WECC HPWG

Aligning Enterprise Software with Human Performance Excellence
DevonWay – who we are

- Provide enterprise software to manage safety and continuous improvement systems for many utilities, including 70% of the domestic nuclear industry
- Help many of our clients implement enterprise software to manage these HU programs:
  - Corrective Action Programs
  - Safety Observations
  - Self Assessments
  - Training evaluations
  - QA Audits
  - Safety Culture Surveys
  - Suggestions
  - Employee Concerns
  - Rewards & Recognition
  - Trending programs
  - KPIs & Metrics
  - HU Evaluations
  - Many more…

- Goal today is to share and show some best practices we have learned
Humans are....

- the cause of most business problems, but
- also the source of all innovation

Human Performance is an Under-Served Opportunity

- **ERP** systems are best at managing physical assets
- **Social media** helps efficiency but does little for effectiveness

*DevonWay takes a new approach on this important topic*
Humans are Imperfect ... Let us Count the Ways

- Task Demands
  - Time Pressure
  - High workload
  - Simultaneous, Multiple tasks
  - Repetitive actions/monotony
  - Irrecoverable Actions
  - Interpretation Requirements
  - Unclear goals, roles, or responsibilities
  - Lack of/unclear standards

- Individual Capabilities
  - Unfamiliar with task/first time
  - Lack of knowledge
  - New technique not used before
  - Imprecise communication habit
  - Lack of proficiency/inexperience
  - Indistinct problem solving skills
  - Can do attitude for crucial task
  - Illness or fatigue

- Work Environment
  - Distractions/interruptions
  - Changes/departure from routine
  - Confusing displays/controls
  - Work around
  - Hidden system responses
  - Unexpected equipment conditions
  - Lack of alternate indication
  - Personality conflicts

- Human Nature
  - Stress
  - Habit patterns
  - Assumptions
  - Complacent/overconfidence
  - Mind set (intentions)
  - Inaccurate risk perception
  - Mental shortcuts (biases)
  - Limited short term memory

Are we doing enough to help humans in everyday work?
Golden Rules for Deploying Everyday Knowledge

• Involve Everyone (make it easy to contribute)
  *Everyone has ideas, often. Share, Notify and Alert*

• Provide Feedback (the ingredient of success)
  *Reward contributors with acknowledgement*

• Follow the Right Process (reduce burden) *(Eskom)*
  *Report ➔ Address ➔ Improve*

• Use Trends to help make Decisions. *(#1 problem statement 80%)*
  *Establish metrics without increasing workload*

• Measure impact.
  *Contributions count. Connect processes. Tell them why?*

• Stay Current with Change. Change is ongoing. *(due date extensions)*
  *Align people, processes, and technology*
Software Plays a role in Human Performance

Human behavior result of:
• Negative attitude
• Lack of motivation
• Work environment unsupportive of good performance
• Personal influence on the worker (e.g. state of mental or physical health)
• Unnecessary burden of administrative duties

Source: IAEA No. NG-T-2.7
Bechtel selected DevonWay to supply a project corrective action program that is
1. mobile and easy to use,
2. designed to capture knowledge and “lessons learned” across all projects.
3. Configurable for all global business units

Implementation on-going to 24,000 users, about 50% of the global workforce.
Bechtel Example Benefit

**Condition:** Inexpensive grating clips cost 10X more to install

**Cause:** Supplier chose clips based on purchase price rather than overall cost

**Solution:** Update hardware guide and include Construction procurement reviews

**Knowledge:** Shared with dozens of construction projects
Savings: $25K/Project/Yr = + $2 million/Yr

*Small Part*

*Big Difference*
+ $2 million annual savings
Best Practices

- Drive adoption of HU tools – critical mass is key
  - ideas silo -> integrated ideas module

- Simple to use, assist users wherever possible
  - Rules govern expectations – APS Fossil vs. T&D CRs

- Introduce positive elements to human performance tools:
  - Tie rewards & recognition into crew observations
  - Communicate exceptional performance observed
  - Incident reporting should feed information back to initiator
  - Integrate social media & gamification into tools
Sample Observation Card – Integrated Tools to Drive Critical Mass
Screening Criteria – Drives level of engagement

### Preliminary Questions

1. **Was this event a good catch or a close call, i.e. there was no injury, property damage, vehicle damage or production services interruption?**
   - Yes
   - No

2. **Was there a fatality, amputation, electrical contact, eye loss, hospitalization, serious OSHA citation, or property damage exceeding $100,000?**
   - Yes
   - No

3. **Did this event result in an employee or contractor injury?**
   - Yes
   - No

4. **How many employees or contractors were injured?**
   - 14

5. **Did this event involve a motor vehicle?**
   - Yes
   - No

6. **Did this event result in property damage?**
   - Yes
   - No

7. **What kind of property was damaged?**
   - Company

8. **Did this event result in loss or interruption of production of services?**
   - Yes
   - No

9. **Did the event occur on company premises?**
   - Yes
   - No
Best Practices

- Integrate software tools directly with Key Performance Indicators (KPIs)
  - Minimize data entry requirements or people will question and complain.
  - Easily manage KPI library
- Establish common metrics for benchmarking
  - Consider benchmarking tools – USA Example
Metrics & KPIs

Data and Analysis By Period

- Analysis: Working
- Complete
- Current Period: January-2015
- Jump to Period
- Total CRs Created: 11
- Level A & B Created: 91.0
- Test: 2.00
- Return to Excellent By: October-2015
- State of Period: Analysis
- Analysis: Test 3766q
- Actions: qq

Chart

CRs Created By Month

- Last Period: 12
- STDev (6 months): 78.25
- Total (6 months): 389
- Average (6 months): 46.83
- High: 6 (6 months): 220

DevonWay
PI-1.03-CAP-CAPEVALTIME - CAP Evaluation - Upper Level CAP Evaluation Timeliness (time to complete RCE / ACE / CCE) - Jun-14

KPI Score: Green

Performance Improvement: Susquehanna KPI

Good

PI-1.03-CAP-CAPEVALTIME - CAP Evaluation - Upper Level CAP Evaluation Timeliness (time to complete RCE / ACE / CCE)

- Jul-13: 37.0
- Aug-13: 39.0
- Sep-13: 35.0
- Oct-13: 30.0
- Nov-13: 30.0
- Dec-13: 35.0
- Jan-14: 38.0
- Feb-14: 29.0
- Mar-14: 29.0
- Apr-14: 27.0

Upper Level CAP Evaluation Timeliness (time to complete RCE / ACE / CCE)
Best Practices

- Make sure mobile option and reporting are simple and available
Best Practices

- Implement a Corrective Action Program (CAP)
  - Low threshold for condition report entry
  - System-driven workflow to minimize committee meetings
  - Integration with related processes
  - Report problems immediately with minimal clicks/taps
  - Develop a knowledge warehouse
  - Enable anonymous reporting
  - Minimal administrative overhead (cumulative effects)
  - Simple screening criteria to drive workflows
  - Share Knowledge

Goal: Continuously Improve by Better Engaging the Workforce
Corrective Action Program

Initiation

Date of Event: 03/24/2014
Time of Event: 
Identified By: Individual

CR Originator Info:

Luis Orozco

Title: Improper finish of concrete in temporary fuel station slab (unconsolidated concrete/cold joints).

Description of Condition:

As it can be seen from the attached picture, there are sections of the fuel station slab that have honeycombs, cold joints, placement lines and a poor concrete finish. This, in addition to the poor appearance, has the potential of rebar cover not meeting requirements to prevent corrosion and

Immediate Actions Taken:

I spoke to concrete supplier and he will make sure delivery tickets are completely filled out. I spoke to one of the superintendents involved in the pour (concrete superintendent is on vacation) and he will ensure the right plan is put together for the next pour.

Assignees

Responsible Organization:

Responsible Manager:

Responsible Person:

Quality POC:

External POC:

Workflow Steps

Initiate Evaluate Causal Analysis Implementation Verification Close
Corrective Action Program

Plan and Evaluation

Extent of Condition/Investigation:

We had a meeting with supervision, craft and field engineering in which we went over the quality issues we had with the fuel slab pour. We also talked about other quality issues which have occurred in other concrete pours. A copy of the PowerPoint presentation used has been attached to this CLCA.

Plan:

1) Supervision will put together a list of questions which will be used by ER to hire concreters.
2) Supervision will pair people with those who are experienced.
3) A site specific prepour checklist.

Cause Codes

<table>
<thead>
<tr>
<th>Cause Code</th>
<th>Rationale</th>
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</thead>
<tbody>
<tr>
<td>A4B3C2; Work plan/schedule</td>
<td>Out of all the reasons listed above, the most important is having a meeting. With such meeting, all problem sources would have been either avoided, prevented or planned for.</td>
</tr>
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Actions

<table>
<thead>
<tr>
<th>#</th>
<th>Action Identifier</th>
<th>Action Title</th>
<th>Actionee</th>
<th>Due Date</th>
<th>Description</th>
<th>Action Type</th>
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<tbody>
<tr>
<td>1</td>
<td>ACT-01-23</td>
<td>Concrete Superintendent</td>
<td>Hagins, Garry</td>
<td>04/30...</td>
<td>Put together a list of qualifying questions which will be used by ER to hire concreters.</td>
<td>Remedial</td>
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Workflow Steps

1. Initiate
2. Evaluate
3. Causal Analysis
4. Implementation
5. Verification
6. Close
### History for CR 2014-1014

#### History Overview

- 04/02/2014: 30
- 04/08/2014: 15
- 04/09/2014: 15
- 04/10/2014: 15
- 04/21/2014: 60
- 05/16/2014: 30
- 05/22/2014: 15
- 05/28/2014: 15
- 06/26/2014: 60

#### History Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Changed By</th>
<th>Field</th>
<th>From</th>
<th>To</th>
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<tbody>
<tr>
<td>04/02/2014</td>
<td>Orozco, Luis</td>
<td>Initiator</td>
<td>Orozco, Luis Alberto - Construction</td>
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<tr>
<td>04/02/2014</td>
<td>Orozco, Luis</td>
<td>Choose GBU</td>
<td>OG&amp;C Condition Report</td>
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#### Workflow Details

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<tr>
<th>Event</th>
<th>Status</th>
<th>Assigned To Team</th>
<th>Created By</th>
<th>Created On</th>
<th>Finished By</th>
<th>Finished On</th>
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</table>

### Step: Causal Analysis
Additional Best Practices

- Effective trending
  - Apply statistical analysis to determine trend
  - Trend code library small enough for adequate sample size each period
  - Adopt trend guidance proven effective elsewhere in the industry
INPO 07-007 – Performance Assessment and Trending

Attachment 1
General Trending Guidance

THE CONTROL CHART METHODOLOGY

For the purpose of applying statistical process control to CAP data, the following set of standard rules may be used to define a trend:

- Individual points above the Upper Control Limit
- Individual points below the Lower Control Limit
- Seven points in a row all above or below the average
- Seven points in a row either increasing or decreasing
- Ten out of eleven points in a row all above the average or below the average
- Two out of three points in a row more than two standard deviations above or below the average
- Four out of five points in a row more than one standard above or below the average
<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>May-14</th>
<th>Jun-14</th>
<th>Jul-14</th>
<th>Aug-14</th>
<th>Sep-14</th>
<th>Oct-14</th>
<th>Nov-14</th>
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<tbody>
<tr>
<td>D5e1 - Admin Procedures (PMIs/PMPs/DHIs) Non-Compliance</td>
<td>727</td>
<td>40</td>
<td>40</td>
<td>53</td>
<td>65</td>
<td>69</td>
<td>126</td>
<td>40</td>
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<td>OE4 - Human Performance Program</td>
<td>4757</td>
<td>328</td>
<td>334</td>
<td>350</td>
<td>397</td>
<td>424</td>
<td>728</td>
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<td>PI6 - Observation Program</td>
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<td>-</td>
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<td>-</td>
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<tr>
<td>ZHP3 - Crew Human Performance</td>
<td>1127</td>
<td>82</td>
<td>71</td>
<td>77</td>
<td>101</td>
<td>98</td>
<td>193</td>
<td>7</td>
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<tr>
<td>ZHP4 - Other Human Performance Issue</td>
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<td>52</td>
<td>59</td>
<td>54</td>
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<td>62</td>
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<td>9</td>
<td>8</td>
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<tr>
<td>ZHPIV - Human Performance error due to independent verification</td>
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<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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Trending

CAP Trending Reason Code - Dec-14:
Owning Group: Projects

Status: Yellow

Graph: C1p2 - Project Management Vendor Deficiency Issues

- Last Period: 2.0
- STDDev (12 months): 5.42
- Total (12 months): 89.0
- Highest (12 months): 18.0

Analysis Criteria:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value of X</th>
<th>Value of Y</th>
<th>Violation Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>X or more consecutive periods Ab...</td>
<td>5</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Above Upper Control Limit X or m...</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>
Common Mistakes When Looking at Data

- Not understanding normal variation
- Giving unusual weight to extreme values
- Predicting the future based on a small data set
- Announcing a Trend without it passing statistical tests

\[
z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}
\]
Business Intelligence
Occupational Safety & Health/OSHA Reporting

Event Description:
An employee fell off of truck number 11818. After tying off a tail bumper, slipped and fell to the ground.

Workflow Steps:
Initiate → Close

Safety Status Report - Direct Employee
Current Week: 7

0 Fatalities
0 Lost Time Injuries
0 All Recordable Injuries
0 Minor Injuries
0 Close Calls
1 MVAs

<table>
<thead>
<tr>
<th>Event ID</th>
<th>Event Date</th>
<th>Responsible Unit</th>
<th>Owning Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
Additional Best Practices

- Consider Specialized HU Investigation Tool
Software Demonstration

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(o) (704) 706-9333