

# Project planning and challenges facing planners construction essay



**ASSIGN  
BUSTER**

This chapter will review the literature which has been used for this dissertation. A number of important aspects will be covered, including an overview of Construction Planning as well as determining what challenges are faced on a daily basis by construction planners. This chapter will also review research relating to Planning techniques used and software packages available within the Construction industry.

## **2. 2 Construction Project Planning**

Project Management can be seen as the application of tools and techniques utilised to guide the use of resources towards achieving an intricate task within the constraints of time, cost and quality. From conception to completion, a mixture of these tools & techniques is necessary to fit the task environment and project life cycle.

(Oisen 1970).

The British Standard for project management (BS6079 1996) defined project management as, “ The planning, monitoring and control of all aspects of a project and the motivation of all those involved in it to achieve the project objectives on time and to the specified cost, quality and performance.” The UK association of Project Management (APM) have produced a UK body of knowledge UK (BoK) which also provides a definition for project management as “ The planning, organisation, monitoring and control of all aspects of a project and the motivation of all involved to achieve the project objectives safely and within agreed time, cost and performance criteria. The project manager is the single point of responsibility for achieving this.”

Project Management as we know today has evolved in order to plan, coordinate and control the complex and diverse activities of modern industrial, commercial and management change projects. (Lock 2007)

To allow for effective planning and control of projects, a requirement for systematic and logical methods should be applied along with proven techniques, thus ensuring a successful project outcome for all concerned parties, particularly the client. Without planning it is difficult to envisage the successful conclusion of any project or the effective control of time, money or resources. Planning is also essential in order to deal with construction risks and devise safe working methods. (Cooke 2008)

Project Planning is defined as the establishment of a set of directions in sufficient detail to tell the project team exactly what must be done, when it must be done and what resources to use in order to produce the deliverables of the project successfully. (Zwikael 2008). Construction planning is an essential and challenging activity in the management and implementation of construction projects. It occupies the choice of technology, the description of work tasks, the estimation of the necessary resources and durations for individual tasks, and the identification of any interactions among the different work tasks. Hendrickson (1998) believes a good construction plan is the basis for developing the budget and the schedule for work. It is therefore common to adopt a conspicuous importance on either cost control or on schedule control as illustrated in Figure 2. 1.

Fig 2. 1 – (Hendrickson. 1998)

Walker (2007) considers that by having a project schedule to work to and sticking to it, you will well be on your way to delivering successful projects. This would be dependant on effective communication and efficiency at all stages of the project and with an aim to reducing risk, time and cost.

## **2. 3 The Construction Planner**

Construction project planning is receiving growing attention as the limitations of formal deterministic planning are becoming more widely recognised. (Winch, Kelsey 2004). There is growing concern over the failure of construction planning to achieve its goals in spite of the considerable resources allocated to it. Deficient planning techniques are commonly blamed for this state. (Laufer, Tucker, 1987)

There has been considerable debate over the last decade or so on the effectiveness of construction project planning. However, there is remarkably little research into what construction project planners actually do.

Laufer and Tucker provide a critique of construction planning.

They protest that:-

the planning and evaluation of planning processes are non-existent

there is over-emphasis on critical path methods

planners lack construction experience

planners have poor information gathering methods

planning is control-oriented instead of action-oriented

<https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>

Plans are been poorly presented with overly-complex information.

In a subsequent paper (1994) Laufer and his colleagues look at the definition and allocation of planning work. They found that there was no clear system at work and planning was done in a multiplicity of ways. They call for the process to be properly co-ordinated by a single individual who will ' own' the planning process and improve communication. Winch and Kelsey (2005) believe the specialist planner has the time to do the work but incomplete practical knowledge. The line manager has the practical knowledge but does not have the quality time to carry out the task. The specialist planner has better strategic decision-making skills than the short-term decision-making focus of the line manager. They then go on to say " Line managers see the delegation of key decision-making to another as a threat to their position".

These problems are confirmed in Laufer (1992) wider project management study and can result in:

The planner preparing a plan which has incomplete information and inadequate decision making authority.

The line manager treating such plans as merely an irrelevant forecast prepared by another.

Allen & Smallwood (2008) believe Construction planners and the role they perform are little understood both within the construction industry and the wider environment where construction has a daily impact.

Planning occupies a central position in the functions of the manager. His responsibilities may vary with organisational philosophy and contingency but <https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>

planning invariably remains an essential ingredient of his duties. (Steiner, 1979). Much Research and Development effort has been made during the last three decades but progress with techniques has not removed the dissatisfaction with the application and results of construction planning (Choudhury 1981, Mason 1984, Morton 1983).

Effective construction planning demands that it is carried out by competent and experienced personnel. While the estimator must remain in charge or pricing the work, most contracts, today, are too complex for the estimator to handle the technical content of pre-tender appraisal. It is here that the construction planner has a major function.

## **2. 4 Planning Techniques**

Most planning techniques aim to express the work to be done, to a time-scale; some also include resources, and perhaps cost and value. In simple terms, they intend to help control time and cost. The other major factor in project control, quality, is controlled by its own family of control techniques; and quality is related to time and cost through the skill and judgement of the project management team.

Neale (1989) believes the major components of planning techniques are:

Activities: literally, being busy, expending energy, consuming resources, taking time; in construction planning, this means a job to be done; for example preparing a drawing, an order to be places, a hole to be dug, bricks to be laid in a wall, a flow of water to be diverted.

Activity durations: the time required for the completion of each activity

Project time-scale: the time structure of the project; it is usual to give each week in the project a number (this makes calculation easier), and these then have to be related to calendar dates, holidays, etc.

Event: an occurrence at a specific point in time; for example, the granting of planning consent, of the start or end of a traffic diversion.

Work method: the plan must be expressed in some logical way, indicating the sequence of operations, and which activities and events are interrelated; this may be implicit (as with bar charts) or explicit (in network analysis, where work method is usually called logic.)

Resources: often called the four Ms (men, machines, materials and money) but can include overheads (for example, site accommodation), and even such essentials as managerial skill.

Costs: what the work has or will cost, often derived directly from the unit costs of the individual resources.

Value: what has or can be earned by payment for work done derived from the bill of quantities, the estimate or an internal budget. The calculation of value-to-date can be used as an overall measure of project progress.

The following four techniques are often used in construction planning;

Bar charts,

Network analysis,

Line-of-balance

Linear programmes.

### **2. 4. 1 The bar chart/ Gantt Chart**

Drafting of a bar chart is popular because it produces results which are easy to understand and not too searching of the planner. Its use is limited to planning straightforward work with simple relationships between the activities. This graphical technique still forms the foundation for most resource scheduling. Its major drawback is that even minor deviations from it require extensive redrafting as a result making it more difficult to having to hand a contemporaneous bar chart that is a reliable indicator of future events.

The main features of the bar chart are as follows:

The activities are listed on the vertical axis

Time is shown on the horizontal axis. This may be an appropriate time unit, such as months or days.

Each bar is divided horizontally into two, with the top half representing when the activity is planned to take place, and the bottom shared in, as proportions of the activity are completed.

A vertical movable marker line indicates the current time, thus enabling the observer to note if any activities are behind programme, and to what extent.

Refer to Figure 2. 2 for additional information.

Figure 2. 2 – Typical bar chart



The format of the bar chart presumes that the end user (client) can involve the same judgment that was in the mind of the planner when he was compiling it. In highly repetitive or simple work it can be implied that the users will better understand the thought process of the planner. However as project complexity increases the user's ability to monitor the project in relation to the programme is reduced unless it is understood:

What work is important to progress?

Of the activities currently behind programme what, if any, effect do they have on overall progress?

On the contrary, if most of the actual work is ahead of programme, does this mean that the current prediction is that the project will be complete in advance of the targeted completion date? The answer is definitely not an automatic yes.

To provide an informed response, an understanding of the relationships between programme activities is crucial. Neale (1989) consider these deceptively simple questions contradict issues which are at the heart of many construction disputes, namely considerations for extension of time.

## **2. 4. 2 Network Analysis**

Unlike a bar chart, activities are not shown on an axis of time. What the network portrays is the logical relationship between activities. Network analysis is a powerful, logical and analytical technique. It is most effective when used for complicated projects, especially those with external constraints and complex interrelationships.

The technique is based on drawing the logical relationships between construction operations, and from an analysis of the relative durations, establishing which operations have the most crucial effect on the project duration. It can be drawn in a number of ways, the most well-known in the UK being the arrow diagram.

### Figure 2. 3 – Network diagram

The technique is sometimes known as the critical path method (CPM), and critical path analysis (CPA). A version which incorporates a statistical method for calculating the probability that a project will be completed on a specific date is called the programme evaluation and review technique. (PERT)

The identification of a “critical path” focuses the attention of the individuals managing the project and highlights to clients and their advisors the tasks that require to be particularly well managed with regard to time. The duration of critical path represents the shortest duration in which the project can be completed.

Delays to activities on the critical path transmit directly through to extend the project completion date. This provides advanced warning of the pending delay to completion and enables the contractor (or employer) to invoke recovery action at a useful point in time rather than waiting until it is manifestly obvious that the completion date is threatened. If the employer or his Architect/Engineer (A/E) instructs additional work which affects the activities on the critical path then the contractor has grounds for a claim for an extension of time. The term critical path is widely used in the construction

industry; what is not fully appreciated is how easily the critical path can change.

Figure 2. 4 – Network diagram showing critical path

Network analysis has a good and inclusive logical basis, lends itself easily to computer processing, and can be used as an effective control tool. These exceptional characteristics are also known to be its principal weakness as it is easier for the planner to be drawn into a level of planning and analysis that is much too detailed and advanced for most construction projects.

### **2. 4. 3 Line of Balance**

Line of balance is a specialised technique used for repetitive work. It derived from the manufacturing industry and has been found to be effective in planning work truly repetitive. Examples of success applications include planning the construction of identical floors in high rise construction, and large housing developments.

Line of balance has been found to be difficult to use on projects which have a high demand for trades or operations to construct each identical unit. The problems arise not from the technique itself, but from the difficulty of showing all the information on one chart, particularly when using the technique to monitor progress. When used to plan, it can be an excellent means of relating resources, activity durations and the general pace of work on site. Neale (1989).

Illingworth (1993) considers the line of balance approach has largely fallen out of use in today's industry due to the fact it was designed primarily for

housing and did not readily provide clear visual appreciation of the situation at a glance.

Figure 2. 5 -Typical line of balance diagram

#### **2. 4. 4 Linear Programme (or time-chainage chart)**

Linear programming is a specialised technique for linear work. This is a basic tool of UK road contractors. Other successful applications include the construction of a large canal in a developing country, and it is especially useful in tunnelling. Illingworth (1993).

Similar to line of balance, this is a simple two- dimensional graphical technique and can show clearly only a limited amount of information and limited degree of complexity.

Figure 2. 6 – Linear Programme (Neale 1989)

#### **2. 5 Which technique?**

The experienced planner in construction needs to be aware of the techniques available, together with the value of each, both in the planning analysis role and how then can be applied to give effective control and communication to management on site. Illingworth (1993).

Like any other professional, the planner has to select the right tool for the job. To make the correct decision, it is therefore a requirement to examine what is wanted in a particular situation programme. Illingworth (1993) believes the main points of this choice are as follows:

Does the method aid initial analysis of the situation and especially in establishing the best sequence of events?

Are deficiencies in progress shown up as the work proceeds?

Can visiting management obtain an immediate view of the contract situation on arrival on site?

With the preponderance of subcontractors on site today, does the programme method give assistance in cash flow control?

According to Illingworth, from these questions it is unlikely to be the answer to all desires. Therefore it is said to be better to consider the situation in two stages – tender planning on the one hand and the operational planning after the contract has been won, on the other.

## **2. 6 Planning Practice**

In order to explore further the reality of construction project planning semi-structured interviews were conducted between July and December 2000 with 18 experienced planners from five leading UK construction firms. Most of the planners interviewed were currently involved in planning at the tender stage including assembly and presentation of the tender documentation. About half of those were also involved at the tender/ pre-construction stage. Only a few were further involved during the site works. (Refer to figure 2. 7).

Generally, although a number of the interviewed planners had on-site experience the typical pattern is that a planner works either at the pre-tender, pre-execution stages or on site but not simultaneously. The exceptions tend to be where planners work for some time on a single large

project. In such cases it may make sense (from the employer's point of view) for their work to carry on to the execution stage.

Figure 2. 7 – Planning Practice, G. M Winch and J. Kelsey

## **2. 7 Programming Considerations at the Tender Stage**

Upon receipt of tender documentation, the contractor will appoint human resources tasked with compiling a tender submission based upon the tender enquiry. One of the main individual in this team is the person accountable for producing the tender programme, the construction planner. Whether or not the contractual terms require a programme to be produced or not should be irrelevant at this stage. The tender programme is an important document produced by the contractor which is used for measuring many risk and cost related issues. In particular, the assessment of cost of the contractor's time related preliminary items as drawn off the content of the tender programme. For example, the anticipated on site durations for different members of staff, periods of scaffold hire and duration for site accommodation are items that cannot be priced by the estimator without reference to the tender programme.

When compiling the tender programme, the construction planner must incorporate the information supplied with the enquiry noting any specified constraints contained in either the contract bills, specification or drawings. Conflict between documents often exists and a view had to be taken on how to proceed. Clarification may be sought from the employer or his agents, assumptions made and stated along with the submission or the conflict may

be ignored and the information that best suits the contractor is assumed without qualification or statement.

It is accepted in the industry that many bids are won or lost on the programme duration alone. This happens frequently where a bill of quantities is being priced and the experienced contractors tend towards similar prime cost for similar items.

On completion of reviewing tender documents, drawings, specification and bills, which may be typically done over a period of one or two weeks, the construction planner will establish the work scope which will be addressed in the creation of a tender programme. The main objective is to be aware of the specified period for construction. Additional to the completed programme should be a schedule of resources which corresponds with the programme and a series of method statements signifying construction techniques and equipment to be employed in carrying out the work.

## **2. 8 Programming on Site**

When the contract is won, the site planning is equally important. It is usually at this point that the site manager will have his first chance to examine the methods on which the job was priced. What is important to recognise, at this point, is that planning must be seen as an addition to management. Thus the site manager must have the right to question the planning methods on which the contract was priced. To do so, site manager's require the technical expertise to assess what has been put forward. In so doing, the manager concerned must, for his part, accept that if he wants to change the method from that in the priced tender, he must demonstrate that his alternative is

obviously cheaper, or at least as cheap, as that priced in the tender submission.

When final agreement has been reached, the planning function can be established on site and develop the final method to be adopted. This, in turn, will lead to the contract master programme and such subsidiary programmes as may be necessary.

On completion of all methods being confirmed the construction planner continues to have a significant role on site. First, in developing control and short-term programmes for all organisations contributing to the contract under the main or managing contractor. Second, the construction planner's cherished knowledge of how the work was originally planned makes him uniquely placed to examine the potential consequences of alterations to what has to be built. In this area he is a valuable source of information to the site quantity surveyor when assessing where possible contractual claims may arise.

Today, with the ever increasing use of trade sub-contractors as well as specialist service contractors, the experienced construction planner has the option of either seeing the role as satisfying its own right, or as an essential ingredient of experience for becoming a successful site manager. Illingworth (1993).

## **2. 9 Purpose of a Programme**

The values applicable to the mechanics of construction planning are similar whether you are a main contractor submitting a quotation to an employer, a sub-contractor quoting to the main contractor, or even a construction  
<https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>



manager providing programme assist to an employer. Common principles apply when compiling a construction programme, that of methodical analysis.

The contractor's construction programme is an important common reference. It shows how the planner they have interpreted the contract documents and other information from which the statement of intent for construction is issued. As the key programme for the construction work, its content is of the utmost significance to all parties charged with handing over to the employer a building fit for purpose within the contract time stated.

“ A well prepared programme is vital to every construction project. Many activities have to be cautiously defined and given a time scale, and it necessary not only to assemble and list the information but also to display it visually in terms of the contract's objectives and the calendar. The working sequences and the relationships between individual activities must be clearly conveyed in this visual presentation.” The Chartered Institute of Building (2001).

They consider the construction programme to be a statement of intended actions, which when properly used provides management with its plan of campaign. It should communicate with ease, providing the common reference for the timing of all activities related to the project.

## **2. 10 Construction Planning Software**

An expert planner faced with the task of producing and analysing a network for a project containing only few activities will undoubtedly produce the fastest results by drawing a freehand arrow diagram and analysing it  
<https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>

mentally. Lock (2007). He believes it is likely to take longer when using a computer because of the formalities needed to set up the new project files in the system and enter the data.

David Arditi and Ann Rackas compiled a short report in May of 1986 with an aim in ascertaining the need for computer software to assist in construction planning and scheduling. This report concluded, the individual needs of a given construction company are the primary reasons for choosing a particular software package. For example, one of the participating general contractor's basic requirements was to have a 40-character activity description field: " a particularly individual need".

They continued to suggest if a program is to survive the inevitable shakeout that occurs after the initial development and interest have peaked; it must offer the features and capacities that are required by the user. In addition, every effort should be made to make computers less mysterious and confusing as they will be dealing with the construction market.

Today there are many planning software packages available to the construction industry. Asta Powerproject, Microsoft Project, Primavera, PERT Master to name a few. Each package is commonly suited to the individual needs of the planner. Some programs present a blank Gantt chart on the screen as soon as they are booted up, and it is apparent to the user that task data can be typed in immediately.

Most programs allow the user/ planner to establish project durations, critical path network, allocate resources, assign costs to tasks and monitor progress

throughout the project. As a result, most construction planning professionals use such packages daily.

## **2. 11 Construction Planning Challenges**

Lock (2007) considers anyone planning a project of significant size will soon find out that there are a number of factors, both inside and outside the project organisation that can have an effect on the planner's intentions.

These are as follows:

### **2. 11. 1 External Factors**

Figure 2. 8 – External Factors (Lock, 2007)

All projects are subject to risk, many of which can have an enormous impact on plans. Lock (2007) deems the following are just four from the long catalogue of happenings that can be categorised as Acts of God:

An earthquake devastates a project organisations headquarters.

A hurricane and flood put a project site under a metre of water and delay the start or ruin the work in progress.

An influenza epidemic puts half the project workforce out of action. (Swine flu outbreak 2008 recorded thousands of people off work for over 5 days.)

The project manager (a keen golfer) is struck by lightning.

The national government can play an important part on the smooth running of a project. E. g. the project could be government-funded and is cancelled or abandoned through a political decision. Lock (2007) also considers less

immediate concerns which are the wider and longer-term economic consequences of government policy leading to downscaling of projects, delays and cancellations in all sectors of industry.

Decisions made outside the project team can also have an affect on many characteristics of planning. E. g. a decision is made at directorate level to carry out a project in a different company within the group from that initially anticipated or a strategic decision is made to cut short all new staff recruitment resulting in a lower number of available resources formerly expected to be available for projects.

## **2. 11. 2 Working Factors**

Figure 2. 9 – Working Factors

Lock (2007)

These are items which are likely to affect the project team on a daily basis. Examples include availability of resources, materials etc.

People are believed to be a construction organisations greatest resource. “ Construction operations depend on the knowledge and skills of people planning and executing the work”. Muir (2005.) Research has been carried out to reveal that the construction industry is typically viewed as being one of the least attractive industries in which to work.

Safety plays an important part in the running of a project. Construction by nature is unsurprisingly dangerous with a high degree of hazard and risk.

The Health & Safety Executive believe each year:

<https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>

Over 1 million injuries and 2.3 million cases of ill-health are experienced by workers;

Around 40 million working days are lost; and

Over 25,000 individuals are forced to give up work because of injury or ill health.

These cost British employers on average £3.3 to £6.5 billion each year.

Most organisations are oblivious of these figures and are often astonished to find out what the actual costs are.

### **Recent HSE Examples (2009)**

An injury to a worker using an unguarded drill cost a small engineering company £45,000. And that was not all. The managing director was prosecuted from which two employees had to be made redundant to keep the company afloat.

At the other end of the scale the Piper Alpha explosion killed 167 people and incurred estimated costs of over £2 billion.

Accidents in construction can account for 3 – 6 % of total project costs.

## **2.11.3 Contribution of effective Planning**

Figure 2.10 – Contributors of effective Planning (Lock, 2007).

Effective Planning and scheduling influences the results of a project as it promotes well-organised working. Personnel who are not trying continually to

overcome crises caused by bad planning can dedicate more time to achieving high quality standards. A well-planned project stands more chance of being completed on time and on budget.

### **3. 0 Methodology**

Based on the findings in Chapter Two, a questionnaire was compiled aimed towards Construction Planners, Project Manager's and other Construction Professionals. The questionnaire was developed in order to reach a significant conclusion on what is happening in the industry today, confirming what challenges are faced on a day to day basis and what can be done for improvement. The author contacted various professionals in the industry whom were contacted via Chartered Institute of Building website in order to get a mixed response. A letter was sent to each individual asking if they could spare time to answer 20 questions which were related to the research. The letter can be found in appendix. In addition, an online link to the questionnaire was sent to over 40 professionals in the industry, from which over 23 people took the time to fill it in. All results can be found in Chapter 4.

### **3. 1 Introduction**

The aim of this study is to analyse current planning techniques used within the construction industry and determine what influence the construction programme has in terms of project success. In order to achieve this aim, sufficient research has to be carried out. Research design is an action plan for getting from ' here' to ' there', where ' here' may be defined as the initial set of questions to be answered, and ' there' is some set of conclusion (answers) about these questions. (Naoum 2007.) Between ' here' and ' there' may be a found number of major steps, including the collection of analysis of <https://assignbuster.com/project-planning-and-challenges-facing-planners-construction-essay/>

relevant data. (Yin 1994.) Developing a successful strategy was an important step towards the collection of key research information.

### **3. 2 Research Strategy**

Research is the systematic and rigorous process of enquiry which aims to describe phenomena and to develop and test explanatory concepts and theories. Ultimately it aims to contribute to a scientific body of knowledge. (Bowling 2009.) There are two types of research strategies, namely, ‘ quantitative research’ and ‘ qualitative research’.

Deciding on which type of researc