

Managing Work & Costs

Lecture 4 – Cost Management – Principles

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1 Objectives of Project Cost Management

Lock would define Project Cost Management as “....ensuring that no preventable wastage of money or unauthorised increase in costs is allowed”.

We can further expand on this:

- To ensure that the correct costs are incurred for each cost component
- To ensure that costs are allocated to the correct component
- To ensure that costs are incurred at the correct time
- To minimise the occurrence of fraudulent costs
- To minimise the costs of waste and other unnecessary costs
- Ensure sufficient funds are available to support project activity
- To help us to track project progress

The output of the budgeting process usually defines two things:

- a. The budgeted costs, allocated to project areas or work packages
- b. The expected timing of the spend on budget costs

Both of these components need to be monitored and controlled by the project manager. The project manager will also need to monitor the flow and timing of funds **into** the project. At its simplest he may have to ensure that the project budget is established on the accounting system and that appropriate authorisations are in place to allow release of funds to the project. Failure to establish this can cause delay in starting a work package.

Lock outlines three reasons why Cost Management is carried out:

- a) To ensure the general control of costs i.e. “...to ensure that no preventable wastage of money or unauthorized increase in costs is allowed”
- b) To make sure that a contractors own budget is adhered to.
- c) To fulfill a responsibility to the project purchaser for project costs

What are the objectives of cost management? In this chapter we will use Locks approach to answer this question in a little more detail.

Cost management is a function of project management and many people involved in the project have an influence on the overall cost management of a project.

Cost reporting and cost control sometimes get used as terms interchangeably. Cost reports that are produced in a timely fashion are indeed important, but it is not the same as cost control. It is a comparable concept to earlier definitions of ‘mentoring’ in a passive manner as opposed to control, the active part of cost control.

2 The Basics of Cost Estimating & Budgeting

In its broadest definition, the process of Cost Management can be broken down into three components:

- Estimating the project costs
- Budgeting for those costs and
- Controlling and managing the costs during the lifetime of the project.

This chapter will focus mostly on the third component – Cost Control. The topics of estimation and budgeting are explored in depth elsewhere on this course but we will introduce them briefly here in order to appreciate their role in successful cost control.

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According to Lock - *“...a good estimate of project costs is necessary for subsequent management decisions and control”*. A good estimate is particularly important if you are using it as the basis for contract tendering, particularly if it's for a fixed price contract. Any underestimation of cost will eat directly into the contractors profit from the venture.

Subsequently, costs estimates will be important because they will also be used to allocate individual budgets to the project components (possible using a work breakdown structure). Cost estimating is an iterative process and the level of accuracy of your cost estimates will increase over time. At some stage, however, they will have to be labelled as “definitive” i.e. where the accuracy is regarded as being within 5% (plus or minus). At this stage the costs are baselined. The process of **Cost Budgeting** takes these definitive estimates and creates a **cost baseline**. This allocates the costs of the project over a time period (the duration of the project). Frequently, a separate baseline is created for each cost component of the project, for example: Labour costs, Management costs, subcontractor costs etc. This now represents the **approved estimate of costs**.

This cost baseline will be used throughout the project to measure variance between the planned use of resources and the actual use of resources. If the estimation is repeatedly shown to be inaccurate then a high proportion of the project manager's time will be expended in managing the variances and re-forecasting the baseline.

Another useful output from the budgeting process might show the cash flow over the project cycle. The diagram in the appendix is used to below shows a cost baseline mapped alongside a cash flow baseline (the cost baseline is also known as an Expense S-Curve)

3 Additional Cost Control Factors

3.1 Adherence to Contractors Budget

As a project manager for the contractor, there is the immediate responsibility to ensure that the project is completed within the limits of the contractors planned costs. For most managers this is their one and only cost consideration. Lack of attention in this area can lead directly to reduction in expected profits for the contractor, particularly in low margin business environments.

On internal projects the profit motivation does not exist. However, the success of the project may be dependent on strict control of the allotted project budget. Significant overruns may undermine the case for executing the project in the first case.

3.2 Responsibility of a contractor to the project purchaser

The project manager is always required to pay attention to the costs likely to be incurred by the client. The client will expect to pay only for approved and agreed costs and for additional costs which are legitimate and reasonable. For fixed price contracts the situation is relatively straight forward. However for contracts which allow for additional undefined costs (e.g. “Cost plus” contracts) the project manager has an ethical duty to ensure that:

- only legitimate costs are claimed
- work is carried out as efficiently as possible

In this situation each additional cost may represent additional profit – So the project manager has often a difficult balancing act to perform!

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4 The Main Elements of Project Costs – variable & Fixed Costs

It is important for the project manager to appreciate the amount of different cost categories that exist in a project. These are generally broken down into 'Variable' and 'Fixed' costs.

4.1 Definition of Variable costs

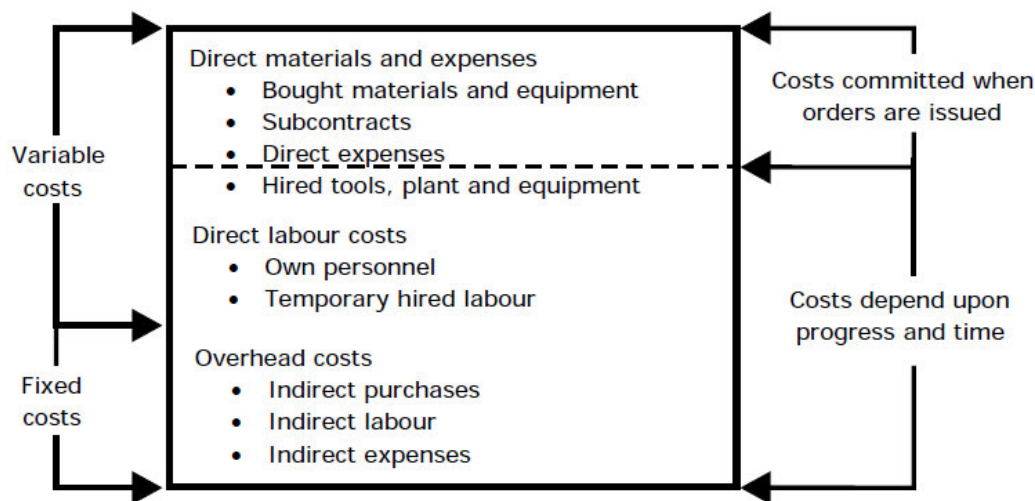
These costs are incurred as a proportion to the rate of working on the project – generally these are 'direct' costs. Direct Costs – costs which can be associated directly with project activity. Examples:

- Labour (working on activities/ managing activities/ project support activities)
- Materials
- Dedicated project equipment costs
- Direct project expenses

4.2 Definition of Fixed Costs

Generally defined as a company's overhead or indirect costs. 'Indirect' means that these are costs incurred generally in running the business. Indirect costs cannot be directly associated with projects. Examples:

- Travel, training, insurance, depreciation etc
- Heat/light
- Accommodation
- Use of photocopiers etc



5 Controlling Variable Costs

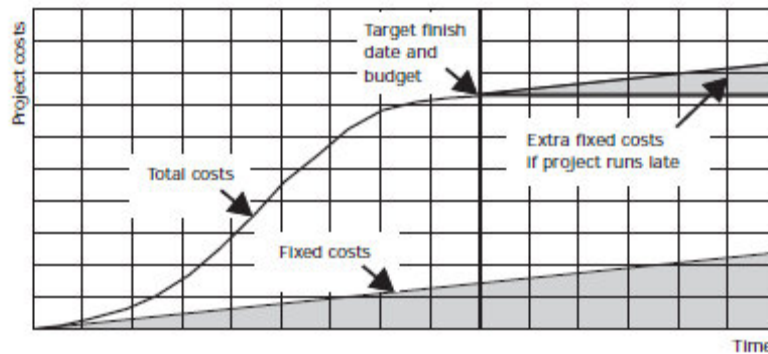
5.1 Materials and Expenses

These can constitute a large proportion of a project's costs. Sensible purchasing strategies (summarize elsewhere) can exercise cost control over a project. Cost negotiations must be done before the purchase order or contract is signed as at this point it is too late to exercise any influence over this..

5.2 Direct Labour Costs

Controlling progress and ensuring projects run on time will prevent resources being wasted on projects that overrun.

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6 Recovery of Fixed Costs / Overhead Costs

The basic aim of any business is to keep Fixed Costs (indirect) as low as possible in proportion to the variable (direct) costs.

6.1 Recovering Fixed costs

The project manager may have little influence on fixed costs as they are set by the business as an entity. In relation to projects, a project manager must understand that these costs continue to accrue even when no work is taking place on the project. One example is temporary site accommodation.

The boundary between fixed and variable costs can sometimes be blurred. Communications, printing / photocopying – these are costs in running a business, cannot be linked with particular jobs but will rise or fall depending on the level of business activity.

Some contract structures (reimbursable) allow claiming of sundry costs (phones, printing) if these can be proven as project costs. Architects and solicitors can use this to recover costs.

Simultaneous projects can make this exercise difficult. Being able to change as many costs as possible (once it is justified).

How can this be done?

- the use of a simple requisition system for all bulk photocopying and other reprographics services, with mandatory use of client or cost codes;
- mandatory use of cost codes on petty cash vouchers and all expense claims forms;
- the installation and proper day-to-day management of an automatic call logging system covering all telephone, and facsimile lines.

6.2 Recovering Overhead Costs

Hourly rates multiplied by the time expended (i.e. Cost / hour or cost per day) are used to work out what's known as 'absorption costs'. This is worked out by calculating the hourly rate and applying a mark up (for overheads and an element profit). Working out the percentage of overheads may depend on the type of business the company is operating in. Companies who can keep indirect costs to a minimum can enjoy competitive pricing advantage.

6.3 Under Recovery

Where the amount of direct costs falls below what's forecast. Happens where projects do not materialize / over optimism.

- Increasing the overhead rate (thus increasing prices, which might reduce the quantity of products or project work sold);

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- Increasing sales by a marketing drive to sell more products or project work; persuading each new project client to agree to pay for some jobs previously regarded as indirect. This will depend on being able to identify those jobs and record their costs in a way that would satisfy subsequent audit. Examples of such costs are special printing and copying of project drawings and other documents, telephone calls, travel expenses and so on;
- Making economies to reduce the overhead costs. That can lead to painful actions, even to the extent of dismissing administrative staff and managers

6.4 Over Recovery

Occurs where direct labour billings exceed what's expected. Can increase profitability but indicate the competitiveness is not very well aligned.

7 “Total Cost” Approach

This concept treats costs holistically, this involves resolving logistical issues or other issues that may impact on costs with a view to making them as minimal as possible.

Project managers and other team members may consider in this approach who their influence or impact on the project is affecting projects costs. A design change that involves more reworks of a design but results in production / construction methods.

8 Setting and Resetting Cost Budgets

Budgets will be derived from the original project estimate – these budgets are before ‘below-the-line’ allowances (for example contingency) and indirect costs. These budgets become the maximum authorized level of spend.

WBS & CBS – these allow costs to be distributed on the sub-project parts. This CBS will have been created when defining the scope of the project. This source CBS will also be used when planning and controlling other aspects of the project. So, used in this way, the budget becomes the project plan in “money” form as below:

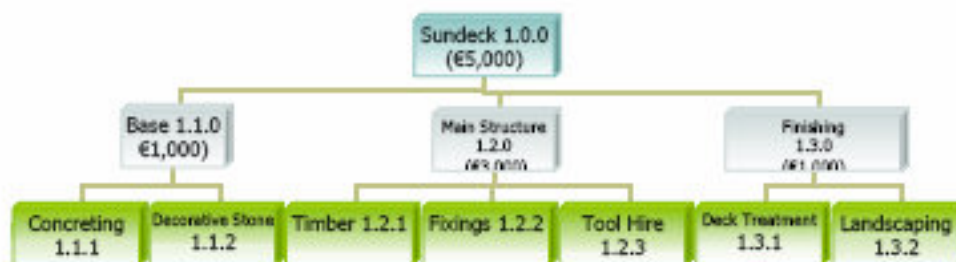


Figure 2 - A Budgeted CBS

Variation orders will reset the budget on a project. Budgets may be described as the original amount plus and addition for variations for clarity. A project budget may be plotted as an S curve, with time on the horizontal axis and expenditure on the vertical to describe the expenditure of the budget over time.

Cost escalation and (for foreign project) exchange rates may have to be considered for projects of longer durations carried out abroad. Some ‘below the line’ costs can be adjusted almost as mini budgets in themselves

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8.1 Labour Budgets

A project manager should be familiar with the allocation of budgets in terms of person hours (sometimes called 'man hours').

9 Cost Collection Methods

The collection, analysis and recording of project costs will be set down by each company, employing different methods as varied as the companies themselves. Care must be taken in the reporting of historical costs – what happens if these costs are more than a month old when they reach the project manager?

9.1 Collecting costs - Bought-in materials and equipment

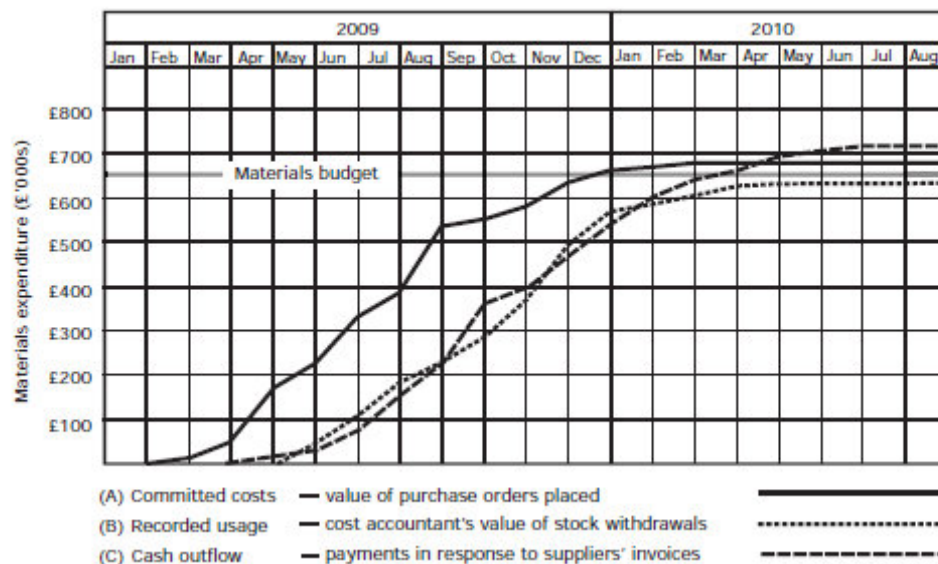
These will be collected using the company's procedures – purchasing, accounting and stores. Note the three different methods:

Committed costs Date when the order is placed. Earliest time which costs of materials can be monitored and most useful for assessing performance against budget

Actual costs Dated when supplier's costs are to be paid.

Job costing Depends on stores' feedback on the inventory

These are summarized in the graph below:



9.2 Collecting Labour Costs

Timesheets are generally used – the time allocated to each project being allocated on a weekly basis.

Time sheets are the time honoured method for recording labour hours used on the project. Project members record the time spend weekly on the project and associate the time to the appropriate or cost code. This sheet is reviewed for accuracy by the appropriate manager or

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supervisor and submitted for recording. This ensures that two cost management principles are adhered to, namely:

- The approval validates the number of hours and controls expenditure
- Recording time against the work package allows for subsequent monitoring against the cost baseline.

For maximum accuracy, time sheets should be completed daily and submitted for approval weekly.

There are particular issues associated with recording the time spent by external and agency staff on contracts. Issues of alignment between timesheets occasionally arise. Also, the project manager needs to consider whether additional measures are required to validate such work, particularly if it is being carried out in an off-site location.

This issue is further complicated when information is input directly to the accounting systems and re-keying of information may be required by the project team.

Timesheets can also be used to track the input of agency staff that may be hired or seconded into an organization.

Some PM software allows staff to direct-enter project time sheet data for sophisticated tracking against project activities.

9.3 'Day works' sheets

Used in the construction industry mainly, these are used to track sub-contractors works that may be carried out on a piece meal basis. They can be problematic in that tracking costs can be difficult and predicting the costs of an activity can be somewhat open-ended. Contractors often avoid these as the costs of sub-contractors can quickly get out of control.

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10 Appendix 1

10.1 The Budget as a Graph: Drawing an S-Curve

We have seen earlier that the cost baseline can be represented by a graph which maps the accumulated cost against project time. This curve is typically a broad s-shape. This curve can be used to understanding issues such as cost baseline and cash flow on a project. To draw an s-curve:

STEP 1 Determine the project activities and total cost (from your Baseline Budget)

Activity	Duration (days)	Total Cost
A	3	150
B	4	160
C	4	320
D	2	100
E	4	60
F	5	300

STEP 2: Determine the Average daily cost of each Activity

Activity	Duration (Days)	Total Cost	Average Daily Cost
A	3	150	50
B	4	160	40
C	4	320	80
D	2	100	50
E	4	60	15
F	5	300	60

STEP 3 – Using your project schedule spread the daily rates across the duration of the activity

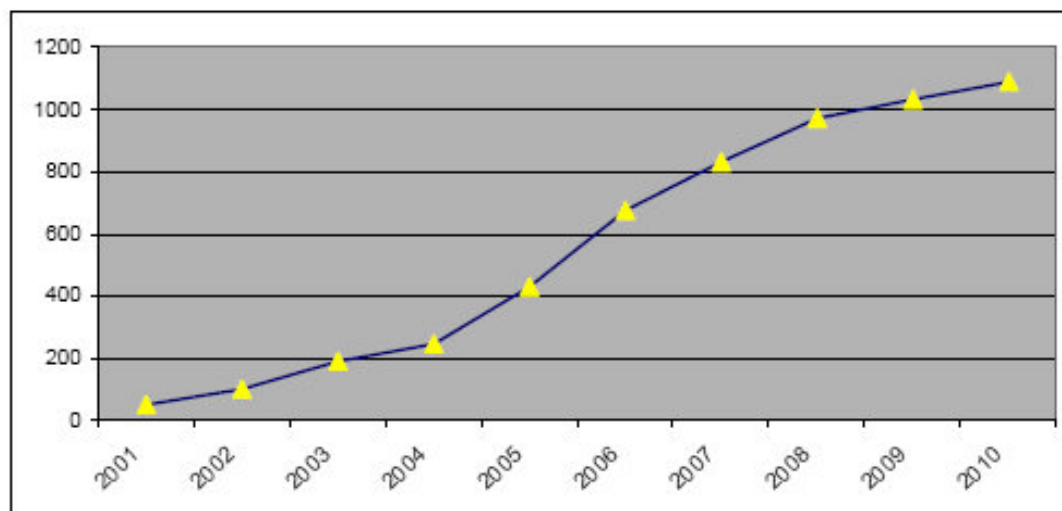
SCHEDULE										
Activity	Nov-01	Nov-02	Nov-03	Nov-04	Nov-05	Nov-06	Nov-07	Nov-08	Nov-09	Nov-10
A	50	50	50							
B			40	40	40	40				
C					80	80	80	80		
D					50	50				
E				15	15	15	15			
F						60	60	60	60	60

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STEP 4 – Total up the daily costs and then calculate the accumulated costs each day working from left to right.

SCHEDULE										
Activity	Nov-01	Nov-02	Nov-03	Nov-04	Nov-05	Nov-06	Nov-07	Nov-08	Nov-09	Nov-10
A	50	50	50							
B			40	40	40	40				
C					80	80	80	80		
D					50	50				
E				15	15	15	15			
F						60	60	60	60	60
Daily Cost	50	50	90	55	185	245	155	140	60	60
Accumulated Costs	50	100	190	245	430	675	830	970	1030	1090

STEP 5 - Draw a graph plotting the accumulated values against the schedule. Put the schedule on the X-Axis and the Accumulated Costs on the Y-Axis. This graph represents your budgeted costs over the scheduled duration of the project



References & Resources

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 Burke, Rory, (2001) Project Management, Planning & Control Techniques, 3rd edition, Wiley
 Lock, Dennis (2007) Project Management, 9th. Edition, Gower – Chapter 24