Ergonomics Study Implementation & Follow-Up

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Objectives

- Identify risks for long-term ergonomic injuries in the current process.
- Investigate potential costs of such risks and benefits of improving ergonomic conditions of the job.

(Revised) Economic analysis considering 2 operators at a rate of US$ 23/hour:
- Purchase cost: $24,500.00 x 2 = $49,000.00
- Effectiveness of the solution: A mechanic arm will eliminate the need for gripping with high force as well as the awkward posture of the wrist, if designed appropriately.
- Productivity improvements: Standardizes (ideally reduces) the assembly time.
- Estimated annual benefits: $79,025.00
- Estimated net benefits after one year: $30,025.00
- Payback: 0.62 years (7.44 months)

Workstation Design

To avoid injury...

- Always adjust the table to your eye level.
- Keep your hands below your elbows; before starting your task.

Recap and Benefits

- Expected sales growth
- Normalized production
  - Improve process flow
  - Implement standard work (SW)
  - Line balancing (time studies)
  - Quality assurance (scrap rates)
- Continuous Improvement

Methodology

1. Workers Interviews
2. Exposure Measures
   - Workstation Design Evaluation
   - Direct Observation
   - Hazard Evaluation
   - Posture Analysis
   - Static Work Evaluation
3. Outcome Measures
   - RULA
   - REBA
   - Body Discomfort Analysis

Hazard Evaluation

<table>
<thead>
<tr>
<th>CBCS</th>
<th>Cleaning Bed</th>
<th>Drying/Bristling Bed</th>
<th>Placing Tri-board on Bed</th>
<th>Pressing Tri-board on Bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MIDDLE</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td></td>
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</tbody>
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Result: Immediate actions should be taken to reduce health and safety risks:
- Change operators’ body posture
- Reduce force exertion
- Reduce exposure time

CAUTION ZONE CHECKLIST (AFTER)

<table>
<thead>
<tr>
<th>LEFT SIDE</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIGHT SIDE</td>
<td>X</td>
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</tbody>
</table>

Posture Analysis

- Neck minor flexion
- Trunk bent and twisted away from the neutral position
- Shoulder abduction
- Elbow flexion

Body Discomfort Analysis

- High Hand Force X
- Highly Repetitive Motion X X X X

Static Work (BEFORE)

- Endurance should be 2.54 mins.
- Recovery: Time the operator can resist the effort demanded by the task

Static Work (AFTER)

- 32, 64 seconds of “pressing” time required per dome
  - 2 seconds/press
  - 10 pounds or less force required
  - 10 pounds or less force required
  - Endurance/Resting Time Calculations NOT Necessary
    - MVIC < the 25% of their maximum strength
    - Range (<7.4, 11.15)
    - 30 seconds of resting time built in the process
- Sequential versus Repetitive Operations:
  - Single Phase Processing
  - Batch Processing

Thank You LF Staff!
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