A Project Journey through Performance Improvement

Using Measurement to Identify and Prioritize Improvement Opportunities

Presented by: E. Chris Buck, President, Productivity Improvement Resources, Inc.
“Measure what is measurable, and make measurable what is not.”

- Galileo Galilei
Productivity Enhancement Resources, Inc

Our Services

• Statistical Productivity Improvement (SPI)
  • Quantifies workforce utilization efficiency (e.g., % of craft time on tools, as well as time spent performing other activities)
  • Multiple specific activity categories allow identification of bottlenecks or issues with Key Resource (Tools, Equipment, Materials, Information) Processes (KRP's)

• Polaris Process (P2)
  • Quantifies first tier supervision (foremen) availability to their crews at the workface
  • Qualitative tools to identify root issues
  • Foreman Availability performance has been linked to performance within quality, productivity, workforce utilization efficiency, and SAFETY
  • Named COAA Best Practice of the Year (2012)
Identify significant few...
• Excessive Travel
• Excessive Planning
• Low Foreman Availability

Then, after analysis of the data, collaborate with process owners/stakeholders to identify best possible solution.

Finally, follow up with future assessments to validate desired consequences of actions taken in response to the data.
How is Safety Measured on Projects?

• OSHA Recordable
• LWC Incidence
• Safety Audit
• Housekeeping Audit
• Hours Since Last LWC
• Near Misses
• Number of First Aid Cases
• Etc.
How is Productivity Measured on Projects?

- Productivity Factor (or other Earned Value Approach)
- ?
- ?
- ?

Why isn’t Productivity measured more extensively like Safety?
Project One

- Industry: Oil & Gas
- Location: Baton Rouge, Louisiana
- Project Type: Capital Work (Expansion Project)
- Site: Refinery
- Crew Size: 500+ workers
- Project Stage: Civil Phase (80% Completed)
Project One: Poor Performance and Delays

PM saw issues with PF, earned values, and schedule slippage. Concern was mounting and mitigating actions were put in place.
Project One Issues: Schedule Creep

- Variance reports and look-aheads were showing more and more activities threatening to delay critical milestones.
- Stakeholders were beginning to worry that the rest of the project may follow suit.

![Bi-Weekly Variance Report Results](image-url)

<table>
<thead>
<tr>
<th>Date</th>
<th>Critical Status Activities (TF = 0 days or less)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/2/2014</td>
<td>12</td>
</tr>
<tr>
<td>6/16/2014</td>
<td>14</td>
</tr>
<tr>
<td>6/30/2014</td>
<td>16</td>
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<tr>
<td>7/14/2014</td>
<td>16</td>
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<td>7/28/2014</td>
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<tr>
<td>8/11/2014</td>
<td>18</td>
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<tr>
<td>8/25/2014</td>
<td>18</td>
</tr>
<tr>
<td>9/8/2014</td>
<td>21</td>
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Persistent Signs From The Field

Compounding to the previous, supervision and management concerns coming from site walk down reports, meeting minutes, and problem-solving discussions, included:

- Questions about first line of supervision
- Seemingly excessive site travel
- Decisions around Equipment Utilization

Project One’s Management reached out to a 3rd party for an impartial analysis of issues.
3rd Party Selection & Reporting Approach

- A 3rd party firm was contracted to conduct a baseline productivity assessment and follow-up studies.
- Reports issued in cycles, with feedback on issues and opportunities.
- Worked together with team consisting of PM, contractors and stakeholders.
Baseline SPI Assessment Results

Interim reports focused on potential improvement opportunities discovered while working with an integrated management team, using feedback to determine best courses of action.

Foremen away during EOS

Elevated foot traffic outside of breaks

No equipment available
Post-Baseline: Action Plan + Tracking

- Facilitate efforts between process stakeholders to implement the best possible solutions to root cause issues.

- An action plan focused on the following significant few:
  - reevaluate foremen roles / responsibilities,
  - add a crane and change heavy machinery assignment process,
  - improve start-up activities logistics plan.
Post-Baseline: Advanced Polaris Process

Issues Affecting Execution
25 Foremen Surveyed

- Equipment Coordination: 68%
- Communication amongst contractors/crafts within area: 48%
- Communication of schedule charges: 44%
- Ease of obtaining FIWP documents: 28%
- Heat: 20%

Foreman Time Distribution Chart

- Time Available at the Workface: 45%
- Permits: 1%
- Other: 2%
- Crew Activity Task Prep, 14%
- Meetings, 8%
- Crew Management, 1%
- Timekeeping Reports, 4%
- Tool Issues, 11%
- Equipment Issues, 1%
- Material Issues, 6%
- Drawing / Schematic Issues, 2%
- Progress Reporting, 5%
- Heat Issues Affecting Execution: 25 Foremen Surveyed

AWP CONFERENCE 2015
Direct Activity vs Foreman Availability

- Overall Direct Activity improved 1.4 percentage points (4%) during study period (36.9 to 38.3%)
  - Normally expect to see a decline in direct activity of 5.3% during this period of the project
  - Net improvement 9.3%

- A linear relationship was found between foreman availability and direct activity
  - Trades with lower foreman availability worked at ~ 35% Direct Activity
  - Trades with higher foreman availability worked at ~ 43% Direct Activity
Direct Activity vs Foreman Availability

- Overall craft travel dropped 5 percentage points (21%) during study period (29.1 vs 24.2%)
  - Normally expect to see an increase in craft travel of 26% during this period of the project
  - Net improvement 47%

- A linear relationship was found between foreman availability and craft travel.
  - Trades with lower foreman availability had ~ 31% Craft Travel
  - Trades with higher foreman availability had ~ 23% Craft Travel
Productivity vs Time

- PF rose from a nominal 0.75 PF to 0.86 PF, partially attributable to increased foreman time at the workface, resulting in greater direct activity and reduced craft travel.
- Productivity during the improvement period exceeded plan numbers for 3 out of 4 months.
  - May was impacted by environmental conditions (forest fire smoke).
Productivity vs Percent Complete

- Productivity levels did not follow the typical decay curves experienced on most projects.
- PF levels continuously exceeded plan numbers during improvement cycle.
  - Overall cost outlook reduced by $11M due to better than plan PF.
Additional Observations

- Improved incident rates occurred, partially attributable to improved foreman time at the workface
  - Recordable injuries vs previous period reduced from 5 to 2
  - Total incidents reduced from 62 to 53.
- Project went 87 days with no recordable injuries during period, one of the longest stretches on the project

**Recordable Injuries**

<table>
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<tr>
<th></th>
<th>Oct'10 - Jan'11</th>
<th>Feb'11 - May'11</th>
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<tr>
<td></td>
<td>5</td>
<td>2</td>
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**Total Incidents**

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<th>Oct'10 - Jan'11</th>
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