Improving Early Estimates
CII Research Team 131

Northwest Construction Consumer Council

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CII Team Members

Mark Chen          Weyerhaeuser
Ronald Clevenger  TVA
David Pendleton   Sverdrup
Garry Oberlender  Oklahoma State University
Philip Pullukat   GM
Joe Smith          Union Carbide
Karl Sturm         Texaco
Joe Terrezza      Foster Wheeler
Steve Trost        Oklahoma State University
Additional Members

Rusty Allen Union Carbide
Bob Cole U.S. Department of State
Mitch Elwood Enron
Guy Futrell Bechtel
Bob Geile Solutia
John Gentile GM
Bruce Manson Graycor
Patrick Sweeney Enron
Craig Ward TPA

“Improving Early Estimates” CII Products

IR131-1 Estimate Score Program (ESP)
IR131-3 ESP User’s Guide
RS131-1 Research Summary
RR131-11 Research Report
IR131-2 Best Practices Guide
IR131-4 CD with all of the above
Improving Early Estimates

- Perspective on the issue
- Research approach
- Blend of early estimate influences
- Application of findings
- Tool for improving early estimates
- Implementation Session overview

“Early” Estimate?
Early Estimates — Basis for Business Unit Decisions

- Asset development strategy
- Screening of potential projects
- Commitment of resources
- Impact of poor estimates
  - Lost opportunities
  - Wasted development effort (dead ends)
  - Lower than expected returns

Common Characteristics of Early Estimates

- Basis for business decisions
- Based on limited scope definition
- High potential for scope change
- Results often “cast in stone”
- Early in a series of estimates
Definition of “Early Estimate”?

- Initial “back of the envelope”?
- Preliminary / conceptual?
- Full funding?
- Specified accuracy range?

Estimate Accuracy Over Life of Project

Accuracy Range

Conceptual Preliminary Engineering Design Construction Start-up

Project Duration
### CII Cost Estimate Definitions (CII SD-6)

<table>
<thead>
<tr>
<th>Estimate Class</th>
<th>Accuracy (%)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order-of-magnitude*</td>
<td>± 30 to 50</td>
<td>Feasibility study - cost curves</td>
</tr>
<tr>
<td>Factored estimate*</td>
<td>± 25 to 30</td>
<td>Major equipment - factored</td>
</tr>
<tr>
<td>Control estimate</td>
<td>± 10 to 15</td>
<td>Quantity based</td>
</tr>
<tr>
<td>Detailed or definitive</td>
<td>&lt; 10</td>
<td>Based on detailed drawings</td>
</tr>
</tbody>
</table>

* Considered to be “early estimates”

### AACE International Cost Estimation Classifications (18R-97)

<table>
<thead>
<tr>
<th>Estimate Class</th>
<th>Accuracy (%)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 5</td>
<td>-50 to +100</td>
<td>Concept screening</td>
</tr>
<tr>
<td>Class 4</td>
<td>-30 to +50</td>
<td>Study or feasibility</td>
</tr>
<tr>
<td>Class 3</td>
<td>-20 to +30</td>
<td>Budget, authorization, or control</td>
</tr>
<tr>
<td>Class 2</td>
<td>-15 to +20</td>
<td>Control or bid / tender</td>
</tr>
<tr>
<td>Class 1</td>
<td>-10 to +15</td>
<td>Check estimate or bid / tender</td>
</tr>
</tbody>
</table>

* Considered to be “early estimates”
**Research Basis**

**Early Estimate** — Any estimate prior to and including the full funding estimate, but not based on detailed design.

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**What Does “Improving Early Estimates” Mean?**

- Better business unit decision making
  - Providing better information.
  - Improving alignment between business units and project teams.
  - Facilitating better understanding and communication of the estimate.
What Does “Improving Early Estimates” Mean?

- Better quality of early estimates
  - Reducing subjectivity by quantitative measurement of estimates
  - Improving accuracy
- Utilization of estimate correlations
  - Estimate drivers
  - Accuracy
  - Risk and contingency

How Can Early Estimates Be Improved?

Fire the Estimator?
How Can Early Estimates Be Improved?

Estimate “harder”? 

How Can Early Estimates Be Improved?

Ask the vice president?
How Can Early Estimates Be Improved?

Make a later estimate?

Project Definition Rating Index

CII Product IR113-2

Higher Definition

Project Definition (PDRI)

Higher Success

Higher Success
Early Estimate Influences

Given: Better scope definition gives better estimates.

Enter: Cost estimating and?

Crossroads

A. Focus on pure cost estimating?

OR

B. Incorporate other real world factors that affect estimate results?
Decision

B. Incorporate other real world factors that affect estimate results.

- Consistent with project definition relationship to project success
- “No excuses” solution
- Incorporates PDRI (scope definition) into improving early estimates

How to Improve Early Estimates?

- Estimating work process
- Alignment / communication
- Human factors
- Estimating tools and techniques
- Components of estimates
- Scope definition
45 Estimate Drivers Identified in Four Divisions

- **Who** is involved in the estimate?
- **How** is the estimate prepared?
- **What** is known (scope definition)?
- **Other factors** affecting the estimate.

Estimate Scoring

- **Estimate Score Sheet** (45 elements)
- Elements rated from 1 to 5
- **Weightings established from sampling of 72 data points**
### Research Results — Estimate Influence by Division

<table>
<thead>
<tr>
<th>Division</th>
<th>Relative Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who Involved</td>
<td>Medium</td>
</tr>
<tr>
<td>How Prepared</td>
<td>Medium</td>
</tr>
<tr>
<td>What Known (scope)</td>
<td>High</td>
</tr>
<tr>
<td>Other Factors</td>
<td>Medium</td>
</tr>
</tbody>
</table>

### Research Results — Estimate Accuracy Driver Groupings

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Relative Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic design</td>
<td>Strongest</td>
</tr>
<tr>
<td>Cost info./experience</td>
<td>Strong</td>
</tr>
<tr>
<td>Time to prepare estimate</td>
<td>Strong</td>
</tr>
<tr>
<td>Site information</td>
<td>Strong</td>
</tr>
<tr>
<td>Market issues</td>
<td>Strong</td>
</tr>
<tr>
<td>Alignment/involvement</td>
<td>Moderate</td>
</tr>
<tr>
<td>Owners costs</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Relative Impact of Team’s Skills and Experience on Early Estimates

Research Accomplishments

- Estimate Score procedure
  - Measure estimate quality.
  - Correlate estimates with their final cost.
  - Identify estimating improvement areas.

- Estimate Score computer model
  - Predict accuracy from estimate score.

- Best Practices Guide
  - Alignment, process, procedures
Estimate Score Program (ESP)

- Calculates score for a given estimate
- Provides estimate database
  - Early estimates versus actual final cost.
  - Estimate scores correlated to predicted accuracy.
  - Initially populated with CII Team 131 data.
  - Set up to accept company-specific data.
- Recommends contingency based on risk level.
- Highlights strengths and weaknesses to facilitate estimate improvement.

Improving Early Estimates with ESP

Score Estimate

Prepare Early Estimate

Who

How

What

Other Factors

Review Estimate Drivers to Improve the Estimate

ESP Database

Predict Estimate Accuracy

Provide Continuous Feedback

Construct Project & Track Costs

Acceptable?

Yes

No
Summary

• Early estimates are:
  – basis for business decisions.
  – driven by team issues as well as scope definition and cost estimating.
  – measurable.

• Early estimate improvement is short term and long term.

• Learn to use ESP in Implementation Session.