

Faster, better value construction

A BEST PRACTICE GUIDE TO
CONSTRUCTION MANAGEMENT

Colin Gray

DEPARTMENT OF CONSTRUCTION MANAGEMENT & ENGINEERING



The University of Reading

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Throughout the 1980s Colin Gray was closely involved with the development of CM. A leader of the group which created the trade contractors' guidelines for the *CM Forum Report and Review*, he was also actively involved in the development of good CM practice for the Broadgate and Ludgate projects. He has jointly authored books on specialist trade contracting and design management.

The Reading Production Engineering Group is tasked with the development of the best CM practice and its wide application to achieve a world class UK construction industry.

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The three organisations who have sponsored this study are committed to the development of the highest professional standards in their approach to construction.

They are determined to develop the best practices of construction management for the benefit of all.



BRITISH AIRWAYS

British Airways have used CM successfully on some important and prestigious projects over the last four years. The CM approach to project delivery, if properly executed provides many benefits.

The main benefits provided on well conducted CM projects are detailed and effective planning and programming, effective management of both the design and construction aspects of projects and more importantly a collaborative teamwork based approach which significantly reduces traditionally adversarial attitudes.

The capability and attitude of the CM team are a key to successful delivery of the project; the need for careful and thorough approach to the selection of the CM cannot be overstated.

British Airways supports any study which provides other client's views and experience of CM. A follow up study to really benchmark the relative performance of CM, against other project approaches, would also be supported by the airline.

Peter Cannon

MANAGER-TECHNICAL SUPPORT, BRITISH AIRWAYS PROPERTY

SAINSBURY'S

At Sainsburys we embarked upon the experiment with CM some seven years ago and have found it a significantly better procurement route for many projects since.

It has long been necessary to clarify exactly what service people are getting when they embark on the CM route and many offerings in the market are not CM as we

understand it to be. This study will, therefore, be enormously useful to bring clarity to the thinking on CM that has been missing up to now. It should help to clarify the benefits for the undecided client and allow them to add this alternative procurement route to their choices, for the right project.

We are pleased to have been associated with this study and recommend the findings to all.

Charles Johnston

PROPERTY SERVICES MANAGER

MACE

We are very pleased to support this pilot study as a first step to helping identify the critical success factors in best practice construction management.

It is hoped that this study will lead to a more detailed benchmarking study, supported by an extended list of clients, so that a proper reference document, backed by authoritative experience, is available for new as well as experienced clients using construction management in the future.

We also wish to help avoid the system of construction management being undermined by less than professional practitioners by showing, through client experience, that the system, in the right hands, works very well.

MACE will fully support a follow up study.

Ian Macpherson

CHIEF EXECUTIVE

m|a|c|e

SAINSBURY'S

I n t r o d u c t i o n

A growing number of clients are using CM to achieve a level of performance from the UK construction industry which is much more difficult to obtain under conventional arrangements.

Clients who have successfully used CM report the following major benefits:

reduction in barriers to problem-solving through mutual trust and teamwork involving all parties to a project;

commitment by everyone to the client's objectives and to searching for the most cost effective solutions;

greater clarification of roles, responsibilities and risks;

simpler organisation with fewer levels of decision-making;

greater certainty and increased flexibility in the delivery process.

One study of 40 client and professional organisations showed that there was no type of project, small or large, simple or complex, refurbishment or new build, which had not used construction management

effectively. (*Hughes W, 1996. Construction Management Contracts – Law and Practice, Engineering, Construction & Architectural Management.*) Projects from as little as £½ m have been built using CM.

However, a warning note needs to be sounded. Unless clients understand how CM works, and employ competent professionals to put it into practice, they are likely to be disappointed.

And, sadly, there are a good many clients who have tried CM but failed to reap the full benefits. In some cases, they have misused their opportunity through a failure to understand and apply CM's basic principles. In other cases they may have employed organisations which claim to offer construction management services but lack the required professional philosophy, experience or qualified personnel.

Faster, Better Value Construction sets out to show clients and their professional advisers how to get the best from CM. Its guidance is based on the practical experience of a wide range of clients, many of whom still use other methods of construction and are able to compare one against the other.

In nearly all CM projects there has been a considerable learning process, and the full benefits often come on

the second and third projects. Some clients have achieved immediate gains, but they have usually recruited as their project manager someone with experience of using CM.

The most important message of this guide is that everyone involved in a project must understand and share the core philosophy of CM. All parties to the design and construction process must see themselves as part of a team working together to seek the best ways of achieving the client's objectives.

To use CM effectively, clients must be honest and open about their requirements and the complexities which may be involved, and they must embrace designers, construction managers and trade contractors in a joint endeavour.

As an overview of current best practice, this guide is only a snapshot in time. Many of the leading CMs are committed to continuing the development of CM. Hopefully this guide will encourage them to formalise the improvement process, establish benchmarks and, with their clients, develop a truly world class approach to the management of construction projects.

Key questions

WHAT IS CM?

The Construction Management Forum's report and guidance (CSSC 1991) defined CM thus:

'The individual or organisation employed to control the cost and manage the realisation of the Client's project in co-operation with the designer through the works contractor.'

CM has evolved quite rapidly during the few years since this definition was formulated. Today, clients expect a higher level of interaction between the construction manager and everyone involved in the project. The construction manager becomes the catalyst for getting the best from the design and construction process. A stimulating environment is created which gives designers free reign to maximize their creative potential, while the construction manager provides the framework to access the best specialist trade contractors.

The creative synergy of designers and specialists working together is then used to accelerate the design and construction process, or to deal efficiently with the complexity of the project, or both.

CM creates a much simpler organisation structure. It reduces the levels of decision-making effectively to only

two – the client, and the designers and specialist trade contractors. The CM becomes an executive arm of the client to provide the decision-making framework for the designers and trade contractors.

CAN CM DELIVER CHEAPER CONSTRUCTION?

Nearly all clients use a PQS for cost planning in the initial project stages. Most then bring in the CM's refined skills to manage the procurement package and achieve the best possible buy. Thus, nearly all the claimed savings of construction management are in expenditure below the cost plan. The savings can be considerable – up to 20%. Clients have often used these price gains to increase the value and specification of their buildings.

The most successful projects are where the CM owns the budget. In conjunction with the client, the CM makes many of the executive decisions on expenditure to ensure that the project is delivered within the cost plan. With CM, flexibility in timing ensures that the purchase of each specialist trade package is made at the optimum point in the market, thus obtaining the most competitive price for the client.

In most cases where the CM owns the budget the PQS which developed the cost plan assumes the role of auditor, particularly in the public sector. However, some

clients are using CM's near market skills to develop the cost plan itself. In other instances, the PQS and the CM have developed a partnership to combine their respective skills. Some clients have engineered this relationship, particularly where the appointments have been sequential due to the timing of the early project development stages.

CAN CM DELIVER QUICKER CONSTRUCTION?

Most clients adopt CM in order to ensure that construction is delivered to fit their timetable. This is achieved by integrating the objectives and activities of designers and trade contractors far more closely into the client's specific requirements.

CM makes everyone in the team a stakeholder and gives them a seat around the table, making the decision-making process more dynamic and tailored.

The key is to achieve fast build by giving full consideration to the production implications of design detail.

At its best CM has delivered projects twice as fast as the norm for the industry. Complex projects in the City of London have been delivered faster than New York skyscrapers (the international benchmark of construction speed).

Speed can often be used to deliver less cost by achieving earlier rent or business revenue from the building.

CAN CM DELIVER BETTER QUALITY?

The quality of the finished product is often better with CM, whether through closer attention to detail or the involvement of practical building skills earlier in the decision making processes.

When specialists are appointed directly by the client and are involved in determining the scope of the package, they are in a better position to control all aspects of their work. They can also avoid the fragmentation of processes which so often militates against quality.

Experienced clients use CM for projects which have a high degree of complexity or where they are not sure of the final outcome. It offers them the flexibility to accommodate, for example, late tenant changes and complex refurbishments which involve liaison with existing occupiers. There is also greater scope for final tailoring of the project to client needs.

What to look for in a CM

Clients have said that few organisations offering CM had a good understanding of the concepts and the professional philosophy which underpins the method. Many CM organisations, drawing on people who only have a limited experience of true CM, are overselling themselves. As a result clients are becoming far more selective.

SELECTION CRITERIA

In selecting good CMs, the qualities to look for are:

depth of understanding of CM among all members of the CM organisation;

a good track record of successful completion over a wide range of projects, both in size and also types of building;

commitment to achieving a significantly improved level of performance from the industry;

willingness to set up an organisation which mirrors that of the client to ensure effective and positive communication;

a fee based service offering only CM and not contracting, demonstrating a total commitment to

the CM philosophy and to the client's interests without hidden agendas or secret discounts;

state of the art systems for project control;

understanding of the economic imperatives of the client's business.

A GOOD MIX OF EXPERTISE

CM must employ the right blend of highly competent people. It is not a low key, low resource management method.

CMs must offer good management skills and a comprehensive knowledge base of construction practice and performance as well as an understanding of the total process. Their staff must develop multiple capabilities, in addition to an in-depth mastery of their technical specialization. Traditionally this experience and skill was only built up over time from enormous experience, but it must now be available at all levels in CM organisations.

CM personnel are expected not only to manage but collectively to challenge any and every solution to ensure it is a cost effective and sensible contribution to the complete building and delivers value for money for the client. They will therefore be largely drawn from

client, professional, property, management, design and site management backgrounds.

COMMUNICATION AND MOTIVATION

The CM organisation must interface actively with all members of the client, design and specialist contractors' teams. At all times it must have the delivery objectives firmly in mind and be able to communicate them in the most appropriate way.

CM therefore requires people who can motivate everyone to produce the best possible performance. There are few sanctions. The most effective weapon is developing a total commitment to achieving the project objectives whatever the circumstances. This is achieved by making certain that everyone is aware of the importance of their contribution at every stage.

PROBLEM SOLVING

CM requires people with considerable experience and technical skills who can think ahead and anticipate potential problem situations. They can then take action early enough to identify the technical inputs necessary to seek a suitable solution. It becomes a simple matter to bring together the necessary expertise to solve the problem in a support culture provided by the CM. The key is to identify the barriers to problem-solving.

BRIEF DEVELOPMENT

Brief development requires the highest possible level of perceptive and strategic analysis involving very experienced people. In many cases the directors of the CM firms are perceived as the only ones with this expertise. One criticism is that they are not available for long enough on many projects. This may be changing as the CM firms become more established.

Many clients find that the complexity of the design process is reduced only when the CM has in-house engineering and architectural design expertise to interpret the design into their context.

DESIGN MANAGEMENT

For experienced clients the question of who manages the design process to achieve its integration into the construction process is of central importance. The major weakness of the other existing systems is their failure to achieve proper integration.

If CMs are to be used in the early stages of brief and feasibility development, then their personnel must have a sympathy with designers, encourage them to achieve their full potential and not stifle design flair or creativity. A CM must be supportive and provide the time and understanding needed by designers to develop

concepts. Effective CMs usually employ architects as managers of this complex area.

CMs must be able to advise the client on the basis of detailed technical expertise. They must also be able to manage the responses from the client to design team proposals. They must show that they have the systems and expertise to provide a strong control of processes and procedures.

Clients require the CM to set the management framework and schedule for both the design and the construction as few design teams achieve satisfactory control of their own processes.

First, and probably most important, the CM must establish a design management philosophy which addresses all aspects of the design and all contributors to the design. This requires a capacity to take an overview of all the project's design contributions and plan their delivery. The design process of a UK building is very complex due to the level of innovation and extensive use of components and pre-assembly.

Second, the CM must develop a deep understanding of the technologies within each of the main systems in order to offer clients and their designers access to the latest world class technology.

Getting the best out of CM

CLIENT RESPONSIBILITY FOR SUCCESS

The client must either have a good working knowledge of the construction industry or employ a project manager who is fully conversant with the requirements and philosophy of CM. A project manager should preferably be in-house to provide the interface between the client's organisation and the construction team.

At the same time, both experienced and inexperienced clients must understand why CM is an appropriate method for their project and really think through, with their advisors, the basis and criteria for selection. More traditional ways of managing procurement tend to focus on the narrow issue of price rather than the potential value released by the best CMs.

SET UP A DECISION-MAKING SYSTEM

Effective construction of any sort requires certainty of decision making at key points in the project cycle. Clients must have an organisation which understands this and can respond when requested. The general view is that CMs should help clients far more in setting up the correct regime to utilize their skills effectively, particularly in the early stages of a project.

A good CM will help the client to structure a decision and command system to respond to project

requirements. The more progressive CM organisations are developing services to deal with this very specialized guidance, which is a mix of management consulting and brief development.

CM projects can only be totally customer-driven if the customer has access to an intimate knowledge of project processes through the CM. The customer must understand the project in order to respond positively to its requirements and avoid decision making failure.

INVOLVE THE CM AT AN EARLY STAGE

Clients are still unclear about when it is best to involve the CM. This is probably because there is very little advice from CMs themselves – or from those designers and quantity surveyors who see the encroachment of the CM into their sphere of influence as a threat rather than an opportunity to enhance their own capability.

Where the client chooses to select the architect and cost consultant to develop the initial scheme proposals, the CM often has greater difficulty adding value to the project. The benefit of the CM is more than just contributing early buildability advice. The CM organisation must be used in a proactive role to identify the key project issues.

DESIGN FLAIR AND PRODUCTION REALISM

It has been claimed that CM is not appropriate for projects requiring design flair. This criticism is largely unfounded. The loss by architects of some of their traditional management responsibilities may have created problems in some circles. But many leading UK architects are currently working successfully with CMs on very challenging projects.

The CM's brief to seek value should not constrain the designer. On the contrary, if the CM is primarily facilitating access to the latest technology then this is a benefit. The role of CM is to bring in practical experience and realism at every stage and always to challenge design decisions in the pursuit of improved value.

The skills needed for managing the creative aspects of design are different from those for managing the practicalities of construction. They require a much more sophisticated focus on integration. Using a CM generally leads to better co-ordination of the design because production expertise is brought to the design discussion. Close involvement of the client can further reinforce the importance of production considerations.

Thinking through the implications of design and gathering all the relevant information gives the client

much greater control and brings forward many more options to choose from.

CHOOSING THE SPECIALIST CONTRACTORS

CM provides quick and efficient access to specialist trade contractors for the development of detail design. The CM can identify the right level of expertise and go straight to it without cumbersome procurement procedures.

The level of input required from the specialist trade contractors varies. Partition design requires a lot whereas electrical design requires less. About 30% of specialists give more than is needed, motivated by a pride in their work. These are the organisations that CMs attempt to identify and use.

CM allows the purchasing of specialist trade contract packages at the best time to meet the needs of the design or construction process. The scope of the trade package can be properly identified and developed before the purchase decision is made. It also allows the timing of purchase decisions to be made at an optimum time to achieve the best market price.

Many clients are nervous about the relationship between the CM and the specialists, but it is essential if the CM is to facilitate the design process. This

nervousness can be removed by careful selection of the CM organisation, taking into account its philosophy, its background and its other business interests.

BENEFITS OF A RELATIONSHIP OF TRUST

Those with experience know that CM provides the means to obtain the best specialist contractors and to get the best performance from them. A relationship of trust is needed, involving the client, designer and CM. By working closely with the CM, the client creates the commercial environment in which trust can develop.

Once the specialist is involved, a good CM develops a non-adversarial relationship with the whole of the specialist's organisation, from the MD down to the site staff. An atmosphere of trust and dialogue encourages the specialist to input in a co-operative environment. Group forums are essential to ensure the specialists understand the context of their contribution.

The crucial issue is to establish ownership of issues and problems by the specialists, who can bring their wide knowledge base to the project. The secret is to work with the specialist contractors to define the exact scope of the package they will deliver.

The mutual trust and certainty created by direct contract between a trade contractor and the client may lead to

significant savings as the 'risk' and 'interference' (commercial or otherwise) elements of the price are reduced or eliminated. Through their direct relationship with the trades many clients have come to understand the difficulties caused by onerous contract terms. In many cases they have attempted to develop a simplified and less onerous contractual framework, even extensively modifying the CM's trade contract.

Trust is a two way process. Many specialists do not believe CMs will deliver a fair working environment, certainly not first time around. It is only after they have experience with a CM project that they appreciate the benefits. Equally, trust comes from performance and delivery. Specialist contractors who understand the concepts are getting more than 50% of their business from repeat orders.

A major advantage of CM to specialist contractors is that it can address one of their main preoccupations – good cash flow. Good performance should be rewarded by providing specialists with prompt and accurate payment!

BETTER ASSEMBLY AND CONSTRUCTION

The very best CM sites are busier, tidier and safer. This reflects the commitment of good CMs to contribute to the change necessary to bring the level of quality on UK

construction sites up to the best of world standards. Construction is historically perceived as a confused and untidy business with little regard for safety. However, designers are placing higher and higher expectations on the industry. The quality that they expect cannot be achieved in these conditions. Nor can component based construction, which requires a high level of accuracy and fit. CM projects may seem to generate more preliminaries costs, but this is necessary to provide the standard of working conditions which produce the required build quality.

Clients, however, criticise the tendency of CMs to leave the trade contractors to manage too many of those aspects of their package which are affected by critical factors outside their control. This is a legacy of the direct transfer of specialist trade practice from the USA in the formative years of CM. But the UK's work environment is very different. It calls for CMs to perform a dual role — on the one hand, helping and encouraging the specialist contractors to develop their skills, while same time providing the decision support and inter-specialist integration necessary to achieve good work.

High productivity is not necessarily a natural consequence of CM. It is the result of many factors, most of which are dependent on the detail of the design and on ensuring that the right skills and components are at the right place at the right time.

However, close integration at the design stage and bringing together the production knowledge of the CM and the specialists can only be beneficial in taking delays out of the system.

The biggest advantage of CM is in removing the barriers to problem solving. Problems are not allowed to fester. Those involved are not trying to exploit a problem to make money. Some clients have felt that they can get sucked into dealing with site problems, but this should only occur in situations where the value of the building could be compromised.

ACHIEVING A SATISFACTORY HANDOVER

All clients remarked in one way or another on the seeming difficulty of handing over a building without defects. Whilst using CM improves quality, the level of defects remains unacceptably high. There just should not be any defects.

The trades are good at starting, but poor at finishing. The CM should provide a feedback loop to help them to learn. It should also provide a clearer definition of responsibilities to avoid defects. And CMs should not walk away too quickly from projects without resolving outstanding defects and finalising details, including settling trade contractor's final accounts.

A final word

The best of current construction management has built upon the success of earlier projects to deliver consistently better quality and efficiency, faster construction and improved value for money.

Good CMs are continuing to make improvements. But there are already too many organisations attempting to offer CM without the necessary commitment, skills or vision.

The essence of CM is to question and, if necessary, to change existing practices and attitudes. This is what all CMs should provide.

Clients interviewed for this study who have used CM testify to its effectiveness on a wide variety of projects. At the moment, however, more research is required to clarify the precise benefits of CM in comparison with other approaches, and to provide benchmarks for assessing the performance of organisations offering the service.

A p p e n d i x

PEOPLE INTERVIEWED & THEIR RANGE OF CM EXPERIENCE.

Don Rushforth, INSOLVENCY SERVICE.
2 in-house projects, 1 new build, 1 refurbishment.

Bill Heath, RANK XEROX (LATER CBX).
Office / research facility; fit-out after D&B for shell and core (this route agreed with CM).

Charles Johnston, J SAINSBURY PLC.
25 CM projects finished; 15 under way.

Phil Kirby, BRITISH GAS PLC
About 6 new build and fit-outs done; others now under way; plus previous Broadgate experience.

Peter Rogers and Paul Lewis, STANHOPE PLC.
Broadgate, Ludgate and Stockley Park; 20 plus buildings.

Eric Gabriel.
National Gallery extension, Glyndbourne new opera house.

Barry Horrell, LYNTON PLC.
3 projects.

Chris Strickland, Julian Vickery, GREYCOAT PLC.
3 CM projects.

Dr Bernard Rimmer, SLOUGH ESTATES AND BRODERO.
4 major CM projects and many minor with Slough Estates; 6/7 major projects with Brodero.

David Williams, BAA PLC.
5 plus CM projects.

Liam Bond, MARKBOROUGH PROPERTIES PLC.
1 current project; Broadgate and Ludgate previously.

Peter Cannon, BRITISH AIRWAYS PLC.
4 major CM projects