	÷16	The supression war damage' as used in clauses 8-13 and 6-14 means war damage as defined by 8.2 at the War Damage Act 1943 or any ambendment or re-enactment thereof.

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SECTION 7: Determination

Default by Managament Contractor - Determination by Employer (7.1 to 7.4)

- 7.1 Without prejudice to any other rights which the Employer may possess if the Management Contractor shall make default in any one or more of the following respects, that is to say.
 - 1 If which resonable cause he wholly supports or fails to proceed regularly and dependy with the compiling out of his obligations referred to in Aracle 1 before the completion of the Project or
 - 2 If he refuses or neglects to comply with a written notice from the Architectime Contract Administrator requiring thin to remove or secure the removal of directive work pr improper meanule or goods and by such refueat or neglect the Project is meterally effected, or
 - 3 If he hale to comply with the proveore of entrer clause 3 19 or if applicable clause 3 28

then the Architectifie Contract Administrator may give to him a nonce by registered post or recorded delivery specifying the detault. If the Management Contractor other shall continue buch default for 14 days after receipt of such nonce or shall at any time thereafter report such default (invalue previously represed or not) then the Employer may within 10 days after such continuance or reportion by nonce by registered post or recorded delivery forthwith determine the employment of the Management Contractor under this Contract, provided that such nonce the terployment of the Management contractor under this Contract, provided that such nonce the analysis of the sectionality or vestionality.

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72 In the event of the Management Contractor metrog a composition or prosperient with this creditors to herving a proposal in respect of this company for a voluntary enorgement for a company to the decite or scheme of an approximant approved in accordance with the Intertwinky Act 1998 or herving an application made under the Intertwinky Act 1998 in respect of the company to the could be the appointment of an aphrophytic or theiring a withing up order means at (second the the appointment of an aphrophytic) and (second the the appointment of an aphrophytic) and the volume of an aphrophytic or theiring a withing up order means at (second the the appointment of an aphrophytic) and the second to the purpose of among an application made under the intertwinted a withing a order mean at (second the the appointment of an aphrophytic) in techning a withing up passed or herving a provisional foundator, receiver or feiving a defined in the Intertwinter accessor period with the holders of the business or understating duly appointed or herving an administration receiver period advised in the Intertwinte accurate due to the order of the transportant for an application to the Intertwinter accessor period at the transportant foundator, receiver or dimension of the holders of any debormants accurate by a floating charge, of any singlerity comprised in a subject to the floating charge, the ameterization of the Management Contractor under the Contract shall be floating the prophetic or at the Management Contractor, was to aphronizated and ophrived at the Management Contractor, the topological and ophrive advisors of the floating of a advisor of a subject to the floating the prophetic or at the Management Contractor, the topological and ophrived at the floating of the approximation of the approximation of advisors of a subministration, receiver as the floating of the approximation of the approximate of advisors of advisors of the approximation of the approximate of advisors of advisors of the approximation of the approximate of

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7.3 The Employee shall be entitled to determine the employment of the Menagement Connector under the or any other context, if the Menagement Contextor by the fitter or any other context, if the Menagement Contextor by the fitter or any other context, if the Menagement Contextor by the fitter or any other context of any house of the design of the design of design of the design of the design of design of the design of design of the design of design of

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In the event of the employment of the Management Contractor under this Contract being determined under clease 7-1, 7-2 at 7-3 and so long as it has not been reinstated and gontinued then without prejudice to the accrued rights or remedies of either party or to any lability of the classes mentioned in cleases 8-7 and 8-8 which may accrue either before the Management Contractor or any Works Contractor shall have removed his or their temporary buildings, plant, tools, equipment, materials or goods or by reason of his or their so removing the same, the following shall be the respective rights and duties of the Employer and the Management Contractor;

- •1 the Employer may employ and pay other persons to carry out and complete the Management Contractor's obligations under this Contract and he or they may enter upon the site of the Project and use all temporary buildings, plays, tools, equipment, goods and materials intended for, delivered to and placed on or adjecent to the Project, and may purchase all materials and goods necessary for the carrying out and completion of the Project;
- .2 .1 except where the determination occurs by reason of the Management Contractor having a winding up order made or (other then for the purpose of amalgametrion or reconstruction) a resolution for voluntary winding up passed, the Management Contractor shell it so required by the Employer or by the Architect/the Contract Administrator on behalf of the Employer within 14 days of the date of determination, assign to the Employer without payment the benefit of any agreement for the supply of materials or goods and/or the securitor of any work for the purposes of the Contract to the entent thet the same is assignable, but on the terms that a suppler or Works Contractor shell be entitled to make any reasonable objection to any Arther assignment thereof by the Employer;
 - -2 subject to the exception to the operation of clause 7.4.2-1, the Employer may pay any supplier or Works Contractor for any materials or goods delivered or works executed for the purposes of this Contract (whether before or after the date of determination) in so far as the price thereof has not stready been paid by the Management Contractor; payments made under clause 7.4.2.2 may be deducted from any sum due or to become due to the Management Contractor or shall be recoverable by the Employer from the Management Contractor as a dot.
- .3 the Management Contractor shall, as and when required in writing by the Architect/the Contract Administrator so to do (but not before), remove from the site any temporary buildings, plant, tools, equipment, goods and materials belonging to, hired or lessed by Nim. If within a researable time after any such requirement has been made the Management Contractor has not complied therewith, then the Employer may (but wrhout being responsible for any loss or damage) remove and self any such property of the Management Contractor, holding the proceeds less all costs incurred to the credit of the Management Contractor;
- -4 the Management Contractor shell allow or pay to the Employer in the manner hereinafter appearing the amount of any direct loss and/or damage caused to the Employer by the determination. Until after completion of this Contract to make any 1-1 the Employer that not be bound by any provision of this Contract to make any 1-1 the Employer that Management Contractor, but upon such completion and the vertication within a trassonable time of the accounts therefor the Architect/the Contract Acrimistrator shall certify the amount of expenses properly incurred by the determination and, if such amount of expenses properly incurred by the determination and, if such amount of expenses properly incurred by the determination and, if such amounts when solded to the management Contract, the difference shall be recoverable by the Employer how the date completion in accordance with this Contract, the difference shall be recoverable by the Employer how the said total amount. The difference shall be recoverable by the Employer how the said total amount, the difference shall be recoverable by the Employer as a deot.

Default of Employer – suspension of Project – determination by Management Contractor (7-5 and 7-9)

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- 7.8 Without prejudice to any other rights and remedies which the Management Contractor may possess, if any of the matters referred to in clauses 7.5.1 to 7.5.4 occur then the Management Contractor may thereupon by notice by registered post or recorded demery to the Employer or the Architechthe Contract Administrator forthwith determine the employment of the Management Contractor under this Contract, provided that such notice shall not be given unreasonably or vestimously;
 - If the Employer does not pay the amount property due to the Managment Contractor on any certificate (otherwise then as a result of the operation of the VAT Agreement) within 14 days from the issue of that certificate and continues such default for 7 days after recept by registered post or recorded delivery of a notice from the Management Contractor stating that notice of determination under clause 7.5 will be served if payment is not made within 7 days from recept thereoft, or
 - .2 the Employer interferes with or obstructs the issue of any certificate due under this Contract; or
 - 3 the carrying out of the whole or aubstantially the whole of the uncompleted Project (other than the execution of work required under clause 2.5) is suspended for a continuous period of the length nemed in the Appendix by reason of:
 - Instructions issued under clauses 3.4 or 3.5, unless caused by reason of some negligence or default of the Management Contractor, his serverts or agents or of any person employed or engaged upon or in connection with the Project of any pert thereof, his serverts or agents other than the Employer or any person employed, engaged or authorised by him or by any local authority or statutory undertaker executing work solely in pursuance of its statutory objection; or
 - 12 the Management Contractor not having received in due time necessary specifications or bills of quantilies for Works Contracts, Instructions, drawings, details or levels from the Architect/the Contract Administrator for which he specifically applied in writing provided that such application was made on a date which having regard to the Completion Date was neither uncessnably distant from nor unreasonably close to the date on which it was necessary for him to receive the same; or
 - 3 delay in the execution of work not forming part of this Contract by the Employer himself or by persons employed or otherwise engaged by the Employer as referred to in clauses 3.23 and 3.24 or the lafure to execute such work or delay in the supply by the Employer of materials and goods which the Employer has agreed to provide for the Project or the Terlure so to supply; or
 - -4 the opening up for inspection of any work covered up or the testing of any of the work, metenate or goods in accordance with clause 3.10 (including making good in consequence of such opening up or testing) unless the inspection or test showed that the work, metenate or goods were not in accordance with the Contract;
 - -5 failure of the Employer to give in due time ingress to or egress from the set of the Project or any part thereof through or over any land, buildigne, way or passage adjoining or connected with the set and in the possession and control of the Employer, is accordance with the Contract Documents after recent by the Architecthe Contract Administrator of such notice, if any, as the Contract is required to give or failure of the Employer to give such ingress or egress as otherwise agreed between the Architect/the Contract Administrator and the Manegement Contractor;

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[in-2]-4 the Employer makes a composition or arrangement with his creditors or has a proposal in respect of his company for a voluntary arrangement for a composition of debts or achieves of arrangement approved in accordance with the line/vency Act 1966 or has an application made under the insolvency Act 1966 in respect of his company to the court for the appointment of an administrator or has a winding up order made or (except for the purposes of an amelgametion or reconstruction) has a resolution for voluntary writing up passed or a provisional ilquidator, receiver or receiver and manager of his business or undertaking is duly appointed, or has an administrative receiver, as defined in the Insolvency Act 1968, appointed or possession is taken, by or on behall of the holders of any debentures secured by a Roating charge, of any property composed in or subject to the floating charge;

7.6 Upon determination under clause 7.5, then without projudice to the accrued rights or remeckes of either party or to any fieldity of the clauses mentioned in clauses 8.7 and 6.8 which may accrue either before the Management Contractor or any Works Contractors at hell have removed his or their temporary buildings, plant, tools, equipment, merenate or goods or by reason of his or their so removing the same, the following shall be the respective rights and liabilities of the Management Contractor and the Employer;

- •1 the Management Contractor shall with all reasonable dispatch and in such manner and with such precautions as will prevent injury, death or damage of the classes in respect of which before the date of determination he was liable to indemnify the Employer under clause 8.7 or 6.8, remove from the site all his temporary buildings, plant, tools, equipment, materials and goods belonging to or hired by him and shall give facilities for his Works Contractors to do the same but subject always to the provisions of clause 7.6.2.2;
- after tailing into account amounts previously paid under this Contract the Management Contractor shall be paid by the Employer;
 - -1 the Prime Cost; and
 - •2 the Prime Cost as defined in Part 48 of the Second Schedule of materiels and goods not delivered to or adjacent to the Project but for which the Management Contractor is legally bound to pay and on such payment by the Employer any such materials or goods so paid for shall become the property of the Employer, and
 - .3 a Management Fee calculated as follows: the Pre-Construction Period Management Fee plus a proportion of the Construction Period Management Fee stated in the Appendix adjusted, where appropriate, in accordance with clause 4-10-2, being the ratio that the Construction Period Management Fee beers to the Contract Cost Plan Total applied to the sum of the amounts referred to in clause 7.6.2-1 and 7.6-2.2; and
 - -4 the reasonable cost of removal under clause 7.6 1; and
 - -S any direct loss and/or demage caused to the Management Contractor by the determination.

Determination by Employer or Management Contractor (7-7 to 7-9)

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- Without prejudice to any other rights or remedies which the Employer or the Management Contractor may possess if the carrying out of the whole or substantially the whole of the uncompleted Project (other than the execution of work required under cleuse 2.5) is auspended for a continuous period of the length nemed in the Appendix by reason of:
 - -1 force melaure; or
 - -2 toes or damage to the Project occasioned by any one or more of the Specified Perfec or
 - -3 civil commotion

then the Employer or the Management Contractor may thereupon by notice by registered post or recorded delivery to the Management Contractor or to the Employer fontiwith determine the amployment of the Management Contractor under this Contract provided that such notice shall not be more immensionable or immensionable.

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octed Parita — ygence etc., Henegement ntractor	7.4	The Management Contractor shall not be entitled to give notice under clause 7-7-2 where the loss or dimmete to the Project occasioned by one or more of the Specified Parita was caused by some negligence or default of the Management Contractor, his servents or agents or of any person employed or engaged upon or is connection with the Project or any part thereof, his servents or agents other than the Employer or any person employed, engaged or authomed by him or by any local suthority or statutory undertaker executing work solely in pursuance of its statutory obligations.
yis and duties (inployer and vagement practor	7.9	Upon such deterministion under clause 7.7 the provisions of clause 7.8 shell apply with the exception of clause 7.6.2.5.
		Determination at will by Employer (7-18 to 7-13)
roloyer's option	7-10	Without prejudice to any other rights or remedies which the Employer or the Management Contractor may possess, the Employer may at any time by notice in writing to the Management Contractor forthwith determine the employment of the Management Contractor under this Contract.
temination for clause 7, 10 opts and duries (indioyet and pagement krinctot	7.11	In the event of the employment of the Management Contractor under the Contract being deter- mined under clause 7.10 then without prejudice to the accrued rights or remedies of either party or to any fieldity of the classes menhoned in clauses 6.7 and 6.8 which may accrue either before the Management Contractor or any Works Contractors shall have removed his or their temporary buildings, plant, tools, equipment, meterials or goods or by reason of his or their so removing the same, the following shall be the respective rights and lebitlies of the Employer and the Management Contractor;
		•1 the Employer shall indemnify the Management Contractor against any valid claims made against him by Works Contractors and others in relation to the Project, such indemnify to be limited to the extent of sums property due to such Works Contractors and others as shall not have been paid to the Management Contractor by the Employer;
		2 the Management Contractor shall if so required by the Employer or by the Architect/the Contract. Administrator on behall of the Employer within 14 days of the date of the determination, assign to the Employer without payment the benefit of any agreement for the supply of meterials or goods and/or for the execution of any work for the purpose of this Contract to the extent that the same is assignable, but on the terms that a suppler or Works. Contractor shall be entitled to make any reasonable objection to any further assignment thereof by the Employer.
fermination bre netruction tod	7-12	In the event of determination under clause 7.10 taking place before the issue by the Employer of a written notice to proceed under clause 2.1 then the Employer shell pay to the Management Contractor in respect of the co-operation with the Professional Team as referred to in Arricle 1 and clause 2.1 an appropriate proportion of the Pre-Construction Panod Management Fee less any amount paid under an interim Cartificate issued in accordance with clause 4.2.1
Himpination mg mtruction rod	7-13	In the event of determination under clause 7.10 taking place after the issue by the Employer of the written notice to proceed under clause 2.1 then upon such determination the provisions of clause 7.6 shall apply.

SECTION 8: Works Contractors

Works Contractors (8-1 to 8-8)

nome of work - 8-1 Works Contractors	Clauses 8 1 to 8 5 shell apply in respect of the items of work to be carried out by Works Contractors which are identified in the Contract Cost Plan or in Instructions
Selection of Works 8-2 Contractors — Lenne of Works Contracts	•1 The Works Contractors to carry out the items of work so identified shall be selected by agreement in writing between the Management Contractor and the Architect/the Contract Administrator and that selection shall be confirmed in an instruction. Provided that, seve where the Employer or the Architect/the Contract Administrator on his behall and the Management Contractor otherwise agree, the Management Contractor shall only employ any persons as Works Contractors who will
•	•1 enter into a contract on the current unamended standard Form of Works Contract (Works Contract/1 and Works Contract/2) issued by the Joint Contracts Tribunal with the Management Contractor and execute that contract under seal where this Contract is under seal; and
	2 if so required (as recorded in Works Contract/1) enter into an Employer/Works Contractor Agreement (Works Contract/3) with the Employer and execute that Agreement under seal where the Works Contract is under seal.
Hymested suppliers to Works Contractors	*8 The Management Contractor shall send to the Architect/the Contract Administrator any submissions by a Works Contractor under clause 8.4.1 of the Works Contract Conditions in respect of restrictions, limitations or exclusions in a proposed contract of sale between such Works Contractor and a Nominated Suppler; and the Management Contractor shall not be required to instruct a Works Contractor to enter into a contract of sale with such Nominated Suppler unless and until the Architect/the Contract of take with such Nominated Suppler unless and until the Architect/the Contract of take with such Nominated Suppler unless and until the Architect/the Contract administrator hes specifically approved in writing to the Management Contractor the sale restrictions, limitations or exclusions. Such approval shall be immediately confirmed in writing by the Management Contractor to the Works Contractor. Where any lebility of a Works Contractor to the Management Contractor to the Bandgement Contractor to the Employer shall be limited to the same entert.
Ounes required B-3 train Management	-1 The Management Contractor shall fulfill all the duties required from him under each Works Contract.
works Contracts	•2 The Architect/the Contract Administrator shall on the leave of each Interim Certificate direct the Management Contractor as to the emounts in respect of each Works Contractor which are included in the emount stated as due in such Interim Certificate.
	Where any Works Contractor requests the Managament Contractor, who shall forthwith send such requests to the Architect/the Contract Administrator, that he be informed directly by the Architect/the Contract Administrator of the amount included for him in each relevant interim Cantificate, the Architect/the Contract Administrator shall so inform that Works Contractor.
	-4 The Managament Contractor shall immediately inform the Architect/the Contract Administration of all notifications from Works Contractors under clause 2-13 of the Works Contract Conditions of the practical completion of their work together with the Managament Contractor's observations thereon. When in the operation of the Architect/the Contract Administrator practical completion of the Works Contractor's work is achieved he shall consent to the Managament Contractor leasing a certificate of practical ecompletion to the Works Contractor is accordiance with clause 2-14 of the Works Contract Canditions.
And payment to 8-4 Wyne Contractor	I following a request by a Works Contractor II is desired by the Employer or by the Architect/ the Contract Administrator on his bahali to secure final payment to such Works Contractor before the issue of the centricate referred to in clause 4-11, and if such Works Contractor hes settelectorly indemnified the Managament Contractor spaniel any latent defects, then the Architectifue Contract Administrator may in an Inferrm Centricore direct an amount to cover the seal final payment.

Loss and expanse caused by metales materially effecting requise progress - Warks Contracts

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8.8 Upon receipt of a written application property made by a Works Contractor under clause 4.45 of the Works Contract Conditions in respect of matters affecting regular progress of the Works by matters referred to in clauses 4.46.1 to 4.46.7 of the Works Contract Conditions the Management Contractor shall pass to the Architectifte Contract Administrator a copy of that written application together with the comments upon the application. Thereafter, if and as soon as the Architectifte Contract Administrator as copy of the Works Contract or any part thereof has been or is takely to be materially affected as referred to in the above 4.45 of the Works Contract or any part thereof has been or is takely to be materially affected as referred to in the abovesaid clause 4.45 and as sat out in the application of the Works Contractor then the Architectifte Contract Administrator shall himsed ascertain, or shall instruct the Quantity Surveyor to excertain, the amount of such loss and/or expense in collaboration with the Management Contractor.

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SECTION 9: Settlement of disputes – Arbitration

Settlement of disputes - Arbitration (9-1 to 9-7)

Depute er difference tocolrement ef Artieren .1

- If a depute or difference as referred to in Article 8 hes arean including a dispute or difference relating to
- any matter or shing left by this Contract to the decretion of the Architect/the Contract Administrator or
- --- the withholding by the Architec/the Contract Administrator of any certificate to which the Management Contractor may claim to be envited or
- -- the rights and fabilities of the parties under section 4, clauses 6.13 and 6.14, or 7-1 to 7-13 or
- The Unreasonable withholding of consent or agreement by the Employer or the Architect/ The Contract Administrator on his behalf or by the Management Contractor or
- the adjustment of the Management Fee under clause 4 10 2 or 4 10 3 or as to any rate or any addition which has to be agreed under the Second Schedule or
- The refusal by the Architect/the Contract Administrator to include an term as Prime Cost

then such dispute or difference shall be referred to the arbitration and final decision of a person to be agreed between the parties to act as Arbitrator, or, (aring agreement within 14 days after eitheir party has given to the other a written request to concur in the appointment of an Arbitrator, a person to be appointed on the request of either party by the person named in the Appandia.

Arbitration -

9.2 Provided that if the dispute or difference to be referred to erbitration under this Contract raises issues which are substantially the same as or connected with issues raised in a related dispute between.

- the Employer and any Works Contractor under an Employer/Works Contractor Agreement, (Works Contract/3); or
- the Management Contractor and any Works Contractor under a Works Contract, or

the Works Contractor and any Nomineted Supplier to whom section 8 of the Works Contract Conditions applies

and If the related dispute has already been referred for determination to an Arbitrator, the Employer and the Management Contractor hereby agree that

- 1 The dispute or difference under this Contract shall be referred to the Arbitrator appointed to determine the related dispute; and
- 2 such Arbitrator shall have power to make such directions and all necessary awards in the same way as if the procedure of the High Court as to powing one or more defendants or joining co-defendants or third parties was evaluable to the parties and to hint; and
- •3 the agreement and consent referred to in clause 8.6 on appeals or applications to the High Court on any question of lew shall apply to any question of lew analig out of the awards of such arbitrator in respect of all related deputes referred to him clauses of the reference of all the related deputes referred to him;

save that the Employer or the Management Contractor may require the depute or difference under the Carenest to be referred to a atterent Arbitrator (to be appointed under the Carenact) I other at them reservably demonsters that the Arbitrator sciencies to determine the retained

(dopening 9-3 Such reference, except

per short

1 on article 3 or article 4; or

- 2 on the questions whether or not the issue of an instruction is empowered by the Conditions, or whether or not a certificate has been improperly withheld, or whether a certificate is not in accordance with the Conditions; or whether a determination under clause 6.4.8 will be just and equitable,
- 3 on any dispute or difference under clauses 2 12 to 2 14 and 6 13 and 6 14, or
- 4 on any dispute or difference under clause 2.3.4 or clause 2.8 in regard to a withholding of consent by the Contractor, under clause 3.3.3, under clause 3.6.4 in regard to any objection by the Management Contractor whether for himself or on behall of a Works Contractor.

shall not be opened until after Practical Completion or alleged Practical Completion of the Project or termination or alleged termination of the Management Contractor's employment under this Contract or abandonment of the Project, unless with the written consent of the Employer or the Architect/the Contract Administrator on his behalf and the Management Contractor

- 9.4 Subject to the provisions of clause 1.14 and clause 3.7 of the Works Contract Conditions the Arbitrator shall, without prejudice to the generality of his powers, have power to direct such measurements and/or valuations as may in his opinion be desirable in order to determine the rights of the perties and to ascertain and award any sum which ought to have been the subject of or included in any certificate and to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision, requirement or notice had been given.
- 9.5 Subject to clause 9.6 the award of such Arbitrator shall be final and binding on the parties
- 9.6 The parties hereby agree and consent pursuant to sections 1(3)(a) and 2(1)(b) of the Arbitration Act 1979, that either party
 - 1 may appeal to the High Court on any question of law arrang out of an award made in an arbitration under this Arbitration Agreement and
 - may apply to the High Court to determine any question of law arising in the course of the reference;

and the parties agree that the High Court should have purisdiction to determine any such questions of law.

9.7 Whatever the nationality, residence or domicile of the Employer, the Management Contractor, any Works Contractor or supplier or the Arbitistor, and wherever the Project or any part thereof is situated, the taw of England shall be the proper law of this Contract and in particular (but not so as to derogate from the generality of the foregoing) the provisions of the Arbitistion Act 1950 (notwithstancing anything in \$34 thereof) to 1979 shall apply to any arbitistion under the Contract wherever the same, or any part of it, shall be conclusing [n].

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Where the parties do not with the proper law of the Contract to be the Law of England analysis do not with the provisions of the Anti-Hallon Acts 1950 to 1979 to apoly to any experision under the Contract had under the procedural law of Scatland (ar any other country) appropriate among-metric to Contract the or and the the procedural law of Scatland (ar any other country) appropriate among-metric to Contract to 7 should be

ECISIONS SOLELY ON THE BASIS OF THIS WESTIONNAIRE, IT IS INTENDED AS A MMER FOR DISCUSSION WITH YOUR MINCIPAL ADVISER.

When all questions have been considered sum the number of ringed dots in each column. The procurement paths with most rings should be worthy of further investigation.

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THE RESEARCH MODEL













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AGAINST PERCENTAGE OVERRUN ON TIME

- MANAGEMENT CONTRACTS
- TRADITIONAL CONTRACTS





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ment. For example, in the case of it related samples, when ordinal measurement has been achieved both the Friedman two-way analysis of variance and the Cochran Q test are applicable.

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Verify dan test, but also of the differences between pairs. See the discussion on pp. 75-76.

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