

Assignment Title – The Importance of Cost Control

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BSC Quantity Surveying

Project Cost Management

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Contents

1.0 Introduction	3
1.1 What is Cost Control?	3
1.2 The Importance of Cost Control	4
1.3 Who is responsible for Cost Control?	5
2.0 Strategies & Techniques	6
2.1 Cost Planning	6
2.1.1 Benefits	7
2.1.2 Limitations	7
2.2 Budgeting	7
2.2.1 Benefits	7
2.2.2 Limitations	8
2.3 Resource Management	8
3.0 Cost Overrun Examples	10
3.1 – Example 1 – The Shard, London	10
3.2 – Example 2 – Crossrail, London	11
3.3 – Example 3 – Scottish Parliament	12
3.4 – Example 4 – London 2012 Olympic Park	13
Bibliography	14

1.0 Introduction

It is a known fact that many construction projects in the UK and Worldwide are renowned for delays and overruns, they begin with time delays which consequently result in huge cost overruns. This fact has tarnished the Construction Industry for years. Therefore, what can be done to address this issue and to reduce the delays and overruns?

In this report I will be investigating in to the projects that have overrun and looking into the pivotal reasons as to why this happened and to what extent the overrun took. Along with this investigation I will be proposing several methods that can be efficiently implemented early in the pre-construction stages of the projects in order to reduce the risk of time and cost overruns later in the project, along with the benefits and limitations they bring to the project in short term and long term. It is crucial in the construction industry that every member of the workforce on a project is aware of cost control and its importance.

1.1 What is Cost Control?

‘Pre-Contract cost control is the total process which ensures that the contract sum is within the clients approved budget or cost limit’
(RICS, 1982)

Or also defined as

‘Cost control is the practice of managing and /or reducing a projects expenses’
(Tobin, 2018)

There are strategies and techniques that have been introduced over time to try and get a hold on expenditure of projects,

“the objective of cost control is to manage the delivery of the project within the approved budget”
(Designing Buildings Wiki, 2018)

There is a process of cost control which is in the form of strategies and techniques that have been introduced and practiced on projects for years which monitor the viability of a project at the start, produce budgets, analyse value and expenditure and manage changes to the cost baseline in a construction project. The available strategies will be discussed further on in this report.
(Tobin, 2018)

Cost control is the most important terms in construction, if a project is going to overrun and come in over budget it comes with associated risk to the business as it then eats in to the profit margin. If Construction Contractors consistently complete jobs over budget and overtime, then the question must be asked as to what the point on building is if the finished product doesn’t provide a profit for the business. An example of where this has been proven is the collapse of the U.K. Based Construction company Carillion in 2018. A brief indication of this are as follows;

- A project of Midland Metropolitan Hospital in Sandwell, this project was a £350M project that was originally scheduled for an opening in October 2018, but difficulties with heating, lighting and ventilation systems have delayed until Spring 2019.
- Another example is the £335M Royal Liverpool Hospital, with a planned completion date of March 2017 but being repeatedly pushed back due to flaws in the construction.
- Finally, a project with the value of £745M Aberdeen Bypass which is a joint venture with other construction companies alongside Carillion, this was due to be completed and open by Spring 2018, but this was delayed because of slow progress in initial earthworks, within this the Environmental Watchdog sanctioned a £280,000 Fine on the consortium of companies for polluting two of Scotland's most important salmon rivers.
(BBC News, 2018)

This gives an indication of the importance of cost control within the construction industry, without it projects fail which later result in business' failing.

1.2 The Importance of Cost Control

From the examples above in Chapter 1.1, the importance of cost control is self-explanatory. Every project whether it be a small self-build or a multimillion-pound highway or hospital, should employ a cost control professional to ensure that the project is in control from day one.

Without adequate cost control procedures and cost managers or quantity surveyors in place who expertly manage the expenditure and prevent overspend, the construction manager and project managers have a free will to do anything in their power in order to get the project complete to a high standard without a second thought on the cost.

When cost control is implemented on a project, you begin by setting a limit for the costs of a project, so that these limits do not get exceeded which then result in every decision you make during the course of the project being guided by that limit, and the project managers and construction managers must be creative and organised to ensure that the project is successfully completed in parallel with that budget.
(Markgraf, 2018)

1.3 Who is responsible for Cost Control?

Although cost control is known by all construction personnel, most of the construction personnel on projects believe that this only lies with the Quantity Surveyors. When every construction worker who is associated with a project has the ability to control cost whilst also have the ability to affect the cost of a project. An example of how each member can help is listed below;

- **Quantity Surveyor/Cost Manager** – It is crucial to employ a single or even a team of QS' on a job dependent on the size of the project to ensure that costs are thoroughly controlled, in order to achieve the best results from employing this professional is to employ them as early on as possible to ensure that resource management is completed and a thorough investigation in to specifications and viabilities are done, along with this the QS will provide cost analysis, earned value management and expenditure control throughout the project life cycle.
- **Construction/Project/Site Manager** – The role of the manager vacant on the project is to manage everything from the time scale, resource management, material management. It is important that the individual in this role is trained and aware of cost control and is aware of the budget allowances for each element of the job. If the site manager is efficient in planning and an organised individual, they are able to plan and arrange labour, plant and material to coincide perfectly with the programme which will result in an efficient build without many delays. If the site manager is poor in resource management and bulk orders materials etc then it runs the risk of materials being stored inadequately resulting in damage, waste and even theft. In regard to labour being mistakenly called off when the element of work is not ready to be undertaken which then result in variations.
- **Engineers** – An engineer has the ability from early on in the design stage to have an impact on cost control and the overall cost of the project. A well-known term is Value Engineering where, designers and engineers coincide with each other to bring together a cost-effective design of the substructure of a building which will consequently come in within budget. This is crucial to get right, as many projects overspend on the substructure before they begin any structural framing or superstructure works.
- **Subcontractors and Labour** – Finally and as important as all the others the labour completing the works on site, in order to ensure that the works are completed within the anticipated budget it is important that the works are completed to the satisfactory standard first time around, in order to get this the site manager must ensure that the area of work is ready for the specific trade, and also that the tradesmen are to the standard required along with all relevant supervision throughout the process of their works on site to ensure that they are completing it to the highest level as required by the contractor and client. If inadequate supervision is in place, then this leads to faults and poor workmanship which in turn result in variations and cost overruns.

2.0 Strategies & Techniques

As mentioned previously there are pre-contract strategies and techniques that can be applied to construction projects to ensure that the final cost is known prior to commencement on site. These strategies are;

- Cost Planning
- Budgeting
- Resource Analysis & Management

2.1 Cost Planning

Cost planning comes in many different forms and can be done at different stages of the pre-construction phases.

“Cost planning is the technique by which the budget is allocated to the various elements of an intended building project to provide the design team with a balanced cost framework within which to produce a successful design”
(RICS, 1982)

Cost Planning links directly in to the design stages of the RIBA Plan of Works, and these can be done at different stage and should as the stages go on produce a much more robust and accurate cost plan to work off.

Cost plans produced at feasibility stage, these cost plans are usually no more than just indicative using a functional method of estimation which I usually based upon rates from previous projects or experience, these are very basic and only used in order to check if a project is feasible prior to the land purchase.

Secondly, Cost Plans at Outline Proposal Stage. At this stage there is more information available therefore the cost plan can be more than an indicative cost from a brief'. This form of cost plan is more informative for a client as it will provide details on cost targets for the main elements with approximate quantities. In order to produce an accurate cost plan at this stage it would be vital that outline drawings of the buildings and site works are made available by the architects, confirmation of a brief and any information from engineers related to the project.

Finally Cost plans at the scheme Design Stage. This is the final cost plan of the process, defined as, a statement of the cost of a selected design, which details the cost targets are for each element of the building together with quantity of specified materials. This cost plan will be a lot more through usually in the form of an elemental estimate at this stage, it may use preliminary quotations from subcontractors and/or rates from previous projects. This cost plan will then be agreed as a form of a budget approved by the client.

2.1.1 Benefits

A cost plan done at design stage is key to the overall project, as it would be a breakdown of the budget that a client is willing to spend, it then acts as a comparison for the tender of the project to ensure that the appointed contractors construct the project within budget and to the quality expected by the client.

2.1.2 Limitations

Although cost plans are vital in obtaining viable land and tracking the cost from the very start this is only beneficial if they are done correctly, if incorrectly then this can result in vast losses throughout the job. If there is a lack of information provided to the estimator, then the cost plan will be made up of assumptions or even missed creating gaps in the plan which later produce losses.

2.2 Budgeting

“The total client authorised by the client which is within responsibility of the design team” (RICS, 1982)

The budget will be set by the client team and then the estimating team will work within the design team to produce a design and cost plans that come in within the preliminary budget. The site budget will be set following the tender process, this is where quotes are obtained by the design team and the best value for money quotations are selected and fed into a budget. These budget figures will be elementally compared with the cost plan to ensure that it comes within the budget and payments will be drawn down against this.

In order to ensure that the agreed budget figure at the start of the job is the same as the final cost it is important that all designs and specifications are thorough and complete which will allow the contractors to price everything that is required, once returned it is critical that it is checked to ensure it is complete.

Once agreed a robust contract must be in place to legally bind the client and the contractor in order to ensure that the client gets the best deal a fixed price contract would be best suited to ensure that the agreed cost is the cost at the end of the project as it puts all the risk back on to the contractor.

2.2.1 Benefits

Benefits of budgets for cost control at pre-contract stage is that it highlights the cost of the project prior to any site commencement. It is critical for the client, for any funders and ideally for the contractor that a fee for the works is agreed at a contractual level to ensure the works are completed and a project is delivered on time, within budget.

2.2.2 Limitations

Limitations of this control technique is that if a project is tender on incorrect, inconsistent or lack of information then it can lead to gaps in the budget in the same way on which the cost plan would. This would leave the client open to risk as the subcontractors/contractors could come back requesting variations to the contract which could be charged at increased rates but could also result in overspend of the construction budget. Another limitation that would leave the client open to risk is the incorrect choice of procurement and contractual methods that can be used which would leave the client open to accepting of inconsistent pricing and overspend.

2.3 Resource Management

Resource management is a very important technique/strategy to use on projects that are highly complex and a fast-paced construction. Resource management requires a team of highly skilled and organised project managers to produce accurate construction programmes to ensure that resources can be managed in accordance with that. In order to avoid overspend resource management will be used by project management team to efficiently manage resources required to ensure the construction is completed on time and as a result within budget. Without adequate resource management, the projects can fall behind schedule and even risk becoming unprofitable.

The resources which are or should be included in resource management are;

- Labour
- Plant
- Materials
- Finance

In order to efficiently and effectively a resource management plan can be used. With this plan it can ensure that the resource is available for when the services are required on the project. It can also be used to optimise time, effort, cost, ensure labour with competent skill sets are available, identifies limitations and will assist in the reassignment of resource in response to criticism.
(Designing Buildings Wiki, 2018)

Labour

It is important to have a resource plan in place for labour on site as without the labour there will be very little to no progress complete on site. A project management team can't expect to phone up a tradesman appointed to the job expecting them to come and complete he works the next day therefore a plan must be in place right from the design stage and understood as to what needs to be done when and then from this will know as to when to book this labour in. In order to create an efficient working space for the labour resource the building must be ready for the tradesman to enter and carry out their work.

Plant

Again plant, whether this be excavators, piling rigs or cranes. They are usually on long call off periods and would need to be forward planned by the project management team to ensure that they fall in line with other activities on site. For example, a crane being booked in to coincide with delivery of roof trusses so that they are fitted which will reduce the requirement for storage areas on site.

Materials

Materials is a very important item of the resource management and it is important to ensure that the correct quantity is on site when its needed. This can go wrong and put the budget on a downward spiral. Usually project management teams will call off more than require as a 'just in case' safety net which then results in more materials than required laying around site, requiring more storage facilities which increase the cost, also if storage is unavailable then left out to the elements which can result in materials being damaged.

Resource management intends to assist in creating an organised project management team to have an efficiently running project that can satisfy the clients requirements on the quality, time and most importantly on the cost of the project.

3.0 Cost Overrun Examples

3.1 – Example 1 – The Shard, London

Example number 1, is probably one of the most famous modern-day skyscrapers in London. The shard towers over London at a staggering height of 309.6m (1,016 ft) and is a prominent feature of London's skyline. Designed by architect Renzo Piano based on the vision by Irvine Sellar they produced the vision of a vertical city to replicate a 'Shard' of glass later giving it the name of the Shard.

The design was to have the structure totally clad in glass. In order to build quickly the substructure was constructed using the top down method which simultaneously allowed the first 23 storeys to be build in tandem along with this other achievements were obtained on this project that consisted of the largest concrete pour, first use of a jump lift construction, first crane to be supported on a slip form in the UK and also the first inclined hoist used worldwide.

(Designing Buildings Wiki, 2018)

The construction itself was completed as follows;

- First 40 Floors in a composite steel frame
- Floors 41- 60 with post tension concrete frame
- Floors 61 – 72 traditional reinforced concrete frames
- Spire to 87th floor – prefabricated steel

Additionally, there were 11,000 panes of glass used to cover a total area of approximately 56,000m².

(Designing Buildings Wiki, 2018)

Therefore, you can tell from these impressive achievements that there was a lot of firsts happening on this project which without the proper expertise could have led to some major cost overruns. Alongside these achievements and the multiple methods of construction even the most experienced construction company would have had difficulty producing cost plans and pricing this project.

In terms of cost, Mace Group were successful in winning the tender for the construction of the shard with a quotation of £350M Fixed Price Contract. This would have been let giving the client piece of mind that £350M would be the full and final price. This eventually rose to a sum of £435M.

(Designing Buildings Wiki, 2018)

It is believed that due to difficulty in the Mechanical and Electrical elements of the construction the price had rose by £100M originally to £450M, but after value engineering this was reduced to the final price of £435M.

The original plan was to construct this skyscraper in a tight timescale of 38months which is optimistic for the scale of the building and being its first of its kind in the U.K. By the time The Shard had achieved practical completion it had been ongoing for 44 months. (Quora, 2018)

In order to achieve this optimistic timeframe, the appointed contractor Mace had the ambition to 'maximise prefabrication and off-site assembly, including 80% of the mechanical, electrical and public health services, and more notably the 500tonne, 66m high steel spire' (Mace Group, n.d.)

As mentioned above about the optimism in prefabrication this was a method of resource management, but unfortunately the unrealistic timeframe and the fast track build put stress on the build. In my opinion to have had a control on the cost of this project an accurate cost plan which reflected the method of build accurately and with the complete design information should have been in place prior to construction to ensure that the costs in the plan reflected what need to be completed. Along with this a thorough resource management plan with a team of project managers in charge of ensuring that the resource, materials and logistics were all in place when required.

3.2 – Example 2 – Crossrail, London

The above project is the Largest Construction Project in Europe, the construction of a new Underground transport system has been ongoing beneath the streets of London for almost 10 years as work began on the new railway in 2009. (Crossrail, 2018)

Crossrail is the construction of a new underground line known as Elizabeth line which will stretch 100km from Reading in the far west direct under the streets of London on to Shenfield and Abbey Wood in the East. Along with the construction of this new line, and tunnelling infrastructure there will be adaptations to the 41 existing stations to accommodate the new line and 10 new stations constructed.

As you can imagine the vast scale of this infrastructure project, the area on which its being constructed and the number of people involved with the project at different times, leave the project vulnerable and open to errors. In July of 2018, "Project Directors finally fessed up to problems and the project budget was increased from £14.8bn to £15.4bn" This is believed to be due to engineering and technical challenges associated with the tunnelling. (The Construction Index, 2018) . After this was announced further scoping of the numbers have revealed that in order to get the project complete, it is going to take an additional £1.3 to £1.7bn which increases the overall cost to £17.6Bn.

Upon commencement the completion date was anticipated for December 2018. In August 2018 it was announced that the Central London section would be delayed by a year to Autumn 2019. (New Civil Engineer, 2018) and it has later been announced that this date is optimistic for completion. Therefore what has gone wrong for the Crossrail project and how has it been let to spiral out of control by over £2Bn? And What should have been done to keep control of this?

In my opinion in order to ensure that the original budget was thorough and complete, a resource management plan should have been in place, due to the vast size of the project and the graphical span of the project the resource management should have been in place with a team in charge who review this to ensure every month or every few weeks so that errors or flaws which can result in cost overruns are noticed early

on and they can be addressed to minimise the impact on the overall project budget and timeframe.

Additionally with an adequate cost plan which thoroughly reflects the works that need to be undertaken it can be tracked throughout the project using an earned value analysis therefore the cost to complete is known from the very start and any big fluctuations to this can be raised. On such a huge project it is very difficult to control the cost, due to the number of labour, materials and activities happening on a daily basis.

3.3 – Example 3 – Scottish Parliament

The Scottish Parliament is located at the foot of Edinburgh's famous Royal Mile near the Holyrood Park and Salisbury Crags. Construction of the new building constructed to a high specification of steel, oak, and granite begun in June 1999.

(The Scottish Parliament, n.d.)

The building is included within the UNESCO World Heritage Site in the centre of Edinburgh and its construction is very prolific in the Construction Industry in the UK but unfortunately not for the right reasons. Its planned completion date was for the year of 2001, but this got delayed by 3 years to 2004. Along with time delays always comes a cost impact. The original budget for the scheme was £50M. The final construction cost of this project was a staggering £414M which is an increase of 730%. (Global Construction Review, 2015) The overspend on this project is being deemed as one of the most spectacular failures of the century in the construction industry. For this kind of overspend on a National Government Facility it raises questions as to the competence of the team employed to construct such a build. Due to its failure a public inquiry was ordered into the construction. The public inquiry addressed the Feasibility on which the Government Ministers decided to proceed on the construction, as the feasibility was done at such an early stage it was only indicative and could have missed out a lot of information which in turn resulted in an overrun cost, secondly addressed the Construction Management and the procurement route, on 5th of March 1988 a minute from a meeting which stated the agreement that traditional contracting was not feasible and that construction management or management contracting would need to be adopted which left the client open to a lot more risk. The inquiry states that it was at this stage where the 'wheels began falling off the wagon' (QC, 2004)

In my opinion the failure of this size on a construction project should be the last of its kind in this century there are professionals and techniques in place to prevent this from happening and it should be taken as a learning curve for every individual in the construction industry. In my opinion the cost plans should never have been used to approve the project, cost plans should have been done at different stages of the design stage. This project failed from the very start with the over optimistic estimates therefore in order to have prevented this in my opinion competent teams of estimators and surveyors needed to be in place to price accurately with thorough information, I believe that if this was done correctly the true cost of this construction would have been known prior to commencement.

3.4 – Example 4 – London 2012 Olympic Park

London 2012 was a huge sporting occasion for the UK, where Athletes and Fans from all over the world would visit London or be one of the millions watching events on TV. Every 4 years a new location aims to construct a collection of new stadiums and venues to become amphitheatres for the worlds best athletes to perform and compete, and the Summer Olympics of 2012 were no different. London quickly needed to find a location to build what was deemed to be the new Olympic Park, a place of stadiums, venues, eateries and accommodation. Olympic Park was constructed in the East End of London, and would include the Main Stadium, aquatics centre and sporting venues.

The land on which it was constructed was contaminated therefore would require clean up and remediation prior to any physical above ground works would begin. The original anticipated cost to bring the Olympics to London was approximately £9.325 Billion and the Olympic Minister stated that that figure would be the absolute limit of public money being spent on the project. It later came out that an extra £2.7Billion was needed in order to deliver the project with a large sum of £1.15 Billion to the London Development agency and to remediate the land. (Telegraph, 2009)

In my opinion in order to have kept a hold on this again I believe that accurate cost plans and budgeting methods needed to be in place. I believe that the government and the teams involved with the project should have obtained site investigation reports and complete designs prior to cost plans being produced. That way figures could have been released which truly reflected what it would be to complete the project.

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