MAJORS COST ESTIMATING TOOL WORKSHOP

Cost Estimating Tool Overview

January 19, 2012
Presentation

- Objectives
- Tool Development
- Estimating Process
- Output options
- Spreadsheet overview
- Estimating Example
Why?

- Develop a reliable and accurate total project estimate
- Used at the conceptual stage of project development
- Provide uniformity and consistency in the estimating approach and process
- Provide a standardized method of presenting results
Why? (Continued)

• Format for documenting basis of the estimate, assumptions and calculations

• Structured step by step process so that items are not overlooked

• Establish a baseline project cost and evaluate cost tradeoffs from changes

• Provide accurate information for funding decisions
Tool Basics

- Major Roadway Item Costs
- Allowance Items & Certainty
- Structure and Specialty Item Costs
- Scope Change and Delivery Allowances
- External Costs
- Risk Adjustments
- Inflation
Major Roadway Items

- Removing Pavement
- Barrier Wall
- Curb & Gutter
- Earthwork
- Signalized Intersections
- Pavement
Allowance Items

• Erosion Control
• Lighting
• Roadway Incidentals
• Signing & Marking
• Traffic Control & Staging
• ITS/FTMS
Allowance Item Factors?

- Majors projects bid from 2002 - 2008
- Analyzed bid tabs from 76 individual projects within 14 different corridors
- Items categorized by:
  - Major Roadway Items (MRI)
  - Allowance Items
  - Structures
- Allowance item costs compared to MRI costs
# Allowance Item Cost Breakdown

## Major Roadway Items (MRI)

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample Corridor 1</th>
<th>Sample Corridor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier Wall</td>
<td>$80,690.75</td>
<td>$35,028.00</td>
</tr>
<tr>
<td>Curb &amp; Gutter</td>
<td>$513,137.69</td>
<td>$175,199.25</td>
</tr>
<tr>
<td>Earthwork</td>
<td>$16,226,200.65</td>
<td>$2,314,167.40</td>
</tr>
<tr>
<td>Pavement, Base, Subbase</td>
<td>$28,298,043.92</td>
<td>$6,970,200.90</td>
</tr>
<tr>
<td>Removing Pavement</td>
<td>$85,968.30</td>
<td>$274,281.30</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$45,204,101.31</strong></td>
<td><strong>$9,768,876.85</strong></td>
</tr>
</tbody>
</table>

## Structures

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample Corridor 1</th>
<th>Sample Corridor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td><strong>$11,973,906.10</strong></td>
<td><strong>$4,681,081.41</strong></td>
</tr>
</tbody>
</table>

## Allowance Items

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample Corridor 1</th>
<th>Sample Corridor 2</th>
<th>% of MRI</th>
<th>% of MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage</td>
<td>$2,816,047.97</td>
<td>$615,673.77</td>
<td>6.2%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Erosion Control &amp; Restoration</td>
<td>$2,498,271.97</td>
<td>$569,204.05</td>
<td>5.5%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Lighting</td>
<td>$29,507.92</td>
<td>$70,339.20</td>
<td>0.1%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Roadway Incidentals</td>
<td>$6,165,175.20</td>
<td>$2,44,974.88</td>
<td>13.6%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Signing/Marking</td>
<td>$476,942.74</td>
<td>$262,557.64</td>
<td>1.1%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Traffic Control &amp; Staging</td>
<td>$769,030.74</td>
<td>$831,413.49</td>
<td>1.7%</td>
<td>4.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$12,754,976.21</strong></td>
<td><strong>$4,814,162.80</strong></td>
<td><strong>28.2%</strong></td>
<td><strong>49.3%</strong></td>
</tr>
</tbody>
</table>

## Contract Total Low Bid

<table>
<thead>
<tr>
<th>Description</th>
<th>Sample Corridor 1</th>
<th>Sample Corridor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td><strong>$69,932,983.61</strong></td>
<td><strong>$19,264,121.06</strong></td>
</tr>
</tbody>
</table>
Allowance Certainty Factor

- A confidence level that the actual project costs will be “less than” the estimated costs.
- Expressed as a percentage
- The higher the certainty factor selected, the higher the resulting estimate
- Likelihood of overestimating the cost of the allowance items
Scope Change & Delivery Allowance

- Scope change allowance
  - Design contingency

- Project delivery allowance
  - Preliminary Engineering
  - Final Engineering
  - Construction Engineering
  - Construction Change Orders & Claims
  - Traffic Mitigation
  - Public Involvement
7. **Scope Change & Delivery Allowance Items**

- Surveyed all 5 Regions, averaged results by project type, and rounded up to nearest whole percentage
## Output Format

<table>
<thead>
<tr>
<th>Base Year $</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inflated $</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Estate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cost Distribution Method

Design

Construction

Conceptual Estimate Prepared
Start Preliminary Design
Start Design
Start Construction
End Construction

Preliminary Engineering
Final Engineering
Construction
Real Estate

Start Const.
Majors Estimating Tool

- Spreadsheet
- Estimating Example