From OHSA Citation to Ergo Cup Celebration: The BIW Journey

Ben Zavitz, CPE

Corporate Ergonomist

General Dynamics, Bath Iron Works

Applied Ergonomics Conference Webinar

Bath Iron Works

- Designer & Builder of Navy Surface Combatants
  - Established in 1884
    - Owned, General Dynamics
  - 6,500 employees
  - 4 Unions
  - 29 Trade Classifications

GENERAL DYNAMICS
Bath Iron Works

What We Do

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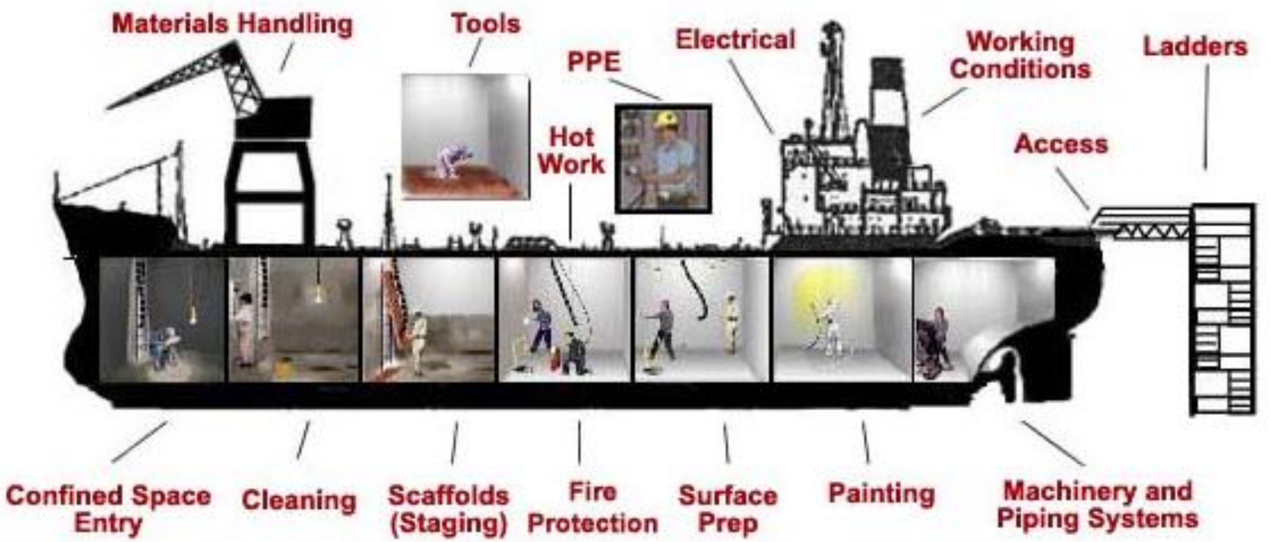
Challenges

- Hazardous Environment
- Physically Demanding Work
- Challenging Work Environment

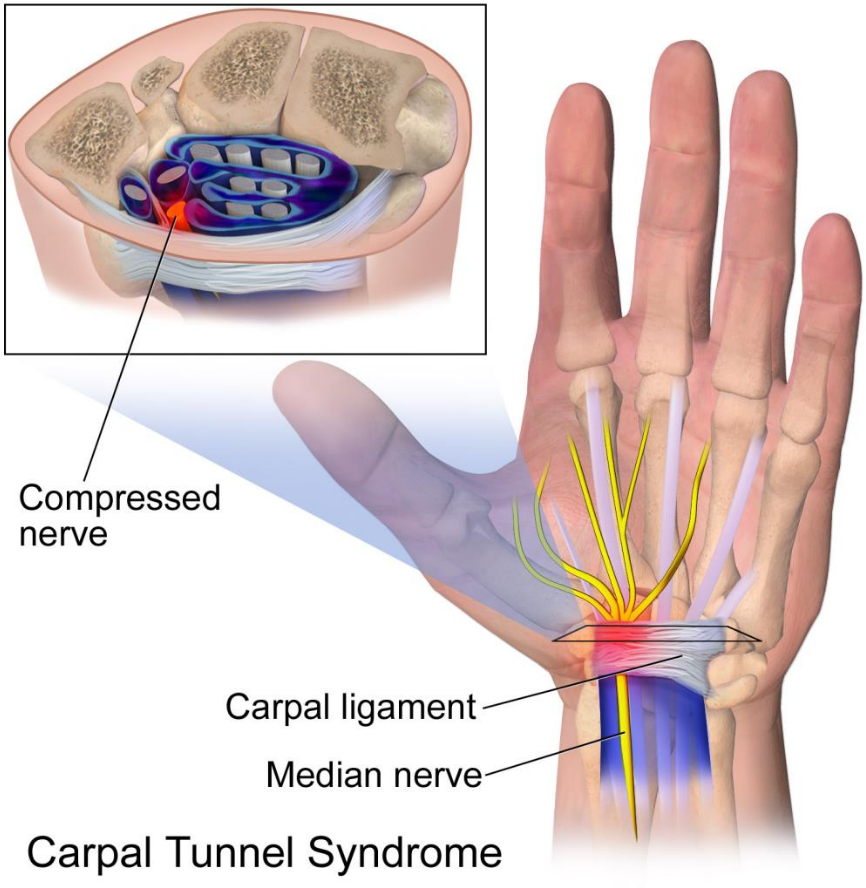


How it all began…

OSHA Site Specific Targeting Program

- 2007 On-site inspection
  - IH, Recordkeeping, Ergo

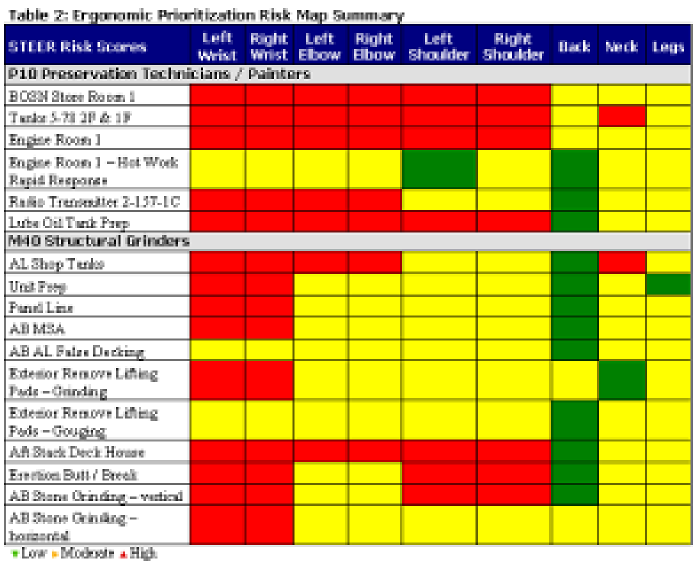
High # Injuries from Grinding

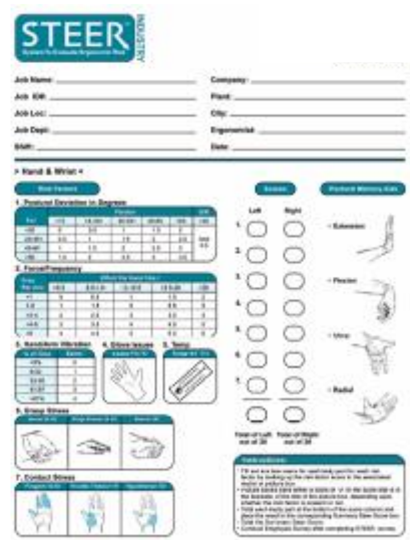


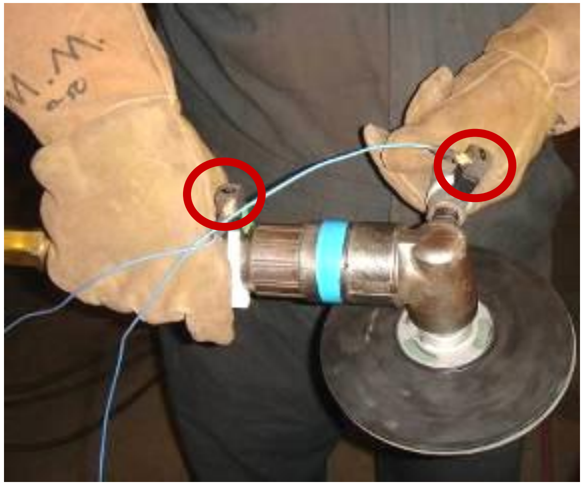
Mitigate OSHA Hazards

Follow DMAIC Process

1. **<u>Define</u>** - Injuries, OSHA citation
2. **<u>Measure</u>** – Risk Assessment







Tip #1: Gaining Trust

… Tank Story

Employee Asks You to Try Their Job – <u>DO IT !</u>

Mitigate OSHA Hazards

3. Analyze

- 33 Potential Solutions
- Impact Analysis
- Prioritization Matrix

Solutions	Hands/ Wrists	Elbows	Shoulders	Back	Neck	Legs
PPE						
Anti-vibratory Gloves	Low					
Grip Gloves	Low	Low				
Knee Pads						Mod
Knee Savers						Low
Elbow Pads		Low				
Body Support Pads				Mod	Mod	Mod
Neck Support					Low	
Work Practice						
Raise Work Off Floor				Mod		Low
Keep Work Inside	Low					
Administrative						
HAV Program						
Task Rotation	Low	Low	Low	Mod	Mod	Mod
Right Tool Right Job	Low	Low				
Tool Training	Low	Low				
Daily Tool Maintenance	Low	Low				
Grind To Spec / specific instructions on daily tasks	Low	Low				
Behavior Based Training	Low	Low	Low	Low		Low
Simple Equipment						
Swivels & quick disconnects	Low	Low				
Creepers				Mod	Mod	Mod
Wearable Lights				Low	Low	
Hose Management Systems						
Tool Belt for Abrasives			Low			
Hand Tools						
Ergo Tools	Mod	Low				
Tool Maintenance - PM	Mod	Low				
Custom Equipment						
Grinding Carts/Tool Extensions	High Med	Mod	Mod	Low	Low	Mod
Double Grinding	High Med	Low	Low			
Mechanized Grinding	High	High	High		Mod	
Tool Monopod	High Med	Mod	High		High Med	
Tool Balancers	Low	Low	Low			
Foot Pedal for Man Lift		Low	Mod		Low	
Design/Process						
Upstream Processes	Mod	Mod	Mod	Mod	Mod	Mod
Grinding Reduction Team	Mod	Mod	Mod	Mod	Mod	Mod
DFA/DFM, Lean Six Sigma	Mod	Mod	Mod	Mod	Mod	Mod

Low = < 20%, **Mod** = 20-30%, **High Med** = 30-40, **High** = >40%

Mitigate OSHA Hazards

4. Improve

4 Categories

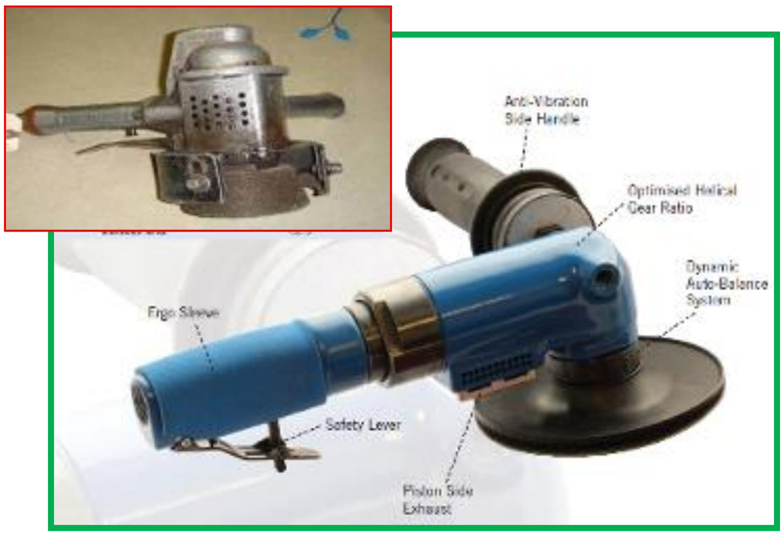
1. Administrative/Work Practice (5)
2. Hand Tools (3)
3. Custom Equipment (4)
4. Long Term Grinding Reduction

Established Mfg. Ergo Steering Committee with 4 sub-teams (ORG)

Solutions	Impact Ranking
Mechanized Grinding	3.1
Grinding Carts/Tool Ext	2.85
Tool Maintenance - PM	2.75
Double Grinding	2.7
Daily Tool Maintenance	2.5
Grind To Spec	2.5
DFA/DFM, Lean Six Sigma	2.45
Grinding Reduction Team	2.45
Upstream Processes	2.45
Tool Monopod	2.4
Behavior Based Training	2.35
Right Tool Right Job	2.35
Tool Training	2.35
Task Rotation	2.2
Ergo Tools	2.15
Swivels / quick disconnects	2.05
Foot Pedal for Man Lift	2
Anti-vibratory Gloves	1.9
Grip Gloves	1.9
Tool Balancers	1.75

Mitigate OSHA Hazards

Eliminated High Vibration Tools



65% less vibration
2-3x removal rate
1/3 weight

70-90% less vibration

75% less vibration
20% more removal

GENERAL DYNAMICS
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Mitigate OSHA Hazards

Custom Developed Tools

95% Risk Reduction

Eliminates force, rep. motion, vibration

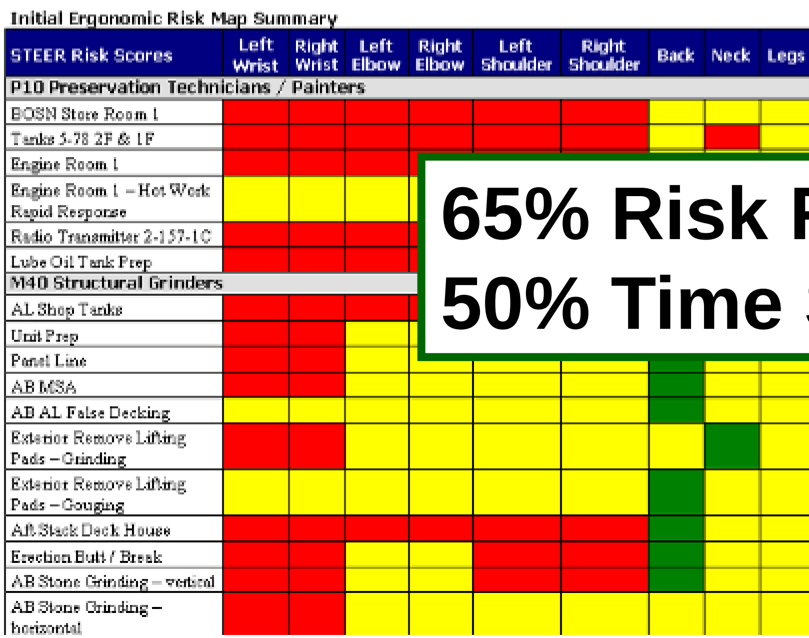
50% Improvement Productivity

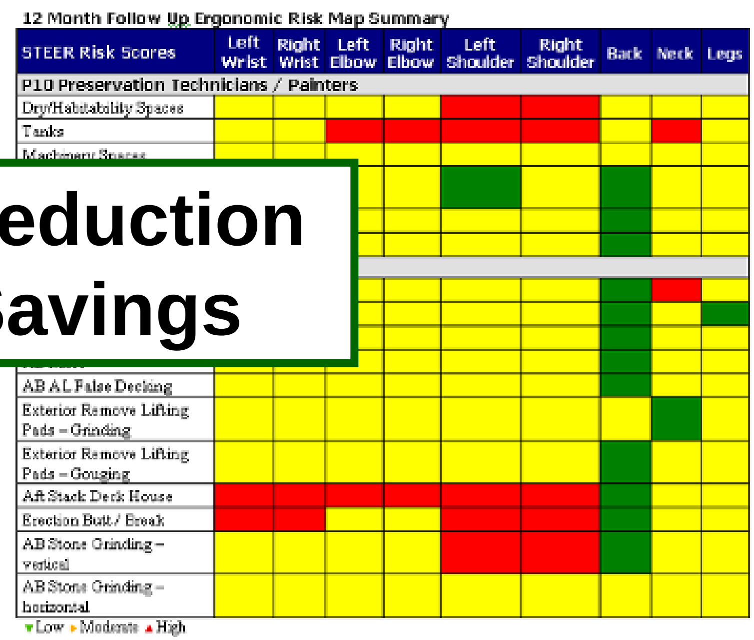
50% Less Consumables

Mitigating OSHA Hazards

5. Control

Verify Results and Impact





65% Risk Reduction

50% Time Savings


Welcome to the Shipyard,
Ergo Boy

Tip #2: Don’t Assume

It’s Not Heavy………..
It Just Needs Handles!

Spend Time to Understand Culture, Risks and People

Participatory Program

SEE, Solve, Share

Engage & Empower

3 Tier Process

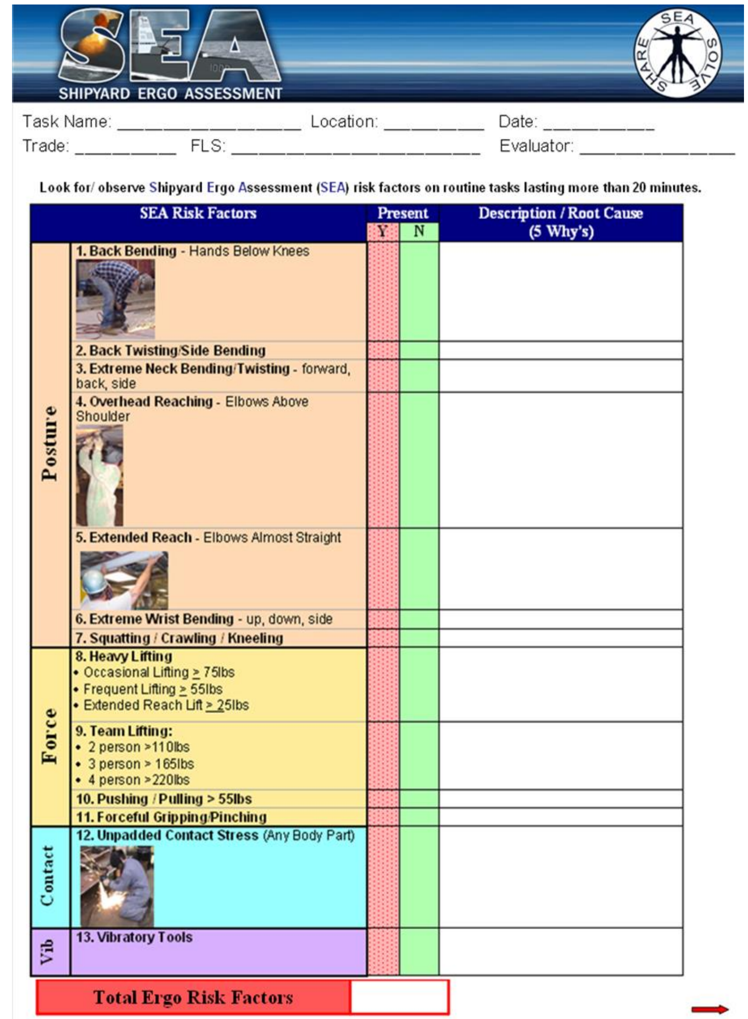
I. Self,

II. Trained,

III. Expert

In the Beginning …………

- Simple Risk Tool
  - 13 Yes/No questions
  - Clever use of "SEA"
- Feedback
  - Too Complicated
  - Spelled SEA wrong



SEA
SHIPYARD ERGO ASSESSMENT
SEA SHARE SOLVE

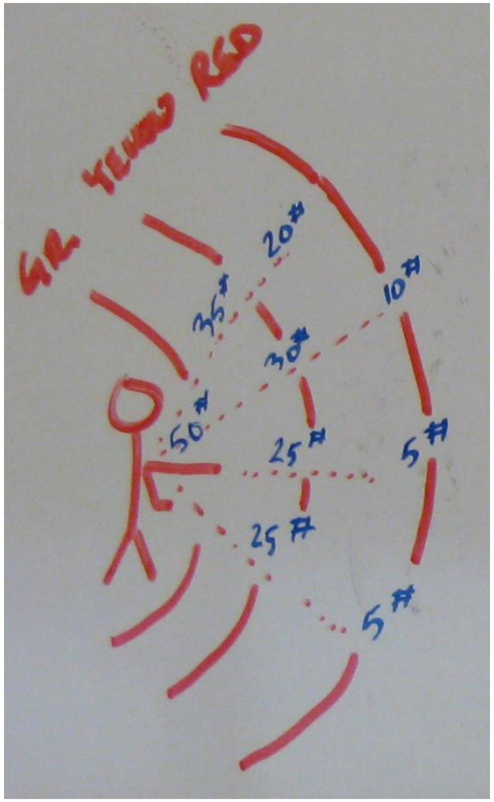
Task Name: ________________ Location: _________ Date: _________
Trade: _________ FLS: ____________________ Evaluator: ____________

Look for/ observe Shipyard Ergo Assessment (SEA) risk factors on routine tasks lasting more than 20 minutes.

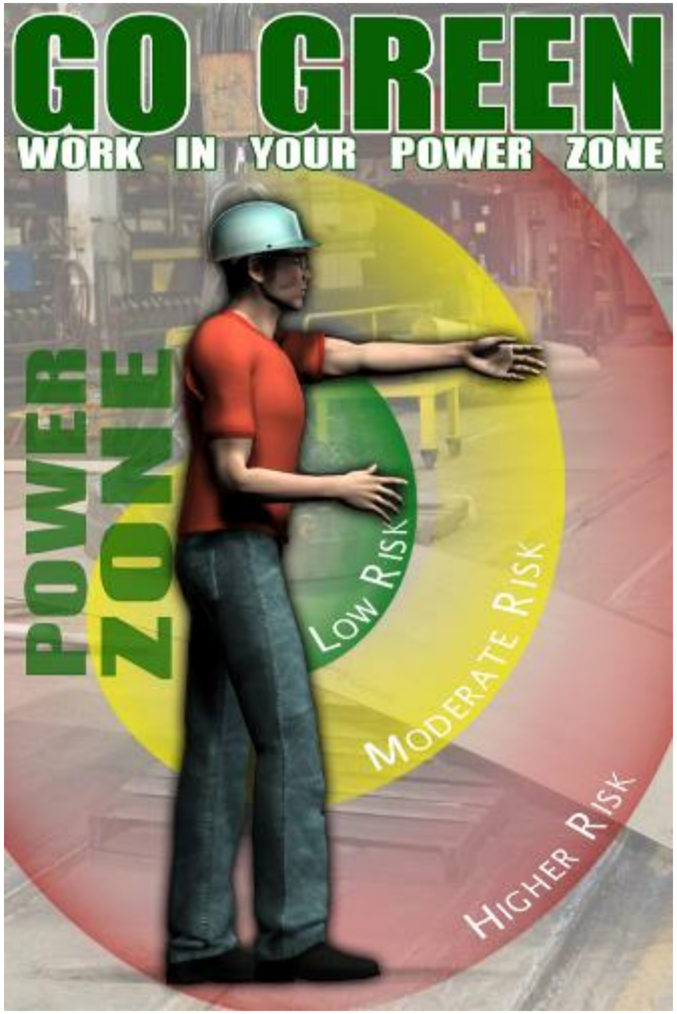
	SEA Risk Factors	Present Y	Present N	Description / Root Cause (5 Why's)
Posture	1. Back Bending - Hands Below Knees			
	2. Back Twisting/Side Bending			
	3. Extreme Neck Bending/Twisting - forward, back, side			
	4. Overhead Reaching - Elbows Above Shoulder			
	5. Extended Reach - Elbows Almost Straight			
	6. Extreme Wrist Bending - up, down, side			
	7. Squatting / Crawling / Kneeling			
Force	8. Heavy Lifting • Occasional Lifting ≥ 75lbs • Frequent Lifting ≥ 55lbs • Extended Reach Lift ≥ 25lbs			
	9. Team Lifting: • 2 person >110lbs • 3 person > 165lbs • 4 person >220lbs			
	10. Pushing / Pulling > 55lbs			
	11. Forceful Gripping/Pinching			
Contact	12. Unpadded Contact Stress (Any Body Part)			
Vib	13. Vibratory Tools			
	Total Ergo Risk Factors			

Tip 3: Do Not Give Up

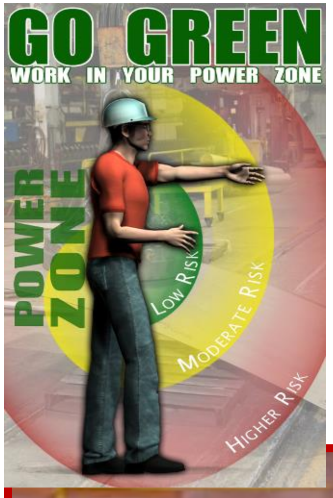
… After Much Reflection



Learning to "SEE" (Shipyard Ergo Evaluation)



SEE – Solve


GO GREEN
WORK IN YOUR POWER ZONE
POWER ZONE
LOW RISK
MODERATE RISK
HIGHER RISK

Solve Problems by Engaging Employees

Ergo Cup Competition

- Recognition
- Integrate in PII initiatives
- Safety/Ergo Committees
  - Quarterly Winners
  - Grand Champion - Attends AEC

Ergo Cup Winners

Excellence Award for “Cost Savings”

Team-Driven Workplace Solution

Excellence Award, “Ergo Risk Reduction”

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Conclusion