HUMANIZING BIG DATA IN CONSTRUCTION

AGC SURETY BONDING AND CONSTRUCTION RISK MANAGEMENT CONFERENCE

HYATT REGENCY COCONUT BONITA SPRINGS, FLORIDA

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INTRODUCTIONS

• **Rose Hoyle**, PE, CRIS (moderator)
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• **Dr. Donna Laquidara-Carr**
  Industry Insights Research Director, Dodge Data & Analytics

• **Doug Ware**
  VP of Risk Management, Suffolk Construction
WHAT DOES THE DATA TELL US?

Dr. Donna Laquidara-Carr
Industry Insights Research Director
IMPROVING PROJECT PERFORMANCE WITH DATA
SMARTMARKET REPORT

➢ Online Survey of 187 Contractors
  ▪ 61% GC/CM/Design-Builders
  ▪ 39% Specialty Trade Contractors

➢ Respondents had to collect data in one of the following categories:
  ▪ Productivity
  ▪ Payroll and manhours
  ▪ Equipment Tracking
  ▪ Safety
  ▪ Project Performance

Available at: www.construction.com/toolkit/reports
MOST IMPORTANT DATA TO GATHER
HIGH/VERY HIGH VALUE

- Project Performance Data (Schedule, Cost): 93% GC/CM/DB, 91% Specialty Trades
- Payroll and Manhours: 71% GC/CM/DB, 91% Specialty Trades
- Productivity Data: 71% GC/CM/DB, 87% Specialty Trades
- Safety Data: 63% GC/CM/DB, 66% Specialty Trades
- Equipment Tracking Data: 33% GC/CM/DB, 49% Specialty Trades
IMPROVEMENT IN DATA GATHERING
IN THE LAST 3 YEARS

- Improved or Significantly Improved: 64%
- Remained About the Same: 34%
- Declined: 2%
CAPABILITIES THAT CREATE BENEFITS
PERCENTAGE SELECTED BY CONTRACTORS

- Gather Accurate Data from the Field: 53%
- Gather Data from the Field: 46%
- Gather Data That is Comparable Across Projects: 46%
- Create Custom Reports: 38%
- Conduct Analysis Across Different Types of Data: 34%
- Store Data in an Easily Managed Way: 30%
- Do Trend Analysis Across Projects: 29%

Contributed to Achieving Benefits
CAPABILITIES THAT CREATE BENEFITS
PERCENTAGE SELECTED BY CONTRACTORS

- Gather Accurate Data from the Field: 53% (Contributed to Achieving Benefits), 54% (Improvements Needed to Increase Future Benefits)
- Gather Prompt Data From the Field: 46% (Contributed to Achieving Benefits), 42% (Improvements Needed to Increase Future Benefits)
- Gather Data That is Comparable Across Projects: 46% (Contributed to Achieving Benefits), 44% (Improvements Needed to Increase Future Benefits)
- Create Custom Reports: 38% (Contributed to Achieving Benefits), 30% (Improvements Needed to Increase Future Benefits)
- Conduct Analysis Across Different Types of Data: 34% (Contributed to Achieving Benefits), 38% (Improvements Needed to Increase Future Benefits)
- Store Data in an Easily Managed Way: 30% (Contributed to Achieving Benefits), 32% (Improvements Needed to Increase Future Benefits)
- Do Trend Analysis Across Projects: 29% (Contributed to Achieving Benefits), 45% (Improvements Needed to Increase Future Benefits)
USING TECHNOLOGY TO IMPROVE RISK MANAGEMENT IN CONSTRUCTION SMARTMARKET INSIGHT

➢ Online Survey of 135 Contractors
  ▪ 59% GC/CM/Design-Builders
  ▪ 41% Specialty Trade Contractors

➢ Qualitative in-depth interviews with 12 representatives from 10 insurance companies and brokerages

Available at: www.construction.com/toolkit/reports
MOST CHALLENGING RISK MANAGEMENT ACTIVITIES

- Ongoing Management of Project Risks: 13%
- Preparing Critical Assessment of Project Risk: 17%
- Accounting Issues for Projects: 17%
- Identifying Project Risks: 6%
We proactively monitor risk practices onsite.
There are clear ways to measure a project’s overall risk performance.
Overall project risk performance is frequently measured.
## Collecting and Analyzing Data

<table>
<thead>
<tr>
<th>Activity</th>
<th>Small Companies</th>
<th>Medium Companies</th>
<th>Large Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting Digital Safety and Risk Data</td>
<td>38%</td>
<td>53%</td>
<td>76%</td>
</tr>
<tr>
<td>Analyzing Raw Safety and Risk Data</td>
<td>36%</td>
<td>62%</td>
<td>81%</td>
</tr>
<tr>
<td>Incorporating Raw Safety and Risk Data Into Existing Data Sets</td>
<td>36%</td>
<td>43%</td>
<td>64%</td>
</tr>
<tr>
<td>Developing and Acting Upon Key Safety and Risk Insights</td>
<td>62%</td>
<td>81%</td>
<td>87%</td>
</tr>
</tbody>
</table>
The majority are [gathering data] at a very basic level ...[Those using technology are in] an exploratory phase: smaller proof of concepts, pilots ...

I don’t think they gather data to measure risk outside of risk of performance, and health and safety.
TYPES OF RISK THAT IOT CAN HELP ADDRESS
ACCORDING TO CONTRACTORS

- Occupational Risks: 41%
- Risks to the Public: 24%
- Property Damage Risks: 27%
- Construction Defects: 22%
- Financial Risks: 18%

(Chart showing percentages of improvement in different areas)
It’s going to be standard operating procedure that when you show up to work, you get issued your wearable, and you go along as you’ve always done, but there’s data being collected that will be used to mitigate those risks.

We’re seeing technology that can recognize that a worker is not wearing a hardhat, a ladder isn’t secured, someone’s not wearing fall protection, or moisture is causing mold. Things that everyday workers may not see and recognize.
IMPROVEMENT IN DATA GATHERING
IN THE LAST 3 YEARS

- Absorb Costs in Expectation of Long-Term Gains: 44%
- Pass on Costs: 32%
- Tie to Replacement of an Existing System: 13%
- Dedicated Innovation Budget: 10%
MOST IMPORTANT FACTORS WHEN EVALUATING TECHNOLOGY

- Ease of Use: 79%
- Costs: 73%
- Training and Support Available: 51%
- Quantified ROI: 33%
Most Important Factors When Evaluating Technology

1. Our relationship with insurance carriers is more of a partnership than a one-off transaction.
   - Agree Somewhat: 35%
   - Agree Strongly: 21%

2. My insurance carrier understands the importance of emerging technology for project risk.
   - Agree Somewhat: 31%
   - Agree Strongly: 7%

3. My insurance carrier is open to integrating emerging technology into project risk pricing.
   - Agree Somewhat: 24%
   - Agree Strongly: 6%
HOW ARE CONTRACTORS USING THE DATA

Doug Ware
VP of Risk Management
What is Predictive Analytics?
“A variety of statistical techniques from data mining, predictive modelling and machine learning, that analyze current and historical facts to make predictions about future or otherwise unknown events” Wikipedia

What is the Question/Challenge?
Predict the likelihood of an incident happening, using image recognition, and other data sources.
WHERE WE STARTED

700k+ images
360 projects
10 years

Will an incident occur in the next week?
PROOF OF CONCEPT
87% 
Observations raised in the selected data range that were due before today and closed on time.

Date | Status | Project Name | Project Number | Method Of Identification | Great Catch | Hazard Category | Risk Factor | Observation | Trade Partner | Required Action | Responsibility |
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
04/15/2019 | New | | 2I7039.0 | Planned Maintenance | Standard Observations | Hand and Power Tool | 0 | good use of gas when cutting nails | | | |
04/14/2019 | New | | 2I7111.0 | Routine Inspection | Standard Observations | Walking and Working Ladders | 2 | clearly mark tripping hazard and direct foot traffic away from | | | |
THE RESULTS

12-Month Rolling LTIR and TRIR As % of Reference Date

September 2017 = 100%
To learn and explore by doing;
To build new models for areas of risk;
To understand the operational, social and business impacts;
To chart course through obstacles and bring the benefits of predictive analytics to the AEC industry
Data Analytics in Construction: No shortage of opportunities across the project lifecycle

- Incident prediction and prevention
- Anticipating quality challenges
- Business Development: Identifying “most likely to win” projects
- Estimating: Refining pricing through bid-to-actuals comparison
- Anticipating and preventing margin erosion
- Predicting and optimizing schedule
- Schedule Analytics
AGGREGATING AND HUMANIZING

Rose Hoyle
Strategic Operations for Risk Engineering
THE CONTRACTOR’S DILEMMA

- How do I translate data into insights?
- Will it scale?
- Which tech is right for my business?
- What’s the ROI?
- How do I manage all the platforms?
- Can tech reduce risk?
- How much does it cost?
- Can tech increase profitability?
AXA XL’S RESPONSE

• Skin in the Game
• Doing the Legwork
• Data Through Partnerships
• Ecosystem Platform
• Trending and Benchmarking
• The Human Element: Data Analytics + Risk Engineering = Risk Analytics
An Ecosystem is an integrated, digital experience, providing an interconnected set of services & products which enables AXA XL & our customers to partner, unlocking & connecting unique insights and opportunities to manage risk.
AXA XL ECOSYSTEM

- Risk Dashboard
- Tailored Risk Analytics Services
- Tailored Claims Services
- Tailored Form/Coverages
- Benchmarking
- Predictive Risk Indicators
- Reduce the Cost of Risk
- Better Risk Selection