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How to Reduce the Ergonomic Risk

Jae Lee, Greenlee



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GREENLEE.

How to Reduce the Ergonomic Risk

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Jae Lee
Jae.Lee@emerson.com

Bradley University
Mechanical Engineering

Rockford University
Masters of Business Administration



Career	Experience
<p>Design Engineer ○</p> <p style="text-align: center;"> </p> <p style="text-align: center;">○</p> <p>Director of Product Management</p>	<p>Lean Manufacturing</p> <ul style="list-style-type: none"> • 6S workplace organization • Leading Kaizen events • Implementing Kanban system <p>Ergonomic Assessment</p> <ul style="list-style-type: none"> • Trained in risk assessment • Monthly area improvement / follow up <p>Product Design</p> <ul style="list-style-type: none"> • Voice of Customer • Product design ergonomic assessment

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Session Agenda

WHY?
1
Importance of Ergonomics

WHAT?
2
Ergonomics Risk Assessment

HOW?
3
Tips, Best Practices and Examples

4

WHY?

WHAT?

HOW?

How Does Ergonomics Impact Our Business?

Ergonomics is designing a job to fit the **worker** so the work is safer and more efficient. Implementing ergonomic solutions can make **employees** more comfortable and increase productivity.

Benefits



Higher productivity



Reduced risk of injury



Reduced absenteeism



Increased moral



Risks

Direct Impact

- Worker compensation claims
- Short skilled labor
- Worker shortage



Indirect Impact

- Project delay
- Poor quality of work
- High waste cost
- Low margin

Resource: www.osha.org

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WHY?

WHAT?

HOW?

Understanding the MSD Risk Factor

MSDs are soft tissue injuries of the muscles, nerves, tendons, ligaments and spinal discs that develop over time as a result of overuse of joints and connective tissue.



NIOSH lifting equation



Number of lifts per minute

FREQUENCY



Design guidelines

POSTURE



Number of hours of continuous lifting

DURATION

FORCE

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Quantify the Ergonomics Risk

WHY?
WHAT?
HOW?

BEFORE **AFTER**

Assess Evaluate Update Assess Evaluate

Source from McAtamney and Corlett (1993)

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Posture Assessment

WHY?
WHAT?
HOW?

Ask
Record
Involve
Observe

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Posture Assessment

WHY?

WHAT?

HOW?

Ask

Record

Involve

Observe

Injury & Illness

Operator Survey

Date

Lost Days

Severity

Frequency

Body Part

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Posture Assessment

WHY?

WHAT?

HOW?

Ask

Record

Involve

Observe

Record

- Side and front views
- Wide-angle and close-up views
- Take minimum 3 cycles

Involve

- Buy-in from the team
- Understand the detail
- Easy wins

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Posture Assessment

WHY?

WHAT?

HOW?

Ask

Record

Involve

Observe

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WHY?

WHAT?

HOW?

Tip 1: Utilize the Neutral Postures for Better Capability

Neutral postures minimize the stress applied to the body while maximizing control and force production

Try this:

Step 1: Make an OK sign with one hand and, while resisting, try to break the ring with the other

Step 2: Bend your wrist and try to break the ring again

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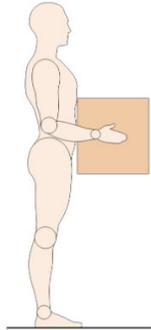
Tip 2: NIOSH Lifting Equation - Force

WHY?

WHAT?

HOW?

- Weight
- Horizontal
- Vertical
- Twisting
- Grip
- Duration
- Frequency



Recommend Weight Limit [RWL]

- Weight that can be safely lifted, given a specific job geometry, frequency and duration

Lifting Index [LI]

- Estimate of physical stress associated with a lift / lower
- Provides a lifting limit that accommodates 99% of males and 75% of females



Under ideal conditions ≤ 51 lbs (23kg) is safe to lift

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Whole-Body Assessment

WHY?

WHAT?

HOW?

	Hands/Wrists	Elbows	Shoulders	Neck	Back	Legs
Posture						
Force	Pinch, press, grip [lb/kg]	One or both [lb/kg]	One or both [lb/kg]	PPE [lb/kg]	Back [lb/kg]	Foot pedal [lb/kg]
Duration	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 30 sec of day
Frequency	≥ 30 per min	≥ 2 per min	≥ 2 per min	≥ 2 per min	≥ 2 per min	≥ 2 per min

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How to Find the Problem Root Cause

WHY?
WHAT?
HOW?

Observation



5 Why's

Why's?	Answer
Why did she fall over backwards?	She swung a heavy garbage bag over her shoulder
Why did she swing a heavy garbage bag?	She thought she could carry the bag better this way
Why did she need better posture?	Because the garbage bag was too heavy
Why was the bag too heavy?	Employees wait to change the bag until it's full
Why do employees wait until it's full?	That's the only indication that it needs to be changed

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Example 1 - Conduit Fishing Process

Traditional Fish Tape



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Observation



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Example 1 - Conduit Fishing Process

Traditional Fish Tape

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REEL-X Fish Tape

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Holding Position

Flexible Setup

Market Usage

Easy Reeling

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Example 1 - Conduit Fishing Process

Traditional Fish Tape

25

REEL-X Fish Tape

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Holding Position

Flexible Setup

Market Usage

Easy Reeling

20% Risk Reduction

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Example 2 - Setting Up The Hydraulic Bender

Before



Observation



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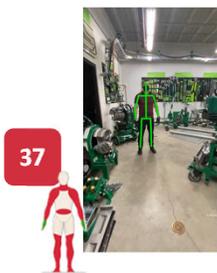
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Example 2 - Setting Up The Hydraulic Bender

Before



After



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Example 3 - Heavy Cable Pull Setup Process

Manual Pull



Observation



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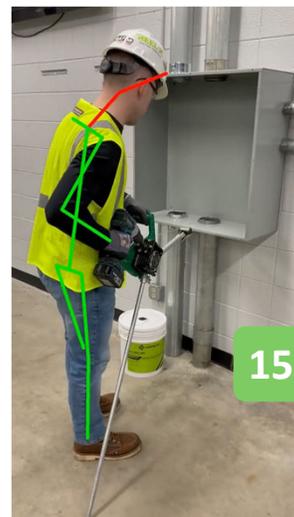
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Example 3 - Heavy Cable Pull Setup Process

Manual Pull



Drill Powered Tugger



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Example 4 - Heavy Electrical Cable Pull Process

Manual Tug



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Observation



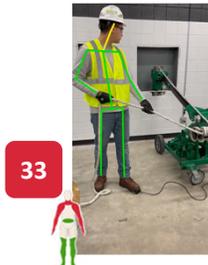
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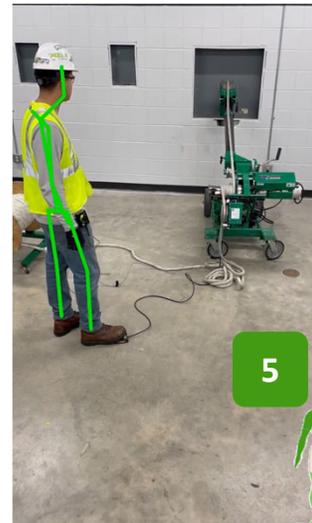
Example 4 - Heavy Electrical Cable Pull Process

Manual Tug



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Hands-Free Tug



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85% Risk Reduction

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Key Takeaways



Improve ergonomics to increase **productivity** and reduce **absenteeism**



Start looking for **quick ergonomic** improvements



Ergonomic **advantage** should be part of the tool selection guide

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Complete the Online Evaluation



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APPENDIX



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Equipment to Use



Force gauge



Dynamometer



Tape measure



Goniometer

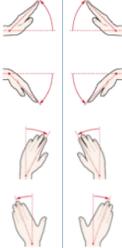
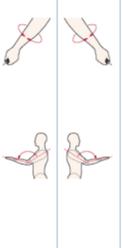


Other tools



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Whole-Body Assessment

	Hands/Wrists		Elbows		Shoulders		Neck	Back	Legs
	Left	Right	Left	Right	Left	Right			
Posture									
Force	≥ 2 lb (0.9 kg)	≥ 2 lb (0.9 kg)	≥ 10 lb (4.5 kg)	≥ 10 lb (4.5 kg)	≥ 10 lb (4.5 kg)	≥ 10 lb (4.5 kg)	PPE ≥ 2 lb (0.9 kg)	≥ 25 lb (11.3 kg)	Foot Pedal ≥ 10 lb (4.5 kg)
	≥ 2 lb (0.9 kg)	≥ 2 lb (0.9 kg)	Both Elbows ≥ 15 lb (6.8 kg)		Both Shoulders ≥ 15 lb (6.8 kg)				
Duration	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 10 sec	≥ 30% of day
Frequency	≥ 30/min	≥ 30/min	≥ 2/min	≥ 2/min	≥ 2/min	≥ 2/min	≥ 2/min	≥ 2/min	≥ 2/min

Resource : VelocityEHS

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