A Systematic Method for Performing an Ergonomic Incident Investigation

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Cargill: Targeted Locations

North American BU’s
- Beef
- Pork
- Case Ready
- CVAM-Food Service
- Cargill Turkey and Cooked Meats (CTCM)

- Plants: ~34

Ergonomics Program

Cargill Meat Solution’s Ergonomics Program has been in place since 1989.

A revised program was launched in 2009 to address:

1. Technical level of application.
2. Consistency of program elements across locations.
3. Targeted effort to reduce musculoskeletal disorders to an even greater level.
Specific Focus: Incident Investigation

Incident Investigation process within Cargill Meat Solutions location:

1. Supervisor leads process
2. Must be completed with 48 hrs of incident
3. Must define causes and solutions

Incident Investigations & Problem Solving

Incident Investigation Primary Objectives

- Identify Incident Cause(s)
- Prevent Recurrence
Incident Investigations & Problem Solving

5 – Steps to Problem Solving

STEP 1
IDENTIFY the PROBLEM

STEP 2
IDENTIFY the CAUSE(S)

STEP 3
IDENTIFY SOLUTION(S)

STEP 4
IMPLEMENT SOLUTION(S)

STEP 5
SUSTAIN & MONITOR

Incident Investigations & Problem Solving

Identify the Problem: Prep Work

- Respond to the scene
- Preserve the evidence
- Identify & interview witnesses
- Document findings

Respond
Preserve
Interview
Document
Incident Investigations & Problem Solving

Identify the Problem: Prep Work

- Preserve the evidence
- Identify & interview witnesses
- Document findings
  - Take photographs
  - Document your findings

Workstation Conditions
Incident Investigations & Problem Solving

Defining the Problem: Prep Work

- Preserve the evidence
- Identify & interview witnesses
- Document findings

- Witnesses must be interviewed as soon as possible after the event
- Interview witnesses separately
- Consider interviewing witness at the incident scene
Evidence - Person

• What evidence can we obtain from the person?

• Symptoms:
  □ Where does it hurt?
  □ When did it start?
  □ What were you doing when you first noticed it?

• Context:
  □ Linking the job, workstation, etc., to the onset of symptoms

• Experience:
  □ How long doing current job?

• Relationships:
  □ With supervisor/management and co-workers?

Ergonomic Risk Factors

3 major ergonomic hazards related to musculoskeletal disorders (MSDs) in the workplace

Posture
Repetition
Force
Ergonomic Evidence: Risk Factors

A risk or hazard is the potential to cause harm.

What evidence collected on the floor either influences or creates these factors?

Incident Investigations & Problem Solving

Defining the Problem: Prep Work

- Preserve the evidence
- Identify & Interview witnesses
- Document findings

- Physical evidence
  - Workstation set-up and conditions
  - Equipment/materials/tools: use and condition
  - Area housekeeping: influencers of activity
  - Noise/lighting levels
Evidence – Work Method

• How does the process or technique influence how the employee developed the symptoms?

• Technique:
  ❑ Has the employee been properly trained?
    ▪ What is the evidence of this?
  ❑ Is the employee performing the job according to training expectations?

• Process:
  ❑ Do the current procedures minimize exposure to ergonomic stressors? (Force, Posture, Repetition)
  ❑ Does the employee rotate to other positions that allow body parts to get a break (i.e. recover)?

Evidence – Workstation, Material Handling, Tools

• Does the job fit the worker?

• Workstation:
  ❑ Does the height of the workstation fit the employee?
  ❑ Does the depth of the workstation fit the employee?
  ❑ Are awkward postures minimized by proper layout of equipment?

• Material Handling:
  ❑ Are boxes/totes moved within an optimal zone (horizontal/vertical) by employees?
  ❑ Are mechanical assists (i.e. vacuum lifts, lift trucks, etc.) used to move heavy loads?
  ❑ Are push forces minimized through design of equipment and castors, and through scheduled PM procedures?
Evidence – Workstation, Material Handling, Tools

- Tools:
  - Are tool(s) available and appropriate to the task?
  - Does the handle fit the employee’s hand (length and diameter)?
  - Are tool(s) maintained to minimize stressors (e.g. sharp to reduce force; vibration)?
  - If heavy (i.e. >3 lbs), are the tools counterbalanced?
  - Is the employee using the correct number of gloves and do they fit correctly?

Incident Investigations & Problem Solving

5 – Steps to Problem Solving

STEP 2

- Select the “team”
- Complete the “5 Why” process

- Who do you need to have on the investigation team?
- Do you have the right people representing the depth of knowledge and experience necessary to identify the basic causes?
Incident Investigations & Problem Solving

- Potential Team Members:
  - Safety Manager
  - Supervisor
  - Trainer
  - Nurse

- Supporting Cast
  - Lead Person / Foreman
  - Coworkers
  - Maintenance

Incident Investigations & Problem Solving

5 – Steps to Problem Solving

**STEP 2**

- Select the “team”
- Complete the “5 Why” process

- A cascading series of “why” questions
- Brings the investigator closer to the basic cause(s)
5 – Steps to Problem Solving

STEP 2  “5 Why” process

IDENTIFY the CAUSE(S)

Determine the Immediate and Basic Causes

Problem


5 Why Cause Analysis

Root Cause Analysis Basics

Symptom of the problem.
“The Weed”
Above the surface
(obvious)

The Underlying Causes
“The Root”
Below the surface
(not obvious)

The word root, in root cause analysis, refers to the underlying causes, not the one cause.
Cause Mapping: Late to Class – The Blame Game

Linear Cause and Effect – His “Cause Map”
Cause Mapping: Late to Class – The True Story

It becomes more difficult to blame others when visually mapping cause-and-effect relationships of a specific problem. The Cause Map clearly shows more than one cause.

Root Causes

Person

Work Method

Workstation/Tools/Equipment
Connecting the Dots with Evidence

- Problem Statement
- Body Part(s) Affected
- Ergonomics Stressors Present
- Workplace Conditions Causing Stressors
- Reason for Current Workplace Conditions – Why?

Problem Statement & Body Part(s) Affected

<table>
<thead>
<tr>
<th>Employee Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td>☐ Neck</td>
</tr>
<tr>
<td>☐ Upper Back</td>
</tr>
<tr>
<td>☐ Left Shoulder</td>
</tr>
<tr>
<td>☐ Left Elbow</td>
</tr>
<tr>
<td>☐ Left Hand/Wrist</td>
</tr>
<tr>
<td>☐ Low Back</td>
</tr>
<tr>
<td>☐ Leg/Wrist</td>
</tr>
<tr>
<td>☐ Right Shoulder</td>
</tr>
<tr>
<td>☐ Right Elbow</td>
</tr>
<tr>
<td>☐ Right Hand/Wrist</td>
</tr>
</tbody>
</table>

Discomfort / Injury = Employee defined problem

Ergo Concern = Analyst defined problem (something you see that could cause a problem)
**Ergonomic Stressors Present**

<table>
<thead>
<tr>
<th>POSTURE</th>
<th>FORCE</th>
<th>REPEITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1. Overhead reach</td>
<td>F1. Lifting/carrying</td>
<td>R1. No repetitive periods</td>
</tr>
<tr>
<td>O2. Bending/stooping</td>
<td>F2. Pushing/pulling</td>
<td>R2. No job rotation</td>
</tr>
<tr>
<td>O5. Static posture</td>
<td>F5. Forceful Cutting</td>
<td>R5. Unable to keep up</td>
</tr>
<tr>
<td>O6. Other</td>
<td>F6. Other</td>
<td>R6. Other</td>
</tr>
</tbody>
</table>

Ergonomic Stressors: Workplace conditions (evidence) that can be linked to body parts of concern

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**Workplace Conditions & Reason they Exist**

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Y/N</th>
<th>Impact</th>
<th>Reason - Why?</th>
</tr>
</thead>
</table>
| Work Method
  - Has the employee been properly trained? JTP signed off? | Y/N |        |               |
  - Is the employee performing the job according to training expectations? | Y/N |        |               |
  - Do the current procedures minimize exposure to ergonomic stressors? (Force, Posture, Repetition) | Y/N |        |               |
  - Does the employee rotate to other positions that allow body parts to get a break (i.e., recovery)? | Y/N |        |               |
  - Other | Y/N |        |               |

**Impact** = What ergonomic stressors are created by the condition? (e.g. employee has to bend at back due to poor height of workstation)

**Reason** = Why is the condition present? (e.g. why is the employee not properly trained?)
Workplace Conditions & Reason they Exist

Immediate Causes

<table>
<thead>
<tr>
<th>EVIDENCE</th>
<th>Y/N</th>
<th>Impact</th>
<th>Reason – Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Method</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the employee been properly trained? JIP signed Y/N?</td>
<td>Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the employee performing the job according to training expectations?</td>
<td>Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the current procedures minimize exposure to ergonomic stresses? (Force, Posture, Repetition)</td>
<td>Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the employee rotate to other positions that allow body parts to get a break (i.e., recover)?</td>
<td>Y/N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Y/N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Basic Causes

Example: Material Handling

[Image of a worker handling materials]
**Root Causes: Linear Thinking**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Body Part</th>
<th>Ergo Stressors</th>
<th>Workplace Evidence</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee experienced discomfort while lifting heavy tote</td>
<td>Low Back</td>
<td>Twisting</td>
<td>Working Too Fast</td>
<td>Slow Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Repetition</td>
<td>Improper Technique</td>
<td>Don't Twist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Working Too Fast</td>
<td>Slow Down</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of Rotation with CoWorker</td>
<td>Rotate When Tired</td>
</tr>
</tbody>
</table>

**Root Causes: Ergo Thinking**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Body Part</th>
<th>Ergo Stressors</th>
<th>Workplace Evidence</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee experienced discomfort while lifting heavy tote</td>
<td>Low Back</td>
<td>Twisting</td>
<td>Workplace &amp; Equipment</td>
<td>Process Flow Issues No Operators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Repetition</td>
<td>Body Mechanics/Technique</td>
<td>Working Over/⸻Duty/Workplace</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Developing/Improving/Training</td>
<td>No Defined Work/Rest Schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of Rotation with CoWorker</td>
<td>No Defined Load Size</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Size of Task</td>
<td>Material/Methods/Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Core/Center of Units</td>
<td>Pallet on Floor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lifting Heavy Load</td>
<td>No Defined Load Size</td>
<td>Pallet Wedge to Safe Weight</td>
</tr>
</tbody>
</table>
5 – Steps to Problem Solving

STEP 3

✓ Set SMART solution(s)

IDENTIFY SOLUTION(S)

- Specific
- Measurable
- Achievable
- Realistic
- Time bound

ROOT CAUSE ANALYSIS
Use the following space to connect the dots between employee concerns, risk factors, and workplace evidence.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Body Part(s)</td>
<td>Ergo Stressors</td>
<td>Workplace Evidence</td>
<td>Why?</td>
</tr>
</tbody>
</table>

Connecting the Dots...
Specific

• To address ergonomic risk and employee symptoms/injury, solutions must:
  - Include quantitative values to guide purchase and installation of solutions:
    - Workstation heights and depths
    - Location of equipment
    - Weights
    - Push/pull forces
    - Etc.

Measurable:
BEFORE ANALYSIS

<table>
<thead>
<tr>
<th>Demand</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demands Back</td>
<td>53</td>
</tr>
<tr>
<td>Demands Right Hand</td>
<td>87</td>
</tr>
<tr>
<td>Demands Left Hand</td>
<td>87</td>
</tr>
<tr>
<td>Demands Right Shoulder</td>
<td>53</td>
</tr>
<tr>
<td>Demands Left Shoulder</td>
<td>47</td>
</tr>
<tr>
<td>SI Right Hand</td>
<td>60.75</td>
</tr>
<tr>
<td>SI Left Hand</td>
<td>54</td>
</tr>
<tr>
<td>REBA Right Side</td>
<td>5</td>
</tr>
<tr>
<td>REBA Left Side</td>
<td>6</td>
</tr>
</tbody>
</table>
## Measurable: AFTER ANALYSIS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demands Back</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Demands Right Hand</td>
<td>80 (11.05%)</td>
<td></td>
</tr>
<tr>
<td>Demands Left Hand</td>
<td>80 (11.05%)</td>
<td></td>
</tr>
<tr>
<td>Demands Right Shoulder</td>
<td>47 (11.32%)</td>
<td></td>
</tr>
<tr>
<td>Demands Left Shoulder</td>
<td>40 (14.89%)</td>
<td></td>
</tr>
<tr>
<td>SI Right Hand</td>
<td>30 (50%)</td>
<td></td>
</tr>
<tr>
<td>SI Left Hand</td>
<td>27 (50%)</td>
<td></td>
</tr>
<tr>
<td>REBA Right Side</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>REBA Left Side</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

### Hierarchy of Controls

```
Engineering
  ↓
Process
  ↓
Administrative
```
What would you choose?

OR

Engineering Out…
Engineer Out...

Engineered Out?
### Root Causes: Connect the Dots to Find Solutions

<table>
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<th>Ergo Stressors</th>
<th>Workplace Evidence</th>
<th>Why?</th>
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Summary

- Ergonomic incidents require specific questions to find the root cause(s)
  - Incident may not have occurred immediately prior to investigation

- Linking workplace conditions to ergonomics stressors provides views of various potential
  - Causes
  - Solutions

- Mapping out the facts provides a visual representation that is more easily
  - Explainable
  - Understandable

Continued Efforts…

Questions that still need to be dealt with:

- Who should be leading the incident investigation?
- How do we maintain supervisor engagement in process if they are not leading it?
- What can we do better to drive towards more effective root cause analysis and solution development?
Questions?
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