SEE, Solve, Share & GoGreen:
Four Concepts to Create a Powerful Participatory Ergonomics Culture in a Physically Challenging & Dynamic Workplace

Applied Ergonomics Conference Webinar
1-14-15

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Agenda

- Overview of Bath Iron Works (BIW)
- Define Physically Challenging Work
- Describe our Participatory Program
  - SEE, Solve, Share
  - Risk Assessment Tools – Go Green
- Share Solutions & Ergo Cup
- Future and Impact of Program
- Q&A
Bath Iron Works Overview

- Established in 1884
- Design & Build Navy Surface Combatants (frigates, cruisers and destroyers)
- ~6,000 people, 4 Unions, 29 Trade Classifications
What is Physically Challenging Work
Definition of PCW – Part 1

1. Physically Challenging (Demanding)
   - Traditional definition
     - DOT “Heavy” “Very Heavy” work classification
   - New Ergo Definition: Risk factors @ upper end of human capabilities
     - Force > 50 MVC (grip, MH)
     - Posture > 50 ROM
     - Vibration > 5m/s² or 1.15 m/s²
     - Contact Stress (hard/sharp objects)
     - Duration (min. 4hrs, >8 hrs)
     - Repetition (may not be a factor - low or high rates)
2. Challenging Work Environment

1. Weather
   - Cold (snow/ice/rain),
   - Hot (heat/humidity),
   - Wind
   - Other (storm, waves, fire)

2. Workplace
   - Heights (low/high),
   - Tight space & narrow work surfaces,
   - Heavy tools/equipment,
   - Schedule demands,
   - Safety hazards,
   - Demographics (not average - High Turnover / Nature Selection)
Challenge with PCW

- Most jobs are rated as high risk (all red)
  - Most risk tools do not have enough sensitivity to rank various levels of risk (exception is material handling)

- Most companies focus on injury data and employee feedback
  - Develop own unique risk assessment tools

- Difficult to make design changes due to the nature of the product (i.e., ship) or environment
Welcome to the Shipyard, Ergo Boy…
It’s Not Heavy… It Just Needs Handles
BIW Participatory Program

Ergo Culture, empowers mgt & employees to:

1) "SEE" ergonomic risks,
2) Solve issues, and
3) Share best practices.

3 Tier Approach:
1. Self Help,
2. Trained Help,
3. Expert Help
Learning to “SEE” (Shipyard Ergo Evaluation)

Avoid Red

Back, Neck, Shoulders, Elbows, Knees
Go Green – Off The Floor
Go Green – Off The Floor
Learning to “SEE” (Shipyard Ergo Evaluation)

3 Steps:
1. Choose Reach Distance
2. Choose Body Zone
3. Identify Risk:
   - Green = Low (Ideal)
   - Yellow = Medium (Caution)
   - Red = High (Avoid)

Avoid Red
Use Mechanical Assistance
Learning to “SEE” (Shipyard Ergo Evaluation)

YOU BE THE JUDGE

BEFORE YOU LIFT

Get Closer (raise, slide, turn, or tilt object)
Get Help (more people, leverage, tools, equipment, cranes)

RECOGNIZE RISK

Compare the weight of the object you are lifting to the weight in the guideline to identify a potential risky lifting situation.

25 LBS or less

Step 1: Reach Distance
Forearm Reach
Arm Reach
Beyond Arm Reach

Step 2: Body Zone
Below Knees
Knee to Shoulder
Above Shoulder

50 LBS or less

Step 3: Risk Level
Green = Low (Ideal)
Yellow = Med (Caution)
Red = High (Avoid)

Over 50 LBS

SEE RISKS - SOLVE ISSUES - SHARE SUCCESSES

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SEE- Hand Arm Vibration
### Learning to “SEE” (Shipyard Ergo Evaluation)

Tools are identified based on vibration and exposure.

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Daily exposure time.
Engaging Employees to Solve Problems

1. Safety / Ergo Committees
2. Employee Suggestion Program
3. Ergo Cup Competition

Goal: Recognize and encourage the development of innovative ergo solutions by employees

- Ergo Committee votes
- Quarterly winners
- Grand Champion
  - Attend Applied Ergo Conference
Applied Ergo Conference
Team Booth

Dan Francisco, Shawn Boyce, Todd McPhee, Marc James, Jamie LaPlante, and Ron Pinard
Team in Action
Ergo Cup Winners

Excellence Award for “Cost Savings”

Team-Driven Workplace Solution Excellence Award, “Ergo Risk Reduction”
Share Successes with Others

- ErgoTalks and Newsletters
- Communication Meetings - Videos
- Best Practices Solutions

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Solutions

Now That Is More Ergonomic ….
Go Green – Off The Floor
Backpacks - Redistribute the Weight
New Equipment

- 50% less vibration
- 3x removal rate
- 33% lighter
Plasma Machines
56% Lighter
80lbs Vs. 35lbs
Equipment / Material Substitution

Aluminum Fittings - 67% Lighter
90lbs Vs. 30lbs = 5,000lbs per ship
Lighter Liners

50% Reduction in Weight
2012 Ergo Cup Winner
Piranha Jig

Low Risk
Safer
2.7x Faster
Plate Edge Prep Tool

70% Reduction in HAV
4x Faster
50% less consumables
Lessons Learned

- Small Improvements
  - can’t fix everything or eliminate all risk

- Simple solutions tend to work best for PCW
  - Introducing handles where there were none
  - Using wheel instead of lifting & carrying
  - Elevating the work area
  - Provide padding to improve comfort
  - Work organization / planning of work

- Get employees involved in the process

- Awareness and education on risks and limitations of human body
Future – what we are working on

- Risk assessment tool that defines the full spectrum of human capabilities:
  - Applying human performance principles to everyday jobs
  - Objective measurement equipment to evaluate processes and solutions
Seeking Answers Through Science

EMG Studies on Grip, Gloves and HAV

Pressure Mapping
Knee Pad Study
Discussion

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