Value Stream Approach to Office and Industrial Ergonomics

Atlas Ergonomics
Why Ergonomics

• Regulatory
• Injury and cost avoidance
  – Aging and obesity
• Productivity and process improvement
Productivity and Process Improvement
Where ergonomics and Lean Manufacturing meet
8 Kinds of Waste

• Overproduction, Inventory, Transportation, Over Processing, Rework, Motion, Waiting, Underutilizing People

• Effective ergonomics reduces waste:
  – Transportation
  – Rework
  – Motion
What about the Ergonomics Process

• Do you strive to eliminate waste in your injury prevention and injury management processes?
  – In the office?
  – In the manufacturing environment?
Agenda

• What is Value Stream Mapping
• Case study #1 – Industrial Company
• Case study #2 – Office Company
What is Value Stream Mapping

• A technique used to analyze and design the flow of materials and information required to bring a product or service to a consumer.
What is a Value Stream
Value Stream Mapping

1. Draw the current state value stream map, which shows the current steps, delays, and information flows required to deliver a product or service.

2. Assess the current state value stream map in terms of creating flow by eliminating waste.
Time to Consumer

• 2 things to measure: Process and Lead time

• Measure process time:
  – The time it takes to actually perform the work
  – Includes all of the doing, communicating, and analysis
  – Aka work time
Time to Consumer

• Measure lead time:
  – Time from when work is made available until it’s completed and passed on to the next person
  – Aka elapsed time or throughput time
Lead Time = Process Time + Waiting / Delays
3 Value Streams in an Effective Ergonomics Process – Prevention and Management

1. Hire the right employees
2. Keep employees injury free
3. Return them to work quickly following an injury
Who are the Consumers?

1. Human Resources
2. Health and Safety/Ergonomics
3. Medical/Worker’s Compensation
Human Resources

Hire the Right People

- ADA Compliant Job Descriptions
- Post Offer Pre-Employment Screens
- Hiring and Placement
- Return to Work
Health and Safety/Ergonomics

Keep Employees Injury Free

- Quantify and prioritize workplace risk
- Abate the medium and high risk
- Education and training
- Track and monitor rates
Medical/Workers Comp

Return Employees Back to Work Quickly

• Job Matching
• Job Modification / Accommodation
• Work Re-Design
• Vocational Training and Placement
Case Study #1 – Industrial Company

• 30 locations

• High exposure to risk factors:
  – Awkward postures
  – High forces
  – High repetitions
  – Low temperatures
Human Resources

Collect job data: 2 hr.

Verify essential functions: 1 hr.

Complete job demands analysis and essential function profile: 2 hr.

Total: 6 hours
H&S / Ergonomics

- Collect job data: 2 hr.
- Complete analysis: 2 hr.
- Develop and Implement recommendations: 3+ hrs.

Total time: 7 hours
Medical/Workers Comp

1 hr.

Establish worker restrictions

4 hr.

Collect job data and review job demands

1 hr.

Match worker to suitable job

8 hours
Silos Everywhere!

– Data and Data Flow/Use
– Department Processes
– Geography/Plant Processes
CURRENT STATE
CUSTOMERS / VALUE STREAMS

Human Resources - Hire the right employee
Health and Safety - Keep them from getting injured
Medical/Workers' Comp - Return them to work quickly following an injury

1. Collect Job Demands
2. Verify Essential Functions
3. Complete Ergonomic Risk Assessment
4. Develop ADA Compliant Job Descriptions
5. Develop Recommendations and Action Plans
6. Implement Improvements to the Job
7. Match Employee to Appropriate Job
8. Determine Employee Restrictions
9. Collect / Verify / Clarify Job Demands
10. Interpreting and Prioritizing Jobs for Improvement
11. Implement 21 hours

21 hours
Current State

• ADA compliant job description = 6 hrs.
• Ergonomic risk assessment and recommendations = 7 hrs.
• Return employee on restricted duties to **value added** job = 8 hrs.

— Total = 21 hrs.
Activity Metrics

• Percent activity
  – % of time work is being done (process) vs. overall lead or throughput time
  – Overall time = 21 hrs.
  – Process time = 18 hrs.
  – Percent activity = 86%

• Problem wasn’t percent activity vs. overall lead time
Quality metrics

• On each process step:
  – % complete and accurate
    • The percent deemed “usable as is” without having to:
      – Correct information that was supplied
      – Add information that should have been supplied
      – Clarify information that could have or should have been supplied
  – Measured by the downstream customer
Quality metrics

• Main concern in HR and Medical/Workers Comp
  – High rate of job information not being complete or accurate (~ 75%)
  – Low percentage deemed “usable as is”
  – Significant time spent:
    – Adding information that should have been supplied
    – Clarifying information that could have or should have been supplied
Current State Problems – Job Descriptions

– Generic (no substantial differentiation between job classifications)
– Incomplete (did not capture all essential functions)
– Inaccurate (concern on content validity and legal implications)
Current State Problems – Risk Assessments

– Inconsistent selection of analysis tools
  • Not using the right tool for the job
– Inaccurate application of methods
– No tracking of recommendations to closure and no evaluation of impact on risk
Current State Problems – JDAs

– Limited content
– Primary use was only for medical department
– Data updated every 18-24 months at best
– Poor accuracy
– No video documentation of jobs
– No database/document control
Current State Problems – RTW

• Return to Work required one of 2 resource extensive options:
  – Ergonomics Coordinator walking employee through facility to find acceptable jobs
  – JDAs are reviewed (search through binder or individual files) 1-by-1 for potential matches
Current State Problems - Overarching

- Similar work being performed by different groups (collect job demands)
- Inconsistent protocol resulting in inaccurate demands
- No update loop to ensure data is always up-to-date
- No quick and easy way to access/search for information
Current State Problems – Overarching

• Lack of program reporting (progress towards goals)
  – Format
  – Existence

• Poor communication of information
  – Intra- and inter- facility
  – To outside providers
Value Stream Mapping

3. Draw the future state value stream map to optimize flow of information and material by eliminating waste and reducing time.
Future State – Integrated Solution

HR
Ergo
H&S
RTW

Leading Safety into the Future
Integrated Single Solution

Single Solution

HR  Ergo  H&S  RTW

Leading Safety into the Future

Pearson’s Successful Strategies with a
CTQs

• System Manages
  – Job demands and media (images, videos)
  – Hazard Identification & Analysis
    • Consistent and accurate use of ergonomic analysis tools
CTQs

• System Manages
  – Hazard Prioritization & Control
    • Report development, implementation management, and results tracking
  – Medical Management
    • JDAs – for job matching
CTQs

• System Supports
  – Prioritization
    • Based on JDA exposures
  – Training and Education
    • Access to SOPs, videos, etc.
  – Program Evaluation
    • Dashboard providing measures of program performance and analysis outcomes
FUTURE STATE
CUSTOMERS / VALUE STREAMS
Human Resources - Hire the right employee
Health and Safety - Keep them from getting injured
Medical/Workers Comp - Return them to work quickly following an injury

Determine Employee Restrictions

Match Employee to Appropriate Job

Collect Job Demands

Verify Essential Functions

Complete Job Demands Analysis

Complete Ergo Risk Assessment

Develop ADA Compliant Job Descriptions

Interpret and Prioritize Jobs for Improvement

Develop Recommendations and Action Plans

Implement Improvements to the Job

Continuous Improvement Loop

2 hr. 1 hr. 2 hr. 0 hr. 2 hr. 1 hr.

0.5 hr. 0.5 hr. 1 hr. 0 hr. 1 hr. 1 hr.

10 hours
Future State

• Previous time = 21 hrs.
• New process flow = 10 hrs.
• Percent reduction = 52%
Accessibility

• All users who need access to data can access appropriate sections:
  – Safety
  – Ergonomics
  – Medical
  – HR
  – Production
Online Application
Consistent & Quantified Job Demands

<table>
<thead>
<tr>
<th>Repetition</th>
<th>Measured Reps / Min</th>
<th>Qualitative</th>
<th>Static &gt; 20 sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Bending:</td>
<td>14</td>
<td>Frequent (34-66%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Back Twisting:</td>
<td>16</td>
<td>Frequent (34-66%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Right Shoulder:</td>
<td>22</td>
<td>Constant (&gt;66%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Left Shoulder:</td>
<td>21</td>
<td>Constant (&gt;66%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Right Hand:</td>
<td>2</td>
<td>Rare (&lt;5%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Left Hand:</td>
<td>13</td>
<td>Frequent (34-66%)</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Duration of Task (hours per day):</td>
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<td></td>
<td></td>
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</table>

Comments
Measure and Track JDA Performance

Dashboard

Start: 07/12   End: 06/13

Status of Job Demands

Number of Jobs

- Update Required
- Not Started
- In Process
- Complete

Dashboard categories:
- Work Dashboard
- Incidents Dashboard
- Discomfort Dashboard
- Analysis Dashboard

Job/Department View

Graph showing the status of job demands over time.
Quantify Exposure based on Physical Demands

**Analysis**

<table>
<thead>
<tr>
<th><strong>Demand Exposure</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Back: 40.00</strong></td>
</tr>
<tr>
<td>Low Risk</td>
</tr>
<tr>
<td><strong>Right Shoulder: 27.00</strong></td>
</tr>
<tr>
<td>Low Risk</td>
</tr>
<tr>
<td><strong>Left Shoulder: 27.00</strong></td>
</tr>
<tr>
<td>Low Risk</td>
</tr>
<tr>
<td><strong>Right Hand / Wrist: 40.00</strong></td>
</tr>
<tr>
<td>Low Risk</td>
</tr>
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Efficient Data Use & Quantify Ergonomics Risk Accurately

### Analysis

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Solutions</th>
<th>Procedures</th>
<th>Media</th>
<th>Demands</th>
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<tbody>
<tr>
<td>FINISH LATER</td>
<td>COMPLETE</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

#### Strain Index

**Right Hand / Wrist: 26.00**

- **Low Risk**
- **High Risk**

#### Left Hand / Wrist: 2.00

- **Low Risk**
- **High Risk**

#### Adjust Demands

<table>
<thead>
<tr>
<th>Right Hand / Wrist</th>
<th>Left Hand / Wrist</th>
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<tbody>
<tr>
<td>Hand GripIntensity of Exertion:</td>
<td>Light (BS:0-2)</td>
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<tr>
<td>Duration of Exertion:</td>
<td>50-79%</td>
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<td>Efforts per Minute:</td>
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Measure and Track Ergonomics Risk
Prioritize Efforts with Quantitative Information

### Analysis Summary

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Department</th>
<th>Solution Status</th>
<th>STRAIN</th>
<th>REBA</th>
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<th>PUSH</th>
<th>PULL</th>
<th>CARRY</th>
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<tr>
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<td>2</td>
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</table>
Record & Prioritize Solution Options

- Solutions are ranked based on:
  - Type
  - Impact
  - Payback
### Solutions Summary

<table>
<thead>
<tr>
<th>Department</th>
<th>Job Title</th>
<th>Concern</th>
<th>Root Cause</th>
<th>Recommendation</th>
<th>Type</th>
<th>Impact</th>
<th>Payback</th>
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<tr>
<td>Output Processing</td>
<td>Assemble of Materials</td>
<td>At Risk Body Part: Lower Back</td>
<td>Lower Back When lifting stack...</td>
<td>• Stand-up Safety Talks emphasis...</td>
<td>2</td>
<td>3</td>
<td>3</td>
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<td>sdfasdf</td>
<td>asdfas</td>
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<td>3</td>
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<td>At Risk Body Part: Lower Back</td>
<td>Lower Back When lifting stack...</td>
<td>• Consistent stretching progr...</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
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<td>Output Processing</td>
<td>Assemble of Materials</td>
<td>At Risk Body Part: Lower Back</td>
<td>Lower Back When lifting stack...</td>
<td>• Consistent stretching progr...</td>
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<td>High exposure of lifting from...</td>
<td>• Stand-up Safety Talks emphasis...</td>
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<tr>
<td>Output Processing</td>
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<td>Ergonomic Considerations: P...</td>
<td>High exposure of lifting from...</td>
<td>• Behavior-based Safety Coach...</td>
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<td>1</td>
<td>1</td>
<td>2</td>
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<td>Lower Back When lifting stack...</td>
<td>• Stand-up Safety Talks emphasis...</td>
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<td>• Behavior-based Safety Coach...</td>
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<td>1</td>
<td>1</td>
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Data Use & Quantification: Job Placement/Return to Work

<table>
<thead>
<tr>
<th>Department</th>
<th>Job Title</th>
<th>Percent Match</th>
<th>Show all</th>
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<tbody>
<tr>
<td>Final Pack</td>
<td>Loading / Palletizer</td>
<td>94%</td>
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<td>Show all</td>
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<tr>
<td>Spiraling</td>
<td>61131 - Quality</td>
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<td>Spiraling</td>
<td>61130 - Palletizer</td>
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<tr>
<td>Sealing</td>
<td>61117 - Quality</td>
<td>98%</td>
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<tr>
<td>Print Machine Operator</td>
<td>77815 - Inserting</td>
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<td>Final Pack</td>
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<td>Print Machine Operator</td>
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<td>Pre-pack</td>
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<td>Final Pack</td>
<td>61144 - Tape Machine Operator</td>
<td>96%</td>
<td>Review Restrictions</td>
</tr>
<tr>
<td>Security Processing</td>
<td>77275 - Dock Sort</td>
<td>95%</td>
<td>Review Restrictions</td>
</tr>
</tbody>
</table>
Optimization of Data Flow and Use

– Average time for collection of single job demands – 2 hrs.
– Uses of demands data within HR, ergonomics and injury management processes
  • Training – Employee Orientation
  • Post-Offer Screens – Testing and Placement of Employees
  • Return to Work and Job Placement – Both Medical and HR are integrated in system
Optimization of Data Flow and Use

• Prioritization – Proactive selection of target jobs
• Analysis – Data used directly to assess risk
• Progress – Changes in demands due to ergo controls used as a measure of program impact

– 2 hrs. of work leads to hours of data utilization and optimization
Time Savings

– Ergonomics Analysis
  • Redundancy in data collection eliminated
  • Analysis and calculations automated
  • Average analysis effort reduced from 6 hrs. to 2 hrs.

– Job Placement and Return to Work
  • Quote from nurse: “job matching process saves me at least 3 hours per week searching through JDA documentation”
Results

• The full integration of data used by safety, ergonomics, HR, workers’ compensation, and case management professionals.
  – Silos have been broken down
Results

• Significant time savings through streamlined and automated:
  – Ergonomic analysis
  – Job matching
  – Further time savings in data collection through use of tablets
Results

• Accurate monitoring of program performance.
• A focus on areas of risk to prevent injuries.
• Up to date information to make the best decisions.
• External access to subject matter experts to assist with solution development and the safe return of injured employees.
Office Case Study

• The Situation:
  – Greater than 180,000 employees deployed over 5,500 individual locations across the country
  – Regional nurses with limited availability that were required to provide reactive service on demand
The Challenge: Striking a Balance
Employee presents with Medical restrictions

Employee requests assistance

Complete Ergonomic Assessment – self assessment

Interpret and Prioritize individuals for Improvement

Self correct – no action required

Complete Ergonomic Assessment face-to-face

Provide reasonable accommodation to employee

Develop Recommendations and Action Plans

Implement improvements to the workstation

87 hours

1 hr. 2 hr. 2 hr. 1 hr. Highly variable
Current State

• Employee requests assistance or presents with medical restrictions
• From request to completion of assessment and recommendations = 87 hrs.
Activity Metrics

- % of time work is being done (process) vs. overall lead or throughput time
- Overall time = 87 hrs.
- Process time = 6 hrs.
- Percent activity = 7%

• Problem was delay in getting on site to complete assessments and implementing corrective actions
Quality metrics

• On each process step:
  – % complete and accurate
    • The percent deemed “usable as is” without having to:
      – Correct information that was supplied
      – Add information that should have been supplied
      – Clarify information that could have or should have been supplied
  – Measured by the downstream customer
Quality metrics

• Moderate quality concerns
  – Moderate rate of assessments not being completely accurate or with full content (26%)
  – High percentage deemed “usable as is” (74%)
  – Not significant time spent on adding or clarifying information
Current State Problems

• Completely reactive program
• Long delay to complete face-to-face assessments
  – Real people in real pain
• Inefficient data access and management
  – Individual Word files
Current State Problems

• Limited content and inconsistent format (images, measurements, etc.)

• HIPAA concerns
  – cross contamination of medical and assessment data

• No tracking of recommendations to closure and no evaluation of impact on risk or discomfort
Current State Problems

• Lack of overall program reporting
  – Format
  – Existence

• Poor communication and access to information
Striking a Balance
Employee presents with Medical restrictions

Complete Ergonomic Assessment face-to-face

Provide reasonable accommodation to employee

Employee requests assistance

Complete Ergonomic Assessment – self assessment

Interpret and Prioritize individuals for Improvement

Self correct – no action required

Complete Ergonomic Assessment telephonically

Develop Recommendations and Action Plans

Implement Improvements to the workstation

0 hr. 16 hr. 16 hr. 0 hr. 1 hr. Highly variable

37 hours
Future State

• Previous time = 87 hrs.
• New process flow = 37 hrs.
  – Percent reduction = 58%
  – 32 of those hours due to lead time for on-site visit by local provider
  – As low as 0.5 hrs for employees who needed no telephonic or on-site assessment
Future State

• Proactive communication on steps to take when ergonomic assistance is needed – automated

• Streamlined self-assessment (10 mins instead of 20 mins)

• Training is optional

• Automated solutions based on survey responses
Future State

• Developed a decision matrix for follow up assessments based on ergonomic risk and discomfort

• Complete telephonic follow-ups

• Use local providers to complete on-site assessments (much shorter lead time) and much shorter on-site time due to employee baseline survey
Future State

• Standard product list from which recommendations are selected (improved quality of assessments because recs are proven to work and system guides assessor on what recommendations to select)
### Standard Recommendations

#### Seating

<table>
<thead>
<tr>
<th>Assessment Information</th>
<th>Standard Recommendations</th>
<th>Other Recommendations</th>
<th>Action / Purchase Suggested</th>
<th>Completion</th>
<th>Date Products Ordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current chair adjustments:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat height ✔</td>
<td>Arm height ✔</td>
<td>Arm rest ✔</td>
<td>Lumbar support ✔</td>
<td>Tilt lock ✔</td>
<td></td>
</tr>
<tr>
<td>Seat depth ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average hours of daily computing (home and work):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 hours ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - 4 hours ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 4 hours ✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height and weight:</td>
<td>6'4&quot;</td>
<td>300 lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chair fits relative to width:</td>
<td>Yes ✔</td>
<td>No ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterfall front:</td>
<td>Yes ✔</td>
<td>No ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work station:</td>
<td>Single user ✔</td>
<td>Multi user ✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyboard &amp; Mouse:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **The chair was changed**
- **Completed**: 1/9/2009
- **Act**: ✔
- **Buy**: ✔

---

**Note:** The table above outlines standard recommendations for seating in the context of computer use, considering factors such as seat height, arm rest, lumbar support, and hours of daily computing. It also includes recommendations for chair fit, height and weight, and specific actions or purchases suggested based on the assessment results.
Future State

• Maintain data integrity by controlling who can change assessment and recommendations
• Track closure of recommendations
• Complete follow up surveys to close loop and verify improvement in ergonomics and reduced discomfort
Decision matrix

<table>
<thead>
<tr>
<th>ERGO Risk</th>
<th>DISCOMFORT</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>- Onsite follow-up</td>
<td>- Phone follow-up</td>
</tr>
<tr>
<td>High</td>
<td>- Onsite follow-up</td>
<td>- Phone follow-up</td>
</tr>
<tr>
<td>Moderate</td>
<td>- Onsite follow-up</td>
<td>- Phone follow-up</td>
</tr>
<tr>
<td>Low</td>
<td>- Onsite follow-up</td>
<td>- Email follow-up</td>
</tr>
</tbody>
</table>
What about the Ergonomics Process

• Do you strive to eliminate waste in your injury prevention and injury management processes?
  – In the office?
  – In the manufacturing environment?
Thank You for your Time