Developing Standards For Quantifying and Analyzing Productivity Claims And The Impact On Construction Auditors
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• Permissive/advisory and not mandatory

• Committee members include several prominent consultants
  • William Ibbs, Ph. D. – Chair
  • Robert D’Onofrio, P.E. C.Eng
  • Paul Stynchcomb
  • James Adrian, Ph.D.
  • William Schwartzkopf, P.E.
  • William Zollinger
  • 18 other members
Divisions

• Introduction and Purpose
• Productivity Basics
• Identifying Productivity Loss
• Establishing Recoverable Loss of Productivity
• Quantifying Productivity Loss
• Avoiding Productivity Loss
• Appendix – Hypothetical project with examples
• Bibliography – containing list of publications on productivity measures and methodologies
Overview

• Written from perspective of claimant/contractor/plaintiff
• Emphasizes the importance of collecting contemporaneous data
• Standards are guidelines
  • Methodology depends on context
  • Not one-size-fits-all
  • Attempt to develop common taxonomy
• Lifecycle of productivity data
  • Collection
  • Storage
  • Verification
  • Analysis
Definitions

• Establishes common definitions for terms
  • Production – measure of output only
  • Productivity – output per measure of input
  • Productivity Index – ratio of actual v. planned
  • Earned Value measure – percent complete

• Establishes tiers and criteria for methodologies
  • Measured Mile
  • Academic and Industry Productivity Studies [surveys]
  • Modified Total Cost
  • Total Cost
Data Collection

• Accurate information critical
• Verifiable and contemporaneous – validated regularly
• Identifiable work segregated by cost account
• Basis of measurement documented
• Changed work tracked separately from base contract
• Create culture valuing data
• Train people to collect and analyze data
• Accurately assign planned hours to activity codes – documentation
• Available data will influence methodology to use
### Sample Data Collection Form

**Figure 2-1. Activity scope reporting form.**

<table>
<thead>
<tr>
<th>INSTALLATION STEPS</th>
<th>DWG REF</th>
<th>Labor Planned</th>
<th>Total Quantity Planned</th>
<th>Material Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Crew Size</td>
<td>Days</td>
<td>Quantity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Main Hours</td>
<td>Size</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Description</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Rental, Totals, Scaffolding, etc.</th>
<th>Days Reg</th>
<th>Cost Day</th>
<th>Amount</th>
</tr>
</thead>
</table>

Remarks:
Identify Productivity Loss

• Establish and monitor measurement control

• Consider factors causing Productivity Loss

• Labor Productivity Reports
  • Planned labor hours from accurate estimate/bid
  • Division of project into definable elements of work
  • Independently and accurately assess progress (units)
  • Charge labor hours contemporaneously
  • Reliable tool/program for calculating productivity

• Consider “accord and satisfaction” wording in change order precluding cumulative impact claims – forecast productivity loss
Recoverable Loss of Productivity

• Actual productivity materially different from planned
• “But for” – causation
  • Logical tie between issue/event and effect
  • Segregate multiple causes
  • Watch for cumulative impacts
  • Isolate productivity loss by issue
• Notice under contract as required
• Each project unique – expert opinion necessary
Methods of Quantifying Loss

- Preferred Order – explain basis for methodology
  - Measured Mile
    - Compare impacted productivity with unimpacted work
    - Same project [ideally]
    - Quantity/time/area-based
    - Periods representative and adequate sample [10% rule of thumb]
    - Occasionally use earned value if productivity data not available
  - Productivity Factors Studies and Modified Total Cost
    - Academic and Industry studies [MCAA/NECA surveys]
    - Modified Total Cost
      - Not possible to use Measured Mile
      - Contractor’s Bid was reasonable
      - Contractor’s incurred costs are reasonable
      - Adjusted to address contractor-caused problems
  - Total Cost – no contractor-caused issues

- Convert hours to dollars and time
  - Consider exchange rates, escalation and burden
Figure 5-2. Effort and reliability of loss-of-productivity quantification methods.
Tiered Approach to Analysis

Figure 5-1. Tiered approach to damage quantification methods.
Note: LOP = loss of productivity.
Avoiding Productivity Loss

• Data Collection – contemporaneous and validated
• Monitoring and Reporting
• Initiate accounting procedures to capture and quantify
• Mitigation of Productivity Challenges
  • Planning and Scheduling
  • Adequate Supervision
  • Change Management
  • Avoid/Limit Productivity Inhibitors [waiting, turnover, accidents, etc.]
    • Additional manpower rather than extended overtime
    • 3-4 weeks of continuous OT show reduced productivity
Documentation is Key

• Role of auditors in validating reliable information
• Assess accuracy of contractor's bid/estimate
• Assess adequacy of time period or sample of “measured” work
• Review labor hours allocated to particular work item
• Segregate Change Order work [language of CO]
• Identify cause and effect
Questions

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