



Construction Estimating – The Good, The Bad, The Ugly

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An overview of best practices and considerations when estimating construction projects. The session will be geared to provide participants with a brief overview of skill sets like reading blueprints, performing quantity take-offs, and job cost estimating.

Estimating

Construction Estimating is to arrive at an often accurate but usually only approximate statement of the cost of a job to be done. It is an undertaking that takes practice, trial-and-error and experience to master. Guided by best practices, preparing precise and accurate cost estimation that benefits the company can be achieved. Basic components of a construction estimate are **Materials, Labor, Equipment, Overhead and Profit.**

Materials

Permanent Materials: These materials are part of Finished Product. Must be an approved material list item and must meet PennDOT Construction Specifications –Publication 408/2020. Examples include Asphalt, Aggregate, Concrete, Reinforcing Steel, Guiderails, Pipes, Line striping, etc.

Construction Materials: These materials are required to assist in building the finished product. These materials leave with Contractor after installation. Examples include Concrete Formwork, Erosion & Sediment Control Fence, Survey Stakes, Temporary Shoring boxes, Scaffolding, etc.

Labor

Labor is the physical work performed by skilled personnel on construction sites. The human effort utilized in the production process. Price of construction labor varies depending on what shift the labor is required. Some highway construction activities are performed at night to reduce impact of traffic. If night shift is required, remember to include night differential premium in your estimate. For Overtime hours in excess of 40 Hours in a week, Labor rate will be adjusted on the base rate only.

- Base Rate (Time & Half) 50% added
- Fringe Benefits – No Change (Verify with local trade unions)

For Shift Differential, adjustment varies among different trades and local unions.

Equipment

Tools and machinery used to facilitate the human effort in the execution of construction work. Heavy and Highway construction equipment are very capital intensive. Unfortunately, not all types of Heavy and Highway construction equipment are available for renting. As a result, most companies engaging in this type of business own certain pieces of equipment. These equipment are built tough to last for years. For startup / emerging contractors, we recommend buying certified used equipment to support rentable equipment.

Items to consider when estimating for Equipment

- Ownership Cost
- Rental Cost Per Day / Per Hour
- Delivery and Pick Up Charges
- Damage Waiver Insurance Cost
- Operating Costs (Fuel & Lube)

Overhead

Job Overhead: The direct costs of a project that cannot be charged to one line item alone.

Office or Operating Overhead: The indirect costs of a particular project such as the expenses of the home office that provides support to the field offices.

Importance of Estimating

Every dollar that comes into your company starts with an estimate. It makes a huge impact down the line because how much of that dollar you get to keep depends on the quality of your estimating process.

Best Practices of Construction Estimating

Some best practices for estimating projects properly include:

- Understand the concept or intent or goal of the project. Imagine it being built as you prepare your cost estimate.
- Understand the design details thoroughly. Understanding the project's design details is crucial to estimating the cost.
- Have a standard for cost estimation to give every project proper, documented and uniform guidance to follow when conducting cost estimation.
- Perform Detailed Estimating: Break down your estimate into small tasks. It takes more time but it is easier to manage and most accurate.
- List and evaluate each task for what it takes to actually get it done. Set-up costs on smaller projects may throw off unit prices.
- Ask questions thru written RFI before cutoff date instead of making several assumptions.
- If clarifications aren't made prior to bid, one can carry reasonable contingency. Be considerate so that you don't lose the bid due to fat contingency.
- Do a Pre-bid schedule to determine that entire scope of work can be performed within the proposed performance period. Avoid Liquidated damages.

- Weather: Does the project happen in spring, summer or winter? Account for weather and temporary protection.
- Get actual quotations for Materials and Equipment.
- Use applicable wage rates and compare dates with performance period.
- Check for overlooked activities. Almost every note on plans has a dollar value.
- Keep Historical data and learn from past projects. The lessons learnt from past projects should be taken into account for estimating new projects.

Blueprints

Blueprints are 2-3 dimensional design drawings that indicate the size of a planned project, the materials to be used in its construction, and the placement of its features. Blueprints are very much the language of Construction. Everyone down the line, from architects, engineers to workers on the ground, use both sketches and blueprints to communicate their ideas and how they should be brought to life.

What is Blueprint Reading?

It is the gathering of information from a print or drawing and interpreting them towards the execution of project. Interpreting also involves using the information in cost estimating.

Principal Elements of Blueprint Reading

Visualization: The ability to create a mental picture of structure from set working drawings.

Interpretation: The ability to understand lines, symbols, dimensions, notes, and other information on the working drawings.

Different Views presented in Blue prints

1. **Plan Views** are a bird's eye perspective.
2. **Elevation Views** show a side-view of an object from north, south, east and west.
3. **Section Views** show a cut- through view of the construction, to give a clearer picture of how it will be built.

Other graphic formats used in blueprints include: Details, Schedules and Diagrams.

Steps of Blueprint Reading

- Familiarize yourself with the scale of the drawings. Understanding how large or small certain items are, are essential when reading engineering drawings.
- Understand the basic symbols used in the construction drawings.
- Identify specific abbreviations.
- Read the title block, notes and legend. These often appear at the beginning of any blueprints.

Abbreviations

Abbreviations are very important in Blueprint reading.

- Often found on the title page.
- They take the place of words in notes and cut down the length of the notes.

Elevations

Elevation is generally defined as the height above or below a given level or benchmark. Sea level is often chosen as the benchmark. Architects and Engineers use elevations to establish heights of project components such as slab on grade, road pavements, top of curb, bottom of curb, top of concrete sidewalks, etc.

Site elevations are very important in calculating the volume of dirt to be moved on a job site (cuts or fills). Contour lines convey elevation information. They show elevation and the shape of the terrain. They're useful because they illustrate the shape of the land surface.

Quantity take-off

Quantity take-off is the determination of the amount of work to be performed through the interpretation of the drawings and specifications for a proposed project. It is a two-step process namely:

(1) Quantifying Process: Work areas and work items are scaled, counted and combined through calculations.

(2) Tabulating Process: The quantities obtained from step 1(Quantifying process) are tabulated in a most logical way that costs can be assigned to them.

Why do we do Quantity take-off ?

- To quantify amount of work
- To estimate project cost
- To monitor production
- To develop historical data

Scale Rule

The actual size of a structure cannot be drawn on a Blueprint. As a result construction drawings are made to a reduced scale (smaller than the actual size).

The scale of a particular floor plan, site plan, elevation or detail is indicated on the sheet, either in the title block or beneath the drawing itself.

Engineer's scale.

- Most Penndot construction drawings are made using an Engineer's scale.
- Typical engineer's scales include 1:10, 1:20, or 1:50
- These scales mean that every 1" on the drawing is equal to 10 feet or 20 feet or 50 feet respectively in reality.