

Ergonomics Risk Screen Case Study – CNC Reservoir

Background

The CNC operator is responsible for maintaining the CNC reservoir level for seven CNC machines at the appropriate fill level. No injuries had occurred; however, employees reported significant physical strain with the manual handling method. Production quality had not been affected yet. The Operators were performing the task as they had been trained to perform it. They performed other tasks with less than 50% of the time on their feet throughout the shift.



Tasks

The task involves:

- Filling empty five gallon buckets with a hose to about 75% full
 - Based on 8#/gallon, each bucket weighs approximately 30#
 - Two buckets weigh 60# total
- Picking up and carrying two buckets at a time a distance of 100 feet for a duration of about 30 to 40 seconds for the carrying/handling component
- Tipping the bucket into the CNC reservoir one bucket at a time

Depending on the level of use, each of the CNC machines requires*:

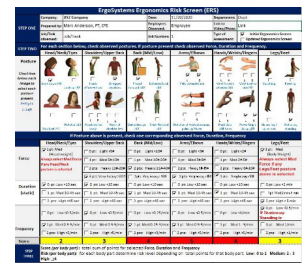
- Two buckets of fluid 1 to 3 times weekly
- For the worst case, this would be about 8 buckets/day
- About 2 to 3 minutes of total carrying/handling time per day.

**Seven CNC machines times 6 buckets/machine/week equals 42 buckets/week. In a five day workweek about 8 buckets/day carried two at a time for a total of 3 trips/day of about 30 to 40 seconds of actual carrying/handling time for a total per day of about 2 to 3 minutes.*

Complete Ergonomics Risk Screen

Open ERS Spreadsheet

Please open the Excel file **Ergonomics Risk Screen 11-0.xlsx** (found in the ErgoM Toolbox folder in the File Repository Area).



Video Clip – Before

Please watch the **CNC Reservoir Before** video clip (found in the Content section)

Complete the ERS

Video Clip – After

Please watch the CNC Reservoir After video to see what the actual ergonomics intervention consisted of.

ERS Worksheet (Questions)

1. From Step Two check the *Postures* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> Look down	<input type="checkbox"/> Hands at/ above head	<input type="checkbox"/> Flexed forward	<input type="checkbox"/> Fully extended arm	<input type="checkbox"/> Wrist flexed/ extended	<input type="checkbox"/> Squatting
<input type="checkbox"/> Look up	<input type="checkbox"/> Shrugged shoulders	<input type="checkbox"/> Extended back	<input type="checkbox"/> Rotation of wrists/ forearms	<input type="checkbox"/> Wrist bent to side	<input type="checkbox"/> Kneeling
<input type="checkbox"/> Side bent	<input type="checkbox"/> Reach behind body	<input type="checkbox"/> Bent sideways		<input type="checkbox"/> Pinch grip	<input type="checkbox"/> On one leg/ up on toes
<input type="checkbox"/> Rotated	<input type="checkbox"/> Reach at shoulder level	<input type="checkbox"/> Trunk rotated		<input type="checkbox"/> Power grip	<input type="checkbox"/> Stationary standing

2. From Step Two check the *Force* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 1 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 1 pt
	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	
	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	
	<input type="checkbox"/> 3 pts	<input type="checkbox"/> 3 pts	<input type="checkbox"/> 3 pts	<input type="checkbox"/> 3 pts	

3. From Step Two check the *Duration (Static)* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt
<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt
<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts

4. From Step Two check the *Frequency* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt
<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt
<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts

5. From Step Two check the *Time Weighted Multiplier* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 1 hr or less (0.75)	<input type="checkbox"/> 1 hr or less (0.75)	<input type="checkbox"/> 1 hr or less (0.75)	<input type="checkbox"/> 1 hr or less (0.75)	<input type="checkbox"/> 1 hr or less (0.75)	<input type="checkbox"/> 1 hr or less (0.75)
<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)
<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)
<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)

6. From Step Four check the *Other Factors* you observed

- Production/Quality
- Training
- Vibration – hand/arm
- Vibration – whole body
- Hot Environment
- Cold Environment
- On feet > 50% of shift
- Contact Stress (sharp/hard)
- Equipment
- Fixture/Jig
- Workstation
- Foot support
- Controls
- Tools
- Chair
- Display
- Work surface height - too low/high
- Ambient lighting too low
- Ambient lighting too high
- Task lighting
- Vision
- Foot Controls

7. From Step Six check the *IDEAL Corrective Action* you would recommend (not limited by budget or time constraints)

- Smaller buckets
- Rotate workers
- Get a cart
- Add water supply

8. From Step Six check the *COST EFFECTIVE Corrective Action* you would recommend (consideration of cost to implement and overall Operator exposure to the job demands)

- Smaller buckets
- Rotate workers
- Get a cart
- Add water supply

ERS Worksheet (Answers)

1. From Step Two check the *Postures* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input checked="" type="checkbox"/> Look down	<input type="checkbox"/> Hands at/ above head	<input checked="" type="checkbox"/> Flexed forward	<input type="checkbox"/> Fully extended arm	<input type="checkbox"/> Wrist flexed/ extended	<input checked="" type="checkbox"/> Squatting
<input type="checkbox"/> Look up	<input checked="" type="checkbox"/> Shrugged shoulders	<input type="checkbox"/> Extended back	<input checked="" type="checkbox"/> Rotation of wrists/ forearms	<input type="checkbox"/> Wrist bent to side	<input type="checkbox"/> Kneeling
<input type="checkbox"/> Side bent	<input type="checkbox"/> Reach behind body	<input type="checkbox"/> Bent sideways		<input type="checkbox"/> Pinch grip	<input type="checkbox"/> On one leg/ up on toes
<input type="checkbox"/> Rotated	<input type="checkbox"/> Reach at shoulder level	<input type="checkbox"/> Trunk rotated		<input checked="" type="checkbox"/> Power grip	<input type="checkbox"/> Stationary standing

2. From Step Two check the *Force* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input checked="" type="checkbox"/> 1 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input checked="" type="checkbox"/> 1 pt
	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	
	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	
	<input checked="" type="checkbox"/> 3 pts	<input checked="" type="checkbox"/> 3 pts	<input type="checkbox"/> 3 pts	<input checked="" type="checkbox"/> 3 pts	

3. From Step Two check the *Duration (Static)* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input checked="" type="checkbox"/> 0 pt
<input checked="" type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt
<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts

4. From Step Two check the *Frequency* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt	<input type="checkbox"/> 0 pt
<input checked="" type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt	<input checked="" type="checkbox"/> 1 pt
<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts	<input type="checkbox"/> 2 pts

5. From Step Two check the *Time Weighted Multiplier* you observed

Head/Neck/ Eyes	Shoulders/ Upper Back	Back (Mid/Low)	Arms/Elbows	Hands/ Wrists/ Fingers	Legs/Feet
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<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)	<input type="checkbox"/> 1 to 2 hrs (1.0)
<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)	<input type="checkbox"/> 2 to 4 hrs (1.25)
<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)	<input type="checkbox"/> 4 + hrs (1.5)

6. From Step Four check the *Other Factors* you observed

- Production/Quality
- Equipment
- Ambient lighting too low
- Training
- Fixture/Jig
- Ambient lighting too high
- Vibration – hand/arm
- Workstation
- Task lighting
- Vibration – whole body
- Foot support
- Vision
- Hot Environment
- Controls
- Foot Controls
- Cold Environment
- Tools
- On feet > 50% of shift
- Chair
- Contact Stress (sharp/hard)
- Display
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