Innovative Ergonomic Solutions
in Manufacturing

“Cost effective ergonomic improvements”

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Innovative Ergonomic Solutions in Manufacturing

Cost effective improvements can produce significant benefits.

Ergonomic solutions produce:

- Risk reduction
- Injury reduction
- Increased productivity
Vacuum Lift System

Problem:
Mechanics were required to lift heavy assemblies (150+ lbs.) during breakout.

Solution:
Introduced a vacuum system that makes use of existing lift system to eliminate the manual lift.

Benefit:
Reduce risk of injury and part damage. Reduce number of people required to remove part.
Dust Extraction

**Problem:**
Mechanics manually lift heavy core assembly to extract dust generated during milling process.

**Solution:**
Existing transportation dolly modified to add forklift tubes that allows rotation of assembly to extract dust.

**Benefit:**
Reduced risk of injury.
Reduced time spent manually moving parts.
Pneumatic End Effector

**Problem:**
Risk of back sprain / strain is high due to manual lifting of 737 nacelle panels out of BAJ to floor during breakout process

**Solution:**
Provide a vacuum powered end-effector with post - jib and air hoist to move panels.

**Benefit:**
Reduced risk of injury and potential damage to assembly.
**Reduce Awkward Posture**

**Problem:**
Accessing part requires bending and stooping.

**Solutions:**
Light weight height adjustable frame built that eliminates the necessity to lift part during sanding process.

**Benefits:**
Part accessibility improved thereby reducing awkward posture.
Tool Weight Reduction

**Problem:**
Tool weight excessive. Handles on outside edge creating bending concern.

**Solutions:**
Tool weight reduced including handles relocated to reduce reach and bending

**Benefits:**
Weight reduced by 20-30 lbs. with cutouts.
Problem:
Manual lifting of tools during assembly process creates fatigue for mechanics.

Solution:
Incorporated column and jib to suspend tools using zero-gravity balancer.

Benefit:
Tools become more accessible and reduces fatigue from manually lifting tools during assembly process.
Articulating Arm

**Problem:**
Repetitive process that results from using awkward posture while drilling creates ergonomic risk.

**Solution:**
Incorporate articulating arm that suspends vertical drill.

**Benefit:**
Eliminate using awkward posture while drilling. Improve productivity by improving hole quality.
Gatlin Tool Suspension

Problem:
Repetitive process of lifting tool for extended periods.

Solution:
Suspend tool from mobile stand to eliminate physically holding tool for extended periods.

Benefit:
More productive employee as a result of reducing fatigue.
Reasonable Accommodation

**Problem:**
Mechanic with prosthetic arm unable to actuate trigger of drill motor.

**Solution:**
Added foot actuator to process that allows mechanic to activate tool with foot.

**Benefit:**
Improved productivity as a result of improving process.
Tool Access

**Problem:**
Tool configuration required mechanics to stand on a box to perform the assembly process.

**Solution:**
Modify tool to accommodate multiple positions and eliminate mechanics necessity to stand on box and stepper.

**Benefit:**
Increased productivity
Problem: Tool and airline weight excessive. Airline created a tripping hazard.

Solutions: Install overhead rail sufficient to support both tools and airline.

Benefits: Eliminates the repetitive process of holding tools and airline tripping hazard.
Tool Suspension

**Problem:**
Mechanic uses multiple tools. Weight excessive.

**Solutions:**
Install overhead rail sufficient to support each tool.

**Benefits:**
Eliminates the repetitive process of holding tools for extended periods.
Squeeze Handle

**Problem:**
Current squeeze trigger configuration stressful to activate. At times mechanic is standing on stepper and working overhead.

**Solution:**
Incorporate handle that extends beyond end of squeeze and replaces trigger style with a more user friendly button style built into the handle.

**Benefit:** Creates a safer work environment.
Reduce Fatigue from Kneeling

**Problem:**
Kneeling discomfort from working in confine spaces.

**Solution:**
Eliminate setting and kneeling discomfort with off-the-shelf stool.

**Benefit:**
Better access to assembly and reduce fatigue.
Problem: Inadequate padding for mechanics in restricted space.

Solution: Provide new pad to reduce contact stress.
**Problem:**
Employees suffered back & upper extremity discomfort from leaning over standard cart for extended periods.

**Solutions:**
Modify standard door cart by cutting off wheels and attaching to hydraulic scissor lift.

**Benefits:**
Reduce potential for injury as a result of deviated posture for extended periods. Improve morale.
Stringer Seat

**Problem:**
Compression to legs and thighs to employees working inside the cargo area.

**Solution:**
Provide a seat that mechanics can lean/sit on when working.

**Benefit:**
Eliminates trauma from extended squatting.
Power Tools

Headlamp

Tools designed with ergonomics in mind and support multiple assembly processes.

Gloves

Knee Pads
90° Drill
Lighter Weight
Pistol Grip Drill

St. Louis Drill
(powerfeed)

Petzel Tika Headlamps

Lighter Weight Squeezes
SUMMARY

Cross functional ergonomic improvements, supporting multiple organizations to accomplish:

• Risk reduction
• Increased productivity
• Injury reduction
• Improved morale
Questions