Biggest Complaints

Summary and Breakdown of Construction Evaluations

Phil Kuntz
Janssen & Spaans Engineering

Presentation

- Previous INDOT Studies/Conclusions
- Construction Evaluations
- Conclusions
- Ideas for Improvement
- Questions

INDOT Division of Research

- December 2004 JTRP-2004/7 Report
  “Analysis of Cost Overruns and Time Delays of INDOT Projects”
- 2001 $17 Mill Cost Overruns, 9% of Total Budget
- Main Reason: Errors & Omissions
- Recommendations:
  - Change Order Mindset
  - Change Order Management Process
  - System of Controls & Review

Change Order Management Seminar

- April 20 & 22, 2005 Mandatory Seminar
  “Reducing Change Orders”
- Goals
  - Reduce Change Orders to 5% in 5 years
  - Communication between Construction & Design
  - Construction Rep throughout Design Process
  - Designer responsive during Construction
Vincennes District Study

- 2005 Change Orders
- $3,826,672 C.O. Overruns
- 72% Attributed to Errors & Omissions
- Recommendation: Thorough Plan Check Prior to Letting

Change Order Overruns by Modified Reason Code (Calendar year 2005 change orders)

- Scope Creep - $276,985.11
- Incentive/Disincentive - $3,174.24
- Political Request - $3,764.28
- Changed Field Condition - $478,511.93
- Mowing Contract Renewal - $366,000.00

Errors & Omissions - $2,759,992.87

- 32% Section 400
- 16% 200 & 700
- Focus Checking on 400 items

Change Order Overruns By Contract Type (Oct 1999-July 2005)

- Maintenance, $2,788,432.44
- Bridge, $4,154,433.66
- Road, $40,461,779.96
- Resurface, $8,336,417.16
- Traffic, $787,132.70

Change Order Overruns by Specification Section (Oct 1999-Jul 2005)

- Sec. 500, $313,189.02
- Sec. 600, $6,555,423.53
- Sec. 400, $18,196,155.58
- Sec. 300, $3,704,856.63
- Sec. 200, $9,536,849.28
- Sec. 100, $3,531,398.24
- Sec. 800, $4,625,741.42
- Sec. 900, $146,631.32
- Sec. 700, $9,917,950.90

Vincennes District Study

- 72% on Road Projects
- Prioritize Checking Road Contracts First

Construction Evaluation

- Construction Supervisor Evaluation and Rating of Plans and Contract Documents
- 23 Questions

Project Summary
- Magnitude of Change Orders: Major, Moderate, or Minor
- Accuracy of Major Items
**Access Database**
- 450 Projects
- 1999-2005
- Consultant, District and Central Office Projects

**Project Information**
- Magnitude of C.O.'s
- Accuracy Summary

**Change Orders by Designer**

<table>
<thead>
<tr>
<th>Designer</th>
<th># of Projects</th>
<th>Contract Amt</th>
<th>Change Order Amt</th>
<th>% Overrun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>251</td>
<td>$486,187,000</td>
<td>$31,379,500</td>
<td>6.5%</td>
</tr>
<tr>
<td>INDOT District</td>
<td>105</td>
<td>$66,225,100</td>
<td>$4,730,100</td>
<td>7.1%</td>
</tr>
<tr>
<td>INDOT C.O.</td>
<td>120</td>
<td>$112,744,400</td>
<td>$8,028,400</td>
<td>7.1%</td>
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</tbody>
</table>

**Change Orders By Year**

<table>
<thead>
<tr>
<th>Year</th>
<th># of Let</th>
<th>Contract Amt</th>
<th>Chng. Order Amt</th>
<th>% Overrun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>3</td>
<td>$14,372,263</td>
<td>$255,000</td>
<td>1.8%</td>
</tr>
<tr>
<td>2000</td>
<td>16</td>
<td>$58,202,658</td>
<td>$10,820,485</td>
<td>18.6%</td>
</tr>
<tr>
<td>2001</td>
<td>64</td>
<td>$146,675,723</td>
<td>$12,910,140</td>
<td>8.8%</td>
</tr>
<tr>
<td>2002</td>
<td>104</td>
<td>$210,165,077</td>
<td>$8,807,665</td>
<td>4.2%</td>
</tr>
<tr>
<td>2003</td>
<td>134</td>
<td>$123,372,825</td>
<td>$5,673,134</td>
<td>4.6%</td>
</tr>
<tr>
<td>2004</td>
<td>106</td>
<td>$75,389,142</td>
<td>$3,926,850</td>
<td>5.2%</td>
</tr>
<tr>
<td>2005</td>
<td>34</td>
<td>$22,790,750</td>
<td>$1,235,427</td>
<td>5.4%</td>
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</tbody>
</table>
Quantities and Pay Items

Question #4: Were the quantities reliable?

<table>
<thead>
<tr>
<th>Reviews</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250</td>
<td>192</td>
</tr>
</tbody>
</table>

% Yes/No: 57% 43%

Question #5: Did the pay items used match the work to be performed?

<table>
<thead>
<tr>
<th>Reviews</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>356</td>
<td>87</td>
</tr>
</tbody>
</table>

% Yes/No: 80% 20%

ACCURACY SUMMARY

<table>
<thead>
<tr>
<th>Estimate of Quantities</th>
<th>Bid Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% Poor</td>
<td>2% Poor</td>
</tr>
<tr>
<td>38% Fair</td>
<td>38% Fair</td>
</tr>
<tr>
<td>50% Good</td>
<td>63% Good</td>
</tr>
<tr>
<td>5% Very Good</td>
<td>7% Very Good</td>
</tr>
</tbody>
</table>

Summary

- 43% Quantities Unreliable
- 43% Accuracy of Quantities as Fair/Poor
- 20% Pay Items Do Not Match work to be performed
- 40% Accuracy of Bid Items as Fair/Poor

Ideas for Improvement

- Perform 2 Independent Sets of Quantity Cals
- Expand IDM Chapter 17 to include more examples
- Update Estimator to include only current pay items
- Review of Plans vs Estimate/Pay Items
- FFC/Final Plans Review Pay Items with District Construction

Structures

Question #17: Were critical dimensions, details, and elevations given within reasonable tolerance?

<table>
<thead>
<tr>
<th>Reviews</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>213</td>
<td>29</td>
</tr>
</tbody>
</table>

% Yes/No: 88% 12%

Question #18: Was difficulty experienced in assembling fabricated components?

<table>
<thead>
<tr>
<th>Reviews</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>159</td>
</tr>
</tbody>
</table>

% Yes/No: 10% 90%

ACCURACY SUMMARY

<table>
<thead>
<tr>
<th>Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>2% Poor</td>
</tr>
<tr>
<td>26% Fair</td>
</tr>
<tr>
<td>64% Good</td>
</tr>
<tr>
<td>8% Very Good</td>
</tr>
</tbody>
</table>
**Structures**

- **Summary**
  - 28% Accuracy of Structures Information as Fair/Poor
  - 12% had difficulty fabricating components

- **Ideas for Improvement**
  - Focus on Big “3”: Elevations, Quantities, Rebar Diagrams
  - Perform 2 Independent Calcs of Critical Elevations
  - Thorough review of Critical Dimensions & Details
  - Expand IDM Chapter 17 to include more examples
  - FFC/Final Plans Constructability Review with District

**Utilities & Railroad**

- **Summary**
  - 28% had Utilities not shown correctly
  - 31% Accuracy of Topography and Utilities as Fair/Poor
  - 17% Utilities not shown on plans

- **Ideas for Improvement**
  - Implement Recommendations of Utility Task Force
  - At FFC, re-mark utilities and do walk thru/verification
  - Identify Costly Utility relocates at Scoping/ PFC
  - Request SUE
  - FFC/Final Plans Review with District/Utilities

**Soils & Foundations**

- **Summary**
  - 28% had Soil information inadequate
  - 31% Accuracy of Topography and Utilities as Fair/Poor
  - 17% Soil difficulties not shown on plans

- **Ideas for Improvement**
  - Implement Recommendations of Utility Task Force
  - At FFC, re-mark utilities and do walk thru/verification
  - Identify Costly Utility relocates at Scoping/ PFC
  - Request SUE
  - FFC/Final Plans Review with District/Utilities

**ACCURACY SUMMARY**

- **Existing Topography and Utilities**
  - 5% Poor
  - 26% Fair
  - 58% Good
  - 11% Very Good

- **Existing Soils & Foundations**
  - 5% Poor
  - 26% Fair
  - 58% Good
  - 11% Very Good
Soils & Foundations

Summary
- 27% had Soil Difficulties not addressed
- 31% Accuracy of Soils and Foundation Information as Fair/Poor

Ideas for Improvement
- Question Locals on Soil Conditions
- FFC/Final Plans Review of Soil Conditions with District & Geotech Section

Recommendations
- “Change Order Mindset”
- Further Study/Coordination with District
- Compare Plans vs Itemized Proposal
- Double, Triple Check Quantity Comps
- Meet with District to Review Final Plans/Itemized Proposal

Biggest Complaints

Summary and Breakdown of Construction Evaluations

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