King Fahd University of Petroleum & Minerals

College of Environmental Design

Construction Engineering & Management Department

CEM 511

Construction Estimating

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Direct versus indirect cost

Whether a cost is considered a direct or indirect cost depends on the definition of the cost object.

Given a defined cost object,
a cost that is directly traced to the cost object is referred to as a direct cost,
whereas if it is not traced directly to the cost object, it is referred to as an indirect cost.

Indirect cost is referred to as an overhead cost.

Overheads include;
Job overhead (project overhead)
Company overhead (Office overhead)

Overheads

- **Job overhead**

Outlays which are incurred in achieving project completion, but don't apply directly to any specific work item.

Directly traceable (chargeable) to the project and should be itemized by an estimator when preparing an estimate.

Some contractors figure their job overhead outlay as a percentage of the total direct cost.

Overheads

- **Job overhead**

Widely varying job overhead requirements make this is not generally considered to be good estimating practice.

The reliable way to arrive at an accurate estimate of job overhead is to make a detailed analysis of the particular demands of that project.

Job overhead includes;
insurances,
financing costs,
others.

Job overhead

Insurances:

Premiums a contractor pays an insurance company.

There are many types of contractor insurances associated with building a project including:

- **Workers' compensation insurance.**

This covers a contractor employees in case of personal injury or death.

- **Contractors' public liability insurance.**

This policy protects against liability for bodily injury to a member of the public arising out of the contractor's operations and against property damage liability.

Job overhead

Project finance cost:

The cost of procurement of cash necessary to carry out construction operations.

A contractor may have to pay his bills before he in turn bills and collects for work performed for project owner.

Finance cost may be further increased because it is typical for owners to retain some of contractors' entitlements until the completion of the project.

The contractor should calculate his forecast interest cost for a project and include it as a direct cost of the project.

Job overhead

Determination of project finance cost:

Preparing a bar chart or CPM plan is fundamental.

The plan serves as the basis for charting the cash inflows and outflows for building a construction project.

For illustration, consider the project of the durations and direct costs as shown on the figures.

Job overhead

Determination of project finance cost:

Determination of project finance cost:

Determination of project finance cost:

Job overhead

Determination of project finance cost:

Overhead expenses are of $2,500 per week and profit is $30,000, the total contract price is calculated as shown in the figure.

Job overhead

Determination of project finance cost:

- The contractor bills for work completed every 4-week period,
- Bills are paid to the contractor within two weeks thereafter.
- The owner retains 10% of each progress payment, retained amounts will be paid as part of the final progress payment if the work is completed satisfactorily.

Job overhead

Determination of project finance cost:

The calculations of construction costs for the first 4-week period is presented below:

Determination of project finance cost:

The calculations of cash inflow for the first 4-week period is presented below:

Job overhead

Determination of project finance cost:

Project cash outflows and inflows are charted below:
Note: the cash inflow received at the end of the 22nd month includes the accumulated retained amounts.

Cash out & cash in

Job overhead

Determination of project finance cost:

The cumulative cash outflows and inflows are shown below:

Job overhead

Determination of project finance cost:

Difference between cash outflows and inflows at any point in time represents the overdraft or surplus of cash.

An overdraft represents the amount of cash the contractor will have to have available from own or borrowed fund to finish the project as scheduled.

Preparing the cash flow for the project charts out the cash needs for the project

Job overhead

Determination of project finance cost:

The contractor can calculate his weekly cash surplus or shortage.

Assuming a specific cost of capital, he could then calculate the estimated finance cost.

It is this finance cost that should be included in the project estimate.

Job overhead

Other job overhead expenses

Each of these costs should be identified and itemized in the project estimate:

Supervision: wages and fringe benefits of the job superintendents.

Temporary office: contractor trailer rent and cost of maintaining the trailer including telephone and utility expenses.

Temporary toilet: costs and maintenance of these facilities

Job overhead

Other job overhead expenses

Temporary water and utilities: temporary water, light and power, and air conditioning for the project. (occasionally, some of this work and the associated cost is covered in the work specifications of subcontractors).

Protecting and repairing work: work performed that are subject to damage as the work proceeds.

Cleanup: removing scrap material and scattered rubbish throughout a project site.

Job overhead

Other job overhead expenses

Photographs: they are asked for by the owner to evaluate percentage of completion and the equity of interim payment requests.

Surveys: Occasionally, surveys may be the responsibility of the contractor according to the contract documents.

Building permits: the contractor is usually responsible for purchasing permits as part of his contract responsibility.

Job overhead of example project

Overheads

- **Company overhead**

General company expenses such as:
office rent, office insurance, heat, electricity, office supplies, furniture, telephone, legal costs, donations, advertising, office travel, association dues, and office salaries.

An allowance for such expenses must be included in the cost estimate of each new project.

Overheads

- **Company overhead**

Company overhead costs are determined for a specific project by means of an allocation process.

Office overheads can be added as:
a separate line item in the cost estimate,
a suitable “markup” percentage can be applied,
a fee established that will include office overheads and profit.

Overheads

- **Company overhead determination**

Applying company overheads to a specific project necessitates the answer of two decisions:

The basis for the overhead allocation process,
The mechanics of determining the amount to be applied.

A good argument for allocating company overhead costs to specific projects as a function of the expected duration of the projects.

Total direct costs, or total direct labor costs.

Overheads

- **Company overhead determination**

The objective of the allocation or application of company overhead costs to projects is to apply every dollar of these costs, not more and not less, to all projects over a defined period of time.

If the contractor uses an allocation basis that falls short of applying $50,000 of company overhead, a profit of $30,000 is actually a loss of $20,000.

Overheads

• **Company overhead determination**

The allocation process involves two estimates:

• **An estimate of the company overhead costs for the time period in question.**

• **an estimate of the dollar amount of the overhead basis.**

Example:

A contractor allocates company overheads to on the basis of the sum of direct labor and material costs.

The contractor reviews overheads application rate annually.

Overheads

- Estimate the coming year's overhead costs to be applied in total to projects constructed during the year by multiplying the prior year's figures by an inflation factor.

- The dollar volume of work performed is projected along with the gross profit margin.

- The gross margin is used to calculate the direct and material costs.

- The total cost of sales is assumed to consist only of the direct labor and material costs.

- Calculations yield an application rate of 10%.

Example

Overheads

Therefore, in the year in question, each time a project is estimated, an overhead cost is applied to the project equal in amount to 10% times the project's estimated direct labor and material costs.

The constraint to good overhead allocation is the competitive nature of the construction industry.

Apart from a firm's accurately calculated overhead rate is the fact that the construction firm still has to be low enough in its bid to secure the project contract.