



Construction Project Management Skills



Construction Industry Council

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Foreword

Procuring the built environment is a complex process that brings together many players who provide many different contributions. The whole process has then to be prioritised into a logical and rigorous sequence of decision making and delivery so that the end product will achieve the desired quality and level of service, delivered on time, and within the cost constraints of the business plan.

Comprehensive, informed and inclusive project management is the principal 'means' to ensure the 'ends'. Accordingly, the Construction Industry Council's (CIC) first publication in 1996 "Project Management Skills in the Construction Industry" provided a benchmark for the function of project management and soon sold out!

Logic, an important part of project management, could have suggested a reprint, but on consideration, it was felt that much had changed in construction in the intervening years and aspirations had risen so that the whole content should be revisited.

The aims of this latest report remain the same:

Raising standards of project management by setting standards of competence to enable continuous improvement; helping the client choose the appropriately competent project manager for their particular project; recognising the complex interactive nature of the industry and the need for coordinated project management through all levels, between all parties and throughout the process, from briefing to post occupancy evaluation and beyond.

This new taskforce has convened under Dr Stephen Simister nominated by the Association for Project Management. Under his leadership an experienced group, from a wide cross section of CIC members from across the industry, has produced this up to date publication. This new report embraces the many issues raised in "Rethinking Construction", particularly that of achieving an integrated supply chain.

The working party has thoughtfully produced a report which takes a sound and complete overview of project management in the construction industry. I have no hesitation in commending it to CIC members, the industry at large and our clients. It compliments the CIC's other recent "Guide to Project Team Partnering" and reinforces the absolute need throughout the industry for sound project management.

On behalf of CIC, my thanks for the considerable contributions to this report from the experienced and knowledgeable taskforce.

Michael Dickson,
Chairman of the Construction Industry Council

There is no doubt - project management will make or break a project. It is the most important single factor in delivering the right buildings, on time and on budget.

But, despite enormous strides over the past two or three years, project management still needs to make significant improvements. And that goes for both client-side and supply-side.

One of the keys is working together. There is a wealth of talent and experience within client organisations and among consultants and contractors, in both private and public sectors. The challenge is getting them working effectively together - pulling on the right resources for each job.

At NHS Estates we are currently going through a PPP process which, we believe, will achieve just this. Our pool of health sector expertise is second to none. But certain gaps existed in project director skills. The private sector partner, that will join us in forming Inventures, will bring plenty of these skills.

Combining specialist health sector knowledge and core construction project management skills will provide health clients with a formidable combination.

As well as teamwork, training and qualifications sit at the heart of this process. As part of Procure 21, we're putting our people through intensive training including developing a health-sector specific NHS project management course tailored for the specific needs of health buildings.

I cannot overstate how important it is to get project management in construction right, not just for clients and the industry, but ultimately for those who have to pay for and use the buildings we develop. I am confident this guide is a significant contribution to this outcome.

Kate Priestley
Chief Executive of Inventures
(former Chief Executive of NHS Estates)

Introduction

Project management has a strong tradition in the construction industry and is widely used on projects of all sizes and complexity. Even so, many projects do not meet their required performance standards or are delivered late / over budget. These issues can be directly addressed by raising the standards of project management within the construction industry and more specifically improving the skills of project managers.

Purpose of construction project management

The purpose of project management in the construction industry is to add significant and specific value to the process of delivering construction projects. This is achieved by the systematic application of a set of generic project-orientated management principles throughout the life of a project. Some of these techniques have been tailored to the sector requirements unique to the construction industry.

The function of project management is applicable to all projects. However, on smaller or less complex projects the role may well be combined with another discipline e.g. leader of the design team. The value added to the project by project management is unique: no other process or method can add similar value, either qualitatively or quantitatively.

Purpose of the guidelines

These guidelines build on the success of their predecessor, *Project management skills in the construction industry*, published by Construction Industry Council (CIC) in 1996. There has been a recent ground swell within the construction industry for improvement in all areas of its activities. Many of these improvements are highlighted in "Rethinking Construction" and in the ongoing work of cross industry representative bodies such as the CIC. Project management is a process which runs throughout the construction life cycle and so touches all associated activities. Recognising that project



management is such an important component of the construction process the aims of this document are:

1. To raise the standards of project management in the construction industry by setting objective standards of competence and encouraging their usage.
2. To help clients choose a project manager who has attained the required competencies at an appropriate level for the type of project or stage in the project.
3. To assist project managers to identify the competencies they need to develop and maintain continuous improvement and a CPD profile.
4. To recognise, in setting out the competencies, that the construction industry is fragmented leading to project management being performed at a number of levels.
5. To continuously improve the project manager's exercise of core competencies and to broaden their understanding of the competencies required in all the stages of development.

Structure of the guidelines

To meet all of the five aims set out above, the document is set out as follows:

- A list of the skills required throughout the life of a project has been compiled. These skills have been grouped together into 5 topic areas: Strategic, Project Control, Technical, Commercial, Organisation & People¹.
- The guide recognises four levels of project management which are generally identified by the manager who has the principal input at each level, these are:

Project Manager:	Overall Project Management
Design Manager:	Project Management of the Design Process
Construction Manager:	Project Management of the Construction Process
Trade Contractor Manager:	Project Management of Specialist Subcontractor/s

- The skills have been broken down into two components and defined as:

Competence:	been in receipt of particular training, fully conversant with systems and issues, practised on a regular basis.
Awareness:	the knowledge and understanding obtained from formal education and technical reading and exposure to the techniques as they are practised by others.

Nature of project management and the construction industry

At its widest, project management embraces:

- defining the business need;
- producing a delivery strategy;
- briefing;
- evaluating the risks and their mitigation
- managing the design of the solution;
- procuring resources and skills to deliver the solution;
- controlling cost, quality and timing of the delivery; and
- commissioning and accepting the solution to the business need.

These are all underpinned by effective communication throughout the process and require an awareness or competence in the skills which are set out in Figure 1. (see page 4)

Figure 1 takes cognisance that the nature of the construction industry is such that although project managers may gain an awareness of all these skills, a working lifetime is too short to gain the competence that comes through practice in all of them. For instance:

- A project manager in a client organisation or acting on the client's behalf will require an awareness of all the skills with competence in most of them, particularly the strategic ones.

¹ These topic areas are broadly in line with the APM's Project Management Body of Knowledge 2000 edition

- A project manager leading a delivery team and deciding how to deliver the project and controlling delivery can have a lesser awareness of the strategic skills.
- The design manager needs competence in briefing, design and procurement and controlling, but an awareness of the strategic and implementation skills.
- The construction manager needs competence in procurement, controlling delivery and commissioning, with an awareness of design and briefing skill areas.
- The trade contractor's competence will need to be in procurement, control and commissioning in a similar manner to the construction manager.

The term Project Manager is widely used but not always in an appropriate context. In this document it is used to describe the person being responsible for the delivery of a project to a client and having the requisite authority to make strategic decisions as required.

		Strategic					Project Control					Technical				Commercial			Organisation & People							
		Strategic planning	Value management	Risk management	Quality management	Safety, health and environment	The Project control cycle	Developing a schedule	Monitoring	Managing change	Action planning	Client / Project interface	Information management	Design management	Estimating	Value engineering	Modelling and Testing	Configuration management	Business case	Marketing and sales	Financial management	Procurement	Legal issues	Organisation structure	Selection of project team	People issues
Project Manager	Competence																									
	Awareness																									
Design Manager	Competence																									
	Awareness																									
Construction Manager	Competence																									
	Awareness																									
Trade Contractor Manager	Competence																									
	Awareness																									

Figure 1: Required skills for varying types of project management

1. Strategic

Project management is concerned with change; managing the process of moving from one condition state to another. In the context of construction this will often mean the production of a building although it can also mean refurbishing existing buildings or changing their use from say warehouse to homes. In some cases the construction project can be the embodiment of a business's corporate strategy e.g. when a supermarket chain sets out to increase market penetration.

A construction project needs to be managed at a strategic level within the client organisation. The project manager should consider the level of support the client needs by evaluating the Client's requirements, objectives and available in-house resources and expertise. From this the role of the project manager can be determined.

The establishment of a strategic framework enables the project to be efficiently and effectively managed. Almost all the topics in this guide have a strategic element. The topics that have been included in this section are those that most obviously affect the strategic definition of the project.

Topics covered in this section are:

- *Strategic planning;*
- *Value management;*
- *Risk management;*
- *Quality management; and*
- *Safety, health and the environment.*

Strategic planning

At the strategic level the project needs to be closely integrated with the client's business and the project objectives set accordingly. Whilst these are normally stated simply in terms of time, cost and quality a more detailed interpretation of the client's objectives needs to be provided to guide the project team.

The documentation of the project's objectives is a key document and is typically termed a "Project Management Plan"². The term "Strategy Plan" and "Project Execution Plan" are also used.

The Project Management Plan is the baseline tool which should be used as a reference for managing the project. The project manager should be responsible both for its production and control during execution. The Plan should include a definition of overall objectives, statements on how these should be achieved (and verified), estimates of the time required and the budget, quality policy, Health, Safety and environmental policies, and risk management strategy. Other items of a technical, commercial, organisational, personnel or control nature may also be included. As part of the Plan approval gates are often set through which the project must pass in order to progress to the next phase.



² For an example of a Model Project Management Plan see BS 6079 Part 1.

Project manager's skills for this topic:

- Demonstrate an appreciation of the process of developing and testing the Project Management Plan and of defining the project organisation that delivers the project.
- Demonstrate specific knowledge of the purpose, content and presentation of the project brief and the Project Management Plan, and experience in managing their preparation and implementation.
- Understand the issues that should be covered in a Project Management Plan including the project organisation, the brief, the procurement strategy and the procedures for managing risk including:
 - Approvals procedure;
 - Levels of authority;
 - Master schedule;
 - Financial controls – change and cost;
 - Project handbook – procedural framework;
 - Health and safety;
 - Commissioning / handover; and
 - Move management.
- Understand the business drivers on which the project is based and the aims and objectives of the Client against which the success of the project will be measured; assist in the development of a business case.
- Appreciate any constraints and their impact on the project including client, statutory, legal, environmental, schedule, budget etc.
- Recognise priorities and the need to continuously test the project against them in order to achieve the project objectives.
- Understand aspects of commercial funding such as arrangement, limitations, constraints, level of funder's involvement, required documentation, drawdown, commercial returns etc.

Value management

Value Management is concerned with the broader optimisation of strategic issues, generation of alternative courses of action and assessment of options. It refers to the overall process of identifying key issues and setting targets in terms of success criteria; identifying the teams and processes necessary to achieve those; and reviewing these throughout the project to obtain successful results. Increasingly, value management is seen as a method which allows a brief and scope of work for a project to be defined.

Project manager's skills for this topic:

- Draw on specific knowledge of the means of defining and maintaining a vision statement for a project.
- Understand the processes of developing, documenting and maintaining the project brief as an accurate and comprehensive statement of the client's requirements.
- Demonstrate a comprehension of the project through an understanding of the business needs and ensuring that they are properly reflected in the brief as it develops.
- Draw on the knowledge of procedures for authorising and recording changes to the brief.
- Demonstrate specific knowledge of the format and content of a typical brief and appreciate the need for an ordered definition of the scope of work for a project and of the techniques that are used to develop and maintain this definition.

Risk management

Risk Management covers the process of identification, assessment, allocation and management of all project risks. In project management terms, risks are those factors that may cause a failure to meet the project's objectives. Project risk management recognises a formal approach to the process as opposed to an intuitive approach. Risks, once identified, assessed and allocated should be managed in order to minimise or completely mitigate their effect on a project. Risk management should balance the upside opportunities with downside threats, doing so in an open, clear and formal manner.

Project manager's skills for this topic:

- Appreciate the project perspective of risk and orchestrate a risk management strategy for implementation by the team and manage the team's involvement in identifying risks.
- Identify key risk stages and facilitate risk workshops at appropriate stages throughout the project.
- Demonstrate an understanding of the nature and origins of the potential risks to a project and their various sources.
- Demonstrate experience and competence in selecting appropriate procurement strategies and in relation to the chosen strategy managing risk allocation, setting of contingencies and monitoring implementation.

Quality management

Quality refers to more than just technical performance and applies to everything in Project Management. Quality Management covers Quality Planning, Quality Control and Quality Assurance.

Project manager's skills for this topic:

- Understand the process of Quality Planning which involves the preparation, checking, and recording of actions that are necessary to achieve the standard of product or service that the customer and legislation requires.
- Understand the process of Quality Control and assist in developing a set of processes for planning and monitoring the project to ensure that quality is being achieved.
- Assist in developing a Quality Assurance system for the project and develop a set of processes and procedures required to demonstrate that the work has been performed according to the quality plan.



Safety, health and environment

Safety, Health and Environment involves determining the standards and methods required to prevent accidents to people and to minimise the likelihood of damage to equipment, property, or the environment.

Health and safety is not just about complying with legislation, it is also about good practice. Just as the project has to be planned so does health and safety; a safe site is no accident. Engendering a health and safety culture within a project provides direct benefits and will promote better project performance.

Project manager's skills for this topic:

- Assist in determining the level of safety, health and environmental standards considered acceptable by the public, the legal system, users and operators, and others for the project.
- Assist in ensuring that these standards are respected and achieved in operation, and reviewing them to ensure their continued validity.
- Appreciate the legal and corporate environmental control and reporting procedures required for the project, especially under the CDM and Health & Safety regulations.

2. Project Control

Project control is about understanding the end goals, establishing a baseline, and undertaking progressive pro-active cyclical reviews of the project. This is done through determining the project scope, establishing a schedule, carrying out timely reviews and preparing and delivering action plans that will reflect trends and changes to scope.

The Project Manager should monitor the project against its baseline plan and Key Performance Indicators.

Topics covered in this section are:

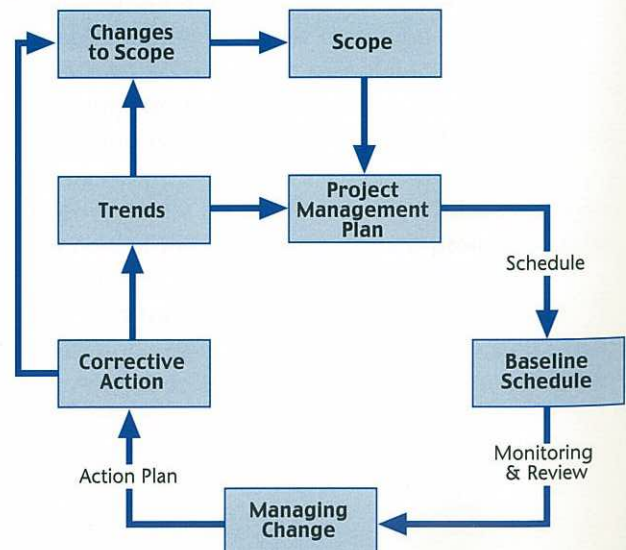
- *The Project Control Cycle;*
- *Developing a Schedule;*
- *Monitoring;*
- *Managing Change;*
- *Action Planning;*
- *Client / Project Interface; and*
- *Information Management.*

The project control cycle

This section includes many of the core tools traditionally associated with project management. A broad view of what is meant by control is taken. Planning, measuring, monitoring and taking corrective action are all usually included in the control cycle. Effective planning determines how the project is to be approached. Monitoring and reporting then relates actual performance against these plans. Action may be needed to ensure performance is maintained. Re-planning may be necessary to ensure the project is accomplished successfully. All these together constitute control. The heart of a planning and monitoring system is prediction and trend analysis based on reliable performance information.

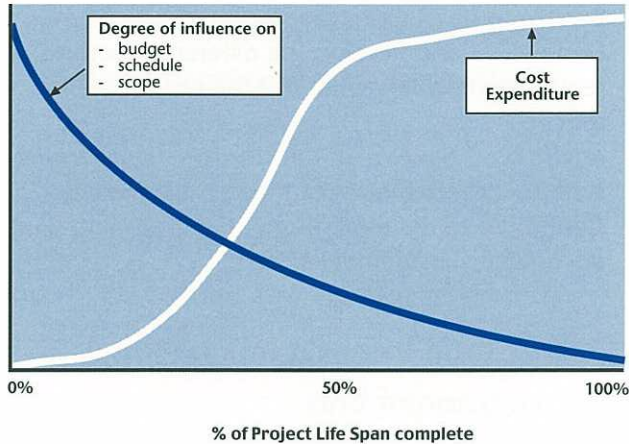
For the majority of projects the Project Control Cycle shown in Figure 2 provides a good model.

Figure 2: Project Control Cycle



Although project control is required throughout the full life of a project, its maximum influence on budget, schedule and scope is at the "front-end" of the project, and is of paramount importance in establishing a realistic baseline from which to work. As the project progresses through its life cycle and actual cost expenditure occurs the degree of influence that project control can have on budget, schedule and scope diminishes as shown in Figure 3.

Figure 3: Degree of Influence of Project Control



Developing a schedule

Having established a scope of work that the client is happy with it is practical to prepare a Work Breakdown Structure (WBS) to disseminate what work has to be done and in which phases of the Project. Against the Work Breakdown Structure is developed the project team resource schedule across all disciplines for the life of the project. This can be prepared through an Organisation Breakdown Structure that should incorporate all members of the project team.

Knowing the scope of work and resource availability it is now possible to develop a detailed estimate and schedule of work to meet the client requirements. This information provides the key items or key performance indicators to be measured against in the baseline Schedule.



Monitoring

On a regular basis, and very much dependant on project size and the timing within the project, proactive monitoring will be carried out against the list of activities within the Schedule. This can be carried out against known deliverables that should have been completed within the period, or percentage completions against targets expected. Earned Value Management, a mechanism of combining schedule and cost measurement, is a common tool to give an overall indicator for total project delivery.



Associate indicators such as Safety, Environment and Quality are also established and their effect on Project key performance indicators monitored.

Managing change

It is important to review the information arising from monitoring in order to establish the health of the project against the key performance indicators. If the indication is good, it is important not just to look at the overall picture but to check the period on period trends, the project could be slipping unknown to the project manager. All changes to scope, budget or schedule need to be recognised immediately and logged.

Action planning

To maximise the full impact of monitoring against the Schedule and logging the changes, it is imperative that Action Plans are prepared that include action to be taken, by whom, and delivered by when. The results will lead to corrective action being taken at the right time for budget, and schedule adjustments to appear as trends in the Project Management Plan or as a change in scope.

Trends that result in changes in the Project Management Plan, that don't exceed budget limits or overall duration, remain the responsibility of the Project Manager. Corrective actions that result in changes to scope that will exceed the budget and overall delivery time scales must be reported to the client immediately.

Client / Project interface

It is important that the client has adequate vision and receives good reporting on how their money is being spent. It is also important to understand how trends, scope changes and the management of risk are being handled. Good project control leads to good reporting and good working relationships with the client. 'No surprises' is key to making this work.

Information management

Projects generate and absorb significant quantities of information and it is important that the project has an effective information management system. Information management, which is broader than simply document management, covers the management of the systems, activities, and data that allow information in a project to be effectively acquired, stored, processed, accessed, communicated, and archived. There should be a valid audit trail of this communication process. Information distribution involves making needed information available to project stakeholders in a timely manner. It includes implementing communication management plans as well as responding to unexpected requests for information.

For project control the Project manager will require the following skills:

- Be able to prepare a work breakdown structure for the project.
- Be able to prepare an organisation breakdown structure for the project.
- Be able to prepare a project schedule.
- Produce a project control procedure for the project, including a communication plan.
- Understand the use of monitoring processes such as earned value management etc.
- Be able to develop a change control procedure.
- Understand and develop the different reporting requirements that clients and the project team require.
- Advise on the use of an Information management system, including computer based technology.
- Contribute to the establishment and running of a document management system.

3. Technical

Effectively managing the technical definition of the project can make an enormous impact on its potential success. This is usually true even of seemingly non-technical projects such as some organisational change projects: all usually involve some definition of what has to be accomplished and how things are to work. Generally the technical base is significant in terms of both size and importance.

Topics covered in this section are:

- *Design management;*
- *Estimating;*
- *Value Engineering;*
- *Modelling and Testing; and*
- *Configuration Management.*

Design management

Design management is concerned with ensuring that the right quality of building design information is produced at the right time and conveyed to the right people. The increased number of specialist designers and specialist subcontractors contributing to the overall package of design information required to practically realise a project has created the need for a defined approach to their direction and co-ordination with a new single point of responsibility. Design Management responds to this need and attempts to improve the efficiency of the design process and its integration with the construction process.

Estimating

In order to plan a project an estimate has to be made of the resources required for its undertaking. Estimating is concerned with quantifying the resources a particular aspect of a project will consume. The project manager should be capable of producing high level, indicative estimates during the early stages of a project e.g. during the conceptual stage estimates may be accurate to $\pm 30\%$.

As the project progresses the project manager will receive estimates from more immediate sources e.g. market testing of works packages. The project manager needs to ensure that the appropriate amount of money is spent producing estimates that match the stage the project has reached.

In terms of how the estimate is produced various methods exist which the project manager should be aware of:

- Approximate - Cost is quoted against the floor area of a building e.g. £1,500 per m².
- Functional - Cost is quoted against the use of a building on a unit basis e.g. £8,500 per school pupil.
- Elemental - Cost is quoted against major elements of a building e.g. £25,300 per upper floor.
- Schedule rates - Detailed breakdown for the performance of individual tasks e.g. £168.96 to hang a door.
- Bill of Quantities - Cost is quoted against detailed quantities e.g. £58.00 per square metre of one brick thick wall.

The above methods are based on a combination of empirical information from previously completed projects and market testing of current rates.

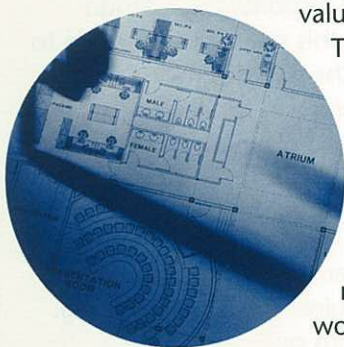
Value engineering

Value Engineering is the structured application of a series of proven techniques, during the concept and design (or formative) stages of a project which has not yet been implemented, to optimise the design. It

should be an integral part of the value management process.

The key to success is the structured approach, thorough preparation, emphasis on functionality (through formal function analysis), and arriving at results by teamwork in a workshop environment, resulting in ownership of the

proposals by the project team. The project manager will not be expected to lead the value engineering process but will take an active part in any workshops. Their role is one of clarifying the project strategy such that decisions made are based on common ground rules.



Modelling and testing

As part of the project strategy the level of modelling and testing required will need to be determined. Whilst high levels of modelling and testing will ensure that various components work and will fit together, this must be offset against the cost of undertaking extensive, even unnecessary work. The project manager should be aware of the various modelling techniques such as CAD clash detection and architectural model making.

Configuration management

The use of configuration management provides a means of tracking how the client's expectations generated at the beginning of a project are turned into a hard deliverable product at the completion of the project. The project manager should establish a configuration management system which integrates the work of all the consultants and contractors on the project.

The effective management of the technical base of the project requires the Project Manager to ensure that:

- the project's requirements are clearly stated;
- the technical base is elaborated with regard to the required quality, technical, safety, environmental and other standards;
- an appropriate technology strategy is in place;
- the design is value optimised;
- the work required is accurately estimated;
- implementation is effectively managed;
- testing of plans and consultant practices should be initiated from the outset; and
- hand-over is effectively managed.

4. Commercial

Construction projects are undertaken in order to provide some form of benefit to an organisation, invariably this will be financial. Traditionally the project manager would deliver a project to the required specification. In today's business environment they have to do more. The dynamic nature of projects means that the business benefits are reappraised throughout its life and the project manager must initiate any changes that may be required as part of this reappraisal.

Topics covered in this section are:

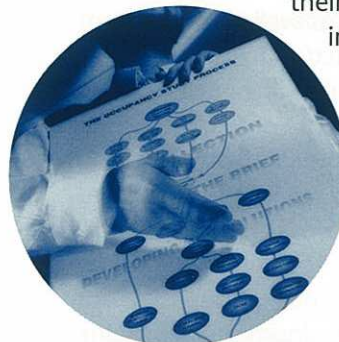
- *Business Case;*
- *Marketing and Sales;*
- *Financial Management;*
- *Procurement; and*
- *Legal Issues.*

Business case

The first step in the appraisal process is the business case developed by the client for the project. The project manager should be able to assist the client in defining the business case and provide strategic advice as to suitable alternatives. The Key Performance Indicators (KPI's) for the project will be set at this time. Many client organisations have a set of investment gates through which a project must pass to ensure that the business case is reviewed at various stages of the project life cycle.

Marketing and Sales

Marketing is the process of matching the abilities of an organisation with the existing and future needs of its customers, to the greatest benefit of both parties. The result is an exchange in which the organisation receives income through the meeting of customers' needs and customers receive benefits that satisfy their expectations. Project managers are often involved in the marketing process in that they are involved in securing new business for their employers. This activity, important in itself, can also interact with the way a project is conceived and conducted. Sales is the process of getting someone to buy the product or service being offered by the



organisation. Some project managers can find themselves having to sell services or products. This too can significantly affect the way a project is conceived and managed.

Financial management

Financing the project is normally the client's responsibility. The project manager should know, and be sensitive to, the impact of how the project is financed and the particular requirements imposed on the project by its financing. Particular attention is likely to be given to cash flow and to the value of early (or late) and/or on-time completion. Bonding requirements (financial, performance, etc) should be understood where appropriate. Currency fluctuations may be important where some or all funding is in foreign currency. Some understanding of the relationship between management accounting and project accounting/cost control is generally necessary.

Procurement

Procurement is the process of acquiring new services or products. It covers the financial appraisal of the options available, development of the procurement or acquisition strategy, preparation of contract documentation, selection and acquisition of suppliers, pricing, purchasing, and administration of contracts. It may also extend to storage, logistics, inspection, expediting, transportation, and handling of materials and supplies. It may cover all organisations within the supply chain. Procurement is normally the highest percentage of project expenditure and a procurement strategy should be prepared very early in the project. This will often stem from a policy defined externally to the project, for example the urgency of the project. It will also often be a function of the state of the project definition, and of the supplier market. The procurement strategy could include potential sources of supply, terms and types of contract/procurement, conditions of contract, the type of pricing, and method of supplier selection. The project manager will often be involved in the preparation and administration of contracts. As well as a firm understanding of the contract(s) themselves, especially standard forms, this will involve definitions of risks and their mitigation.

Legal issues

The project manager should have an awareness of the relevant legal duties, rights, and processes which govern in a particular project situation. Selectively there should be an awareness of the potential causes of disputes, liabilities, breaches of contract, means of resolving a dispute, and legal basics of industrial relations. The project manager should be particularly familiar with pertinent legislation such as the Housing Grants, Construction and Regeneration Act 1996.

In this section the Project Manager should be able to:

- Provide input on the preparation of a Business case.
- Provide presentations to potential clients in order to secure future work.
- Appreciate the principles of project accounting and cost control techniques.
- Demonstrate specific knowledge of the various procurement methods and related forms of contract that are commonly used to procure construction projects and of the characteristics and key differences of each in terms of control and risk allocation particularly in terms of client risk.
- Appreciate the issues to be considered in developing the project procurement strategy and of the format for the presentation of the strategy.

5. Organisation & People

For a construction project to be undertaken a reasonably complex temporary organisation has to be established which is populated by people drawn from a number of permanent firms. The project manager should be able to advise clients on the most appropriate way of establishing this temporary organisation. One of the most important issues to consider is the allocation of roles and responsibilities amongst the team members.

Topics covered in this section are:

- *Organisation Structure;*
- *Selection of Project team; and*
- *People Issues.*

Organisation structure

The project's organisation structure defines the reporting structures, processes, systems and procedures of the project. Issues typically important in the structuring of a project include the degree of project/functional orientation, the extent of the project management (office) authority, collocation of project members, the allocation of resources, work packaging and interface management, and the definition of control, authorisation and reporting procedures and systems.

When establishing an appropriate project organisation the project manager must be able to:

- Develop an organisation structure that delivers effective communication and robust teamwork particularly in respect of the organisational interfaces.
- Understand client organisations and external influences that may impact on the project.
- Show that the organisation is appropriate to the scale and nature of the project and reflects the strategy for procuring the project and the various contributors to it.
- Demonstrate specific knowledge of the characteristics of functional and matrix organisations.
- Demonstrate knowledge of the current methods of defining the structure of the project team and the roles and responsibilities of individuals within it.
- Establish an organisation structure that is capable of managing the organisational interfaces, particularly between the client and the project team.
- Appreciate that all members of the project team, which should include the client, must understand the roles and responsibilities of the various parties and must communicate effectively in writing, drawings, conversation and formal meetings.

- Establish in conjunction with the client appropriate levels of authority for individual project participants.
- Understand the application of team building techniques to focus the project team on their common objectives.
- Demonstrate knowledge and experience of the processes of planning, organising and recording team meetings and formal reviews.
- Appreciate the role that briefings, review meetings, formal progress meetings and personal communication play in the management of the team.
- Understand the techniques that are commonly used to direct the day-to-day work of design and construction teams.
- Demonstrate practical experience in applying management principles to the implementation process.
- Understand the purpose of formal reviews in measuring the team's progress against defined performance criteria.

Selection of project team

The fragmentation of the construction process means that the project manager is involved in putting together a team invariably drawn from a large number of organisations. Some of the key points for consideration are set out below. This list is generic in nature and can be applied to any appointment including that of the project manager.

Method of selection

Selection is by its nature a competitive process. For the majority of projects a two stage approach is generally used where organisations are invited to offer *expressions of interest* in the project. From this large list approximately 3-5 organisations will be invited to tender for the work. The principle procedures are:

- Interview - generally the preferred method.
- Fee tendering - based on quality and price.
- Competition - principally used for choice of architect.

Having considered which of these procedures is appropriate the names of firms may be chosen by:

- Personal experience.
- Private recommendation.
- Advertising - e.g. to satisfy EU directives.
- Nomination by Professional Institutions' Client Advisory Service.

The major criteria by which the client should select the project team will be influenced by the nature of the project - but consideration should include:

- Experience of similar projects.
- Management process and procedures.
- Size of organisation and geographical location.

People issues

In this topic the softer side of project management is dealt with. It is widely recognised that the project manager is the focal point for the team. In this aspect there is a number of roles to perform:

Communication

The ability to communicate clearly with all those associated with a project whether in the client's, the designer's, the contractor's or other supply chain organisations is the most important skill that the project manager needs. The project manager needs to be trained in effective thinking and communication and must be able to establish clear lines of communication throughout, often extremely complex, project networks.

The project manager needs to be focused on the project objectives and progress against these objectives must be communicated regularly, clearly and accurately by line managers to the project manager and then by the project manager to the client as well as to other organisations.

Therefore the project manager must put in place a schedule of reporting activities to ensure satisfactory achievements of project objectives. These may involve regular meetings, written reports, conference meetings, calls or virtual reports and meetings. The project manager must be experienced and comfortable using any media.

The project manager must understand and be able to communicate to the team and others the importance of clear presentation of accurate and relevant information. In receiving progress reports a project manager must be satisfied that information received and acted upon is accurate and up to date.

Communication is also linked to motivation and the project manager has, at the outset, to understand the objectives of the project, the commercial value to the client and the value to all parties in participating



in the delivery of the project. The motivations of all those involved in a project may be established by a variety of methods and it is the project manager who needs to ensure that the appropriate methodology is adopted to facilitate stakeholder dialogue. It is crucial that, if not trained in personnel issues, a project manager does not assume a level of competency in any matter to do with people and is able to search for and deploy staff with the required skills and training for the tasks needed.

Negotiations and conflict resolution

The project manager plays a pivotal role in maintaining the project's momentum. This is done by managing the interfaces between all parties to a project and also within the team so as to ensure continually productive relationships.

The establishment by the project manager of the drivers and objectives of all parties to the project is an essential first step in understanding the motivations of the parties, anticipating conflicts and managing disputes.

The project manager must, in consultation with key project personnel, assess the impact on the project of likely disputes, possible solutions have to be developed to mitigate the impact of these conflicts and seek to resolve conflicts at the earliest possible opportunity.

Communication with the client and all key stakeholders of the project is particularly important at times of conflict. A level-headed and practical approach to conflict resolution must be adopted by the project manager. If the project manager does not feel they possess the skills required effectively to resolve conflicts, then external expertise must be brought in as this is an area where a professional experienced approach could make the difference between success or failure of a project.

Teamwork and leadership

The project manager's role in the team is two fold the first as a team member and the second as a team leader. For the first, the project manager must be able to understand how to establish the skills required for the delivery of the project objectives. They must be able to identify sources of expertise and how to mobilise these for the benefit of the project. For this the project manager must understand the drivers and objectives of all key individuals on the project and be able to use theories of team building and motivation for the benefit of the project and its stakeholders.

The project manager must also be able to help the team, as a facilitator or communication manager, to achieve its objectives. This involves a general understanding of how the construction industry operates and the roles and responsibilities of all parties. To do this requires sufficient technical knowledge to understand generally the proposed method of working with the client and the proposed method of construction by the contractor.

As a team leader the project manager must be able to command a level of leadership and respect from all parties to the project. They must demonstrate an understanding of their role as primarily a facilitator and catalyst for the achievement of the project objectives. Clear communication with the team and the ability to brief the team members on their roles and responsibilities is essential. The project manager must be able to draw on previous experience of project and team leadership while maximising benefit to all participants.

Personnel management

Personnel management is commonly not a natural ability. However, project managers are often expected to carry out the role of personnel manager without further training. For a project manager to be successful in this role they must understand the drivers of all their team members and how these may be achieved within the context of the project and endeavour to build productive relationships with all key members of the project team.

The project manager must also be able to demonstrate an understanding of the basics of human resource (HR) management and be able to draw on the experience and skills of others for support in this function. Laws and regulations, particularly the new Human Rights Act, Equal Opportunities Guidelines, health and safety and employment regulations all have significant impact on construction and the methods of working. The project manager must be familiar with the basic principles of all the relevant rules and regulations and must be careful to consult with experts when needed.

The project manager must also have a clear vision of responsibilities for the training and development of personnel concerned. If this falls within their responsibilities for the project, then they must be able to demonstrate experience in identifying the team members' training needs, whether through training reviews or appraisals, and taking necessary actions to facilitate this training.

End Piece

The skills required of a project manager have been presented within each of the five sections Strategic, Project Control, Technical, Commercial, Organisation & People. Complementing these skills are a wide range of attributes the project manager should also possess. An indicative range of these multi faceted and changing attributes are summarised in the Attitudes, Skills and Knowledge (ASK) analysis shown in Figure 4.

Attaining higher standards of project management is a pre-condition to raising the status of the construction industry and its reputation for delivery to specification, cost and time.

The creation of a building or project is a series of business to business transactions and the standard of management at each step must be improved. Each business wants certainty of outcome and wants to trust in those who are delivering the project or part of the project. Project managers will bind these businesses together.

Clients can be confident that their projects will be successful if they select project managers who have the competencies and understanding appropriate to their position in the supply chain. This document states those competencies and gives the client a framework which they can apply to their own projects.

As economies develop, the differential between one firm and another, one country and another will be the ability of their people. So the construction industry must invest, and, with their clients, demand investment in developing improved levels of competence and new skills.

ATTRIBUTES OF A PROJECT MANAGER – A.S.K. ANALYSIS			
Stage of Project	ATTITUDE (State of mind or emotional condition)	SKILLS (An observable behaviour or input)	KNOWLEDGE (An understanding or underpinning grasp)
Project Definition	<ul style="list-style-type: none"> • Open minded • Supportive • Interested • Professional • Searching • Empathy with stake holders • Receptive • Patient 	<ul style="list-style-type: none"> • Analytical skills • Decision making • Listening • Reflection • Communication • Leadership 	<ul style="list-style-type: none"> • Construction Techniques and timescales • Commercial knowledge • Business knowledge • Industry knowledge • Systems knowledge • Development Knowledge • Regulatory processes • Client requirements and briefing • Cost management • Project scheduling • Selection of designers • Procedures
Concept	<ul style="list-style-type: none"> • Receptive and enthusiastic • Comprehensive and thorough • Empathy with the design team's aspirations aims and objectives • Clarity of purpose 	<ul style="list-style-type: none"> • Lateral thinking • Cost and planning skills • Negotiation • Assist decision making • Ability to formulate strategic project schedule • Listening • Organisation • Leadership • Planning 	<ul style="list-style-type: none"> • Researched subject knowledge • Commercial knowledge • Design team contracts • Building regulations • Buildability • Cost planning • Design agreements and sign off • Project scheduling • Client processes
Design	<ul style="list-style-type: none"> • Supportive but practical • Comprehensive and thorough • Empathy with the design process through the different design stages • Attention to detail 	<ul style="list-style-type: none"> • Presentation skills • Communication skills • Negotiation • Cost and planning skills • Reviewing • Checking • Identifying needs, reflecting back the short comings and offering solutions • Technical skills 	<ul style="list-style-type: none"> • Design constraints • Construction constraints • Buildability awareness • Procurement options • Technical competence • Project stages • Value engineering • Trade contractor design and procurement
Procurement	<ul style="list-style-type: none"> • Analytical and interrogative • Delivery orientated • Empathy with the trade contractors and the process for procurement • Persistence 	<ul style="list-style-type: none"> • Imagination • Skills to seek gaps • Communication • Negotiation • Attention to detail • Cost and planning skills • Organisation • Identifying interfaces • Technical skills 	<ul style="list-style-type: none"> • Contractual knowledge • Commercial knowledge • Technical knowledge • Time management • Trade contractor capabilities • Packaging strategy
Construction	<ul style="list-style-type: none"> • Pragmatic and realistic • Comprehensive and thorough • Delivery orientated • Empathy with the construction Process and technical difficulties • Durability • Persistence 	<ul style="list-style-type: none"> • Organisational skills • Communications skills • Negotiating • Lateral thinking • Attention to detail • Organisation problem solving • Dealing with people • Time management • Negotiation • Leadership 	<ul style="list-style-type: none"> • Planning • Scheduling • Practical knowledge • Technical knowledge • Construction techniques • Package scope review • Project Management procedures • Change control • Element and product technical Requirements • Client aspiration • Team capability
Handover / Operation & Maintenance	<ul style="list-style-type: none"> • Meticulous • Fastidious • Comprehensive and thorough • Empathy with the stakeholders and end user requirements • Attention to detail • Determination 	<ul style="list-style-type: none"> • Organisational skills • Communication and negotiating • Identify key issues • Attention to detail • Dealing with people 	<ul style="list-style-type: none"> • Practical knowledge • Contract knowledge • Technical knowledge • Project history • Client brief signed off as delivered • Technical requirements • Client processes

Figure 4: Attributes of a Project manager - A.S.K analysis



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