

Construction Estimation, Planning and Control

CE4333
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Week 1

Introductions

Syllabus

- [Class Home Page](#)

The Construction Industry

- The Interface between Infrastructure and Design
- Construction Industry: 8.2% of GDP (Y2K)
- Employs 6 million people
- ~ \$819 Billion in economic activity
- Fragmented
- Very low profit margins (2-3%)

Introduction

- What are we estimating?
- Cost ...

	Unit Rates	Quantity
Material	✓	✓
Equipment	✓	✓
Labor	✓	✓

- ... and Time

Questions

- How much material do we need?
 - Basic Quantity take-off + % Waste
- What is the nature of the work?
- What is the expected labor productivity?
- What kind of supervision is expected?
- What kind of skilled labor is available?
Judgement!!

What is used?

- Project drawings and specifications
- Nationally published cost manuals
- Time schedule
- Estimator's ability to judge the nature of the job
- Historical information

Estimating What?

- Determine direct costs
- + Indirect costs (tax, bonds, insurance, field costs, home-office costs)
- + Contingencies (unexpected events)
- + Profit

Estimate of the amount of money the contractor receives

Estimating What?

- Time taken to complete project
- Directly related to direct costs for estimating labor and equipment
- Indirect costs are also dependent
- Very critical in litigation

Time is money

Players

- | | |
|---|---|
| <ul style="list-style-type: none">• Contractor<ul style="list-style-type: none">▪ To bid a job▪ To control cash flow▪ Level of accuracy +/- 2%▪ Set up payment schedules | <ul style="list-style-type: none">• Owner<ul style="list-style-type: none">▪ Buy, build or lease▪ Project budgeting and financing▪ Bid negotiation▪ Set up payment schedules |
|---|---|

Types of Estimates

- Preliminary
 - Conceptual: precedence
 - Low effort
 - Accuracy: +/-20%
 - Do we want to do this job?
- Detailed
 - To the last bolt: Needs plans and specs, CSI MasterFormat
 - Months
 - Accuracy: +/-2-5%
 - Are we being competitive

Detailed Estimates

- Who: Contractor
- For: Owner
- Determine:
 - Costs of MLE
 - Sub-contract
 - Overhead & Profit (O&H)
- Use:
 - Complete set of Bid Documents
- Goal:
 - A bid price

The Counting & Paperwork

- Quantity take off
- Estimating labor
- Estimating equipment
- Bid Documents
- Understanding bonds, taxes, insurance

The Decision-Maker's Perspective

- Buy, Build or Lease a facility?
- How do you analyze a competitive bid?
- How do you control cash flow?
- What kind of material to use and why?
- How to estimate labor productivity?
- How to estimate equipment productivity?

Preparing Detailed Estimates

- Table 1.2
- Table 1.3 (CSI Format)
- Table 1.4
- Table 1.5, 1.6, 1.7 (WBS Format)

Bid analysis

- CSI Format
- Lowest responsible bidder
- Payment schedules
- Balanced bids
- Conversion ratios
- Percentage completion
- Cost control