2016 Best Practices Conference

COAA Safety & Productivity
High Level Metrics

11 May, 2016
Call to Action

Twice as Safe,
Twice as Productive
by 2020

Sector-wide improvement

- Stimulate leadership from the top – the imperative to improve
- Engage everyone – owners, engineers, contractors, labour providers, government
- Develop high-level metrics

What gets measured, gets done!
Twice as Safe

High Level Safety Metric

• Industry Standard TRIR = \( \frac{Total \ Recordable \ Incidents}{200,000 \ hours} \)

• Industry baseline data courtesy of ISNet
  (Alberta companies in selected industry codes)
Twice as Safe

High Level Safety Metric
TRIR

- 73 COAA Associate Members (various industry codes)
- 178 Alberta-based contractors (40400 industry code)
- 1,762 Alberta-based contractors (various industry codes)
Twice as Safe

High Level Safety Metric

TRIR

[Graph showing safety metric trend from 2012 to 2020 for different groups of contractors.]

- 73 COAA Associate Members (various industry codes)
- 178 Alberta-based contractors (40400 industry code)
- 1,762 Alberta-based contractors (various industry codes)
Twice as Productive

High Level Productivity Metric

• Development – by CII

  Dr. Stephen Mulva & Dr. Sungmin Yun

• Principles – by Roundtable
  o Sound methodology – accepted by industry
  o Include FEED elements + site elements
  o Intuitive for users at project level or company level
  o Underlying components can be disaggregated – insights for root cause analysis
  o Compatible with existing CII/COAA database – calculate industry baseline from data in hand
  o Data collection not onerous
CII Project-Level Construction Productivity

DISCIPLINE-LEVEL PRODUCTIVITY

Concrete Field Productivity
Structural Steel Field Productivity
Electrical Field Productivity
Piping Field Productivity
Instrumentation Field Productivity
Equipment Field Productivity
Insulation Field Productivity

Raw Productivity = \frac{\text{Actual Direct Field Wk-Hrs}}{\text{Quantity Installed}}

(Note – lower is better)

PROJECT-LEVEL CONSTRUCTION PRODUCTIVITY
Balanced Report Card

13 elements:

• Field work – 7 disciplines, ~80% of field hours
• Off-site module fabrication
• Scaffolding work hours
• Indirect work hours
• Owner team FTEs
• Engineering completeness / accuracy / timeliness
• Engineering work hours / productivity
COAA Productivity Index

Productivity Measurement Scales

Normal Distribution (Bell Curve)

- Higher Productivity
- N.A. Median Productivity
- Lower Productivity

Percentages in 8 Standard Deviations

- 0.1%
- 2.1%
- 13.6%
- 34.1%
- 34.1%
- 13.6%
- 2.1%
- 0.1%

Cumulative Percentages

<table>
<thead>
<tr>
<th>Z Scores (CII metric)</th>
<th>1%</th>
<th>5%</th>
<th>10%</th>
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Concrete Field Productivity

Productivity Measurement Scales

Normal Distribution (Bell Curve)

- Higher Productivity
- Lower Productivity

Percentages in 8 Standard Deviations

- 0.1%
- 2.1%
- 13.6%
- 34.1%
- 34.1%
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- 2.1%
- 0.1%

Cumulative Percentage

Z Scores (CII metric)

-4.0  -3.0  -2.0  -1.0  0.0  +1.0  +2.0  +3.0  +4.0

Productivity Index (COAA metric)

99  95  90  70  50  30  10  5  1

Concrete Field Productivity
N.A. median = 12.6 hr/m³

Project A
6.6 hr/m³

Project B
41.5 hr/m³

73.6  12.4
### Structural Steel Field Productivity

**Project A**
- Productivity: 39.0 hr/t

**Project B**
- Productivity: 66.0 hr/t

**N.A. Median**
- Productivity: 40.1 hr/t

#### Productivity Measurement Scales

**Normal Distribution (Bell Curve)**

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Alberta Productivity Trends

Alberta Productivity Trends

Alberta

United States

North America Heavy Industrial Median (2001-2015)

Alberta (N=33; R²=4.7%; p-value=0.224)

Target Productivity

2X
Data Gathering

Questionnaire

High-Level Productivity Metric

Benchmarking Database

Project A

Project B

... 

Project N

Productivity Index

Productivity Index

Productivity Index

CII/COAA Database

High-Level Project Productivity Benchmarking

Industry Analysis
Next Steps
... towards Twice as Safe, Twice as Productive by 2020

COAA

• Best practices and tools – www.coaa.ab.ca and www.GOProductivity.ca ✔
• Safety metric (TRIR): publish and track – early 2016 ✔
• Productivity metric: issue v1.0 – late 2015 ✔
• Proposed productivity app/website – mid 2016

Members

• Lead from the top
  • Owner CEOs/SVPs – set the bar for productivity
  • Engineer, Contractor, Labour Provider CEOs/SVPs – engage!
• Engage everyone: safety + productivity = competitive advantage
• Embrace metrics and benchmarking to drive improvement
Twice as Safe, Twice as Productive by 2020