



How to Reduce the Ergonomic Risk

Jae Lee, Greenlee



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The image shows a male worker in profile, facing right. He is wearing a white hard hat, safety glasses, and an orange high-visibility safety vest over a grey t-shirt. He is holding a thick, braided cable that is being fed into a green Greenlee cable pulling machine. The machine is mounted on a wall and has a large spool of cable. The background is a light-colored, textured wall.

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GREENLEE.

How to Reduce the Ergonomic Risk

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Masters of Business Administration



Career	Experience
Design Engineer <div style="position: relative; height: 100px; border-left: 1px solid black; border-right: 1px solid black; margin: 0 auto; width: 2px;"></div>	Lean Manufacturing <ul style="list-style-type: none"> • 6S workplace organization • Leading Kaizen events • Implementing Kanban system
Manufacturing Engineer <div style="position: relative; height: 100px; border-left: 1px solid black; border-right: 1px solid black; margin: 0 auto; width: 2px;"></div>	Ergonomic Assessment <ul style="list-style-type: none"> • Trained in risk assessment • Monthly area improvement / follow up
Plant Supervisor <div style="position: relative; height: 100px; border-left: 1px solid black; border-right: 1px solid black; margin: 0 auto; width: 2px;"></div>	Product Design <ul style="list-style-type: none"> • Voice of Customer • Product design ergonomic assessment
Director of Product Management <div style="position: relative; height: 100px; border-left: 1px solid black; border-right: 1px solid black; margin: 0 auto; width: 2px;"></div>	

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Session Agenda

1

WHY?

Importance of Ergonomics

2

WHAT?

Ergonomics Risk Assessment

3

HOW?

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

Resource : VelocityEHS

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Quantify the Ergonomics Risk

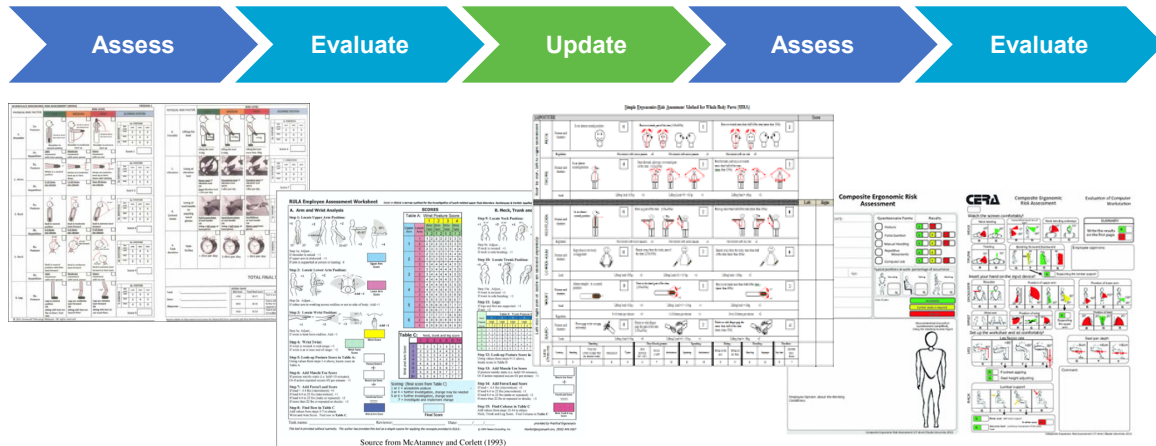
WHY?

WHAT?

HOW?

BEFORE

AFTER



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Posture Assessment

WHY?

WHAT?

HOW?

Ask

Record

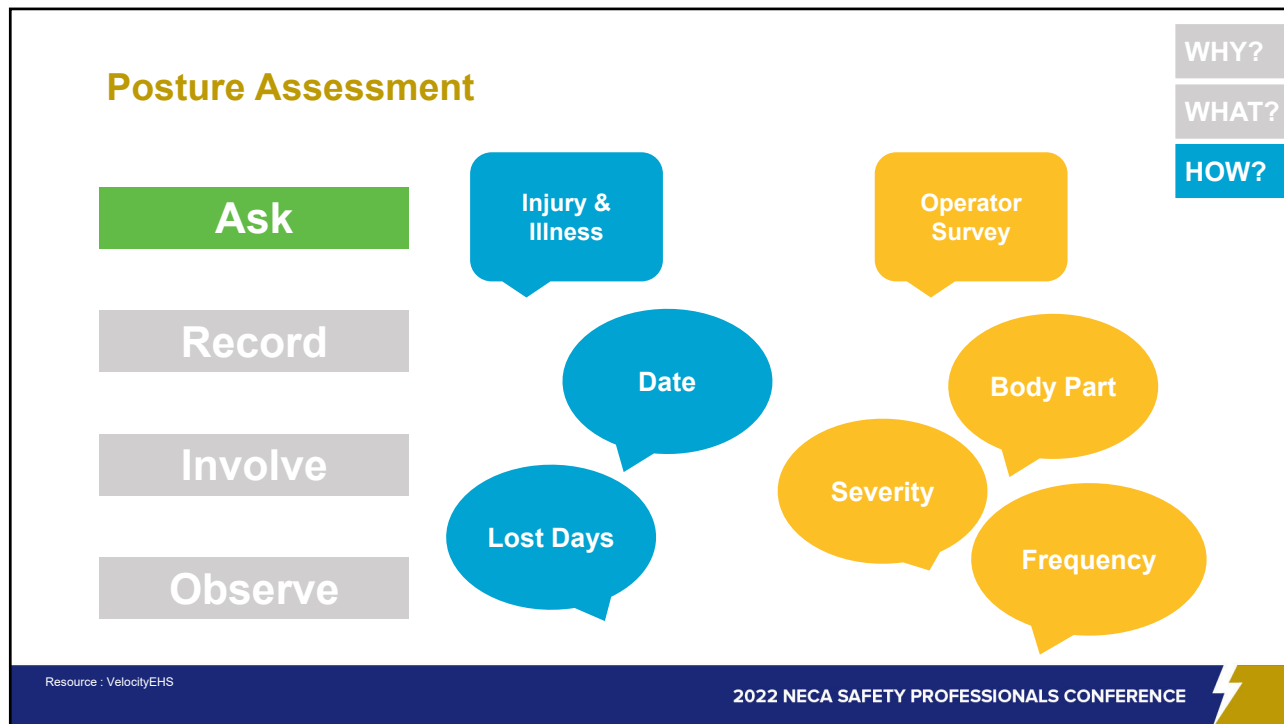
Involve

Observe

Resource : VelocityEHS

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Posture Assessment

WHY?

WHAT?

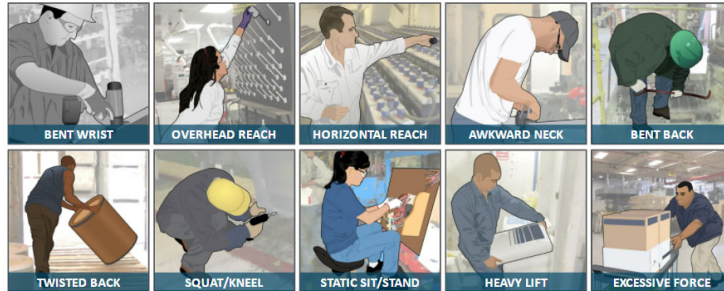
HOW?

Ask

Record

Involve

Observe



Resource : VelocityEHS

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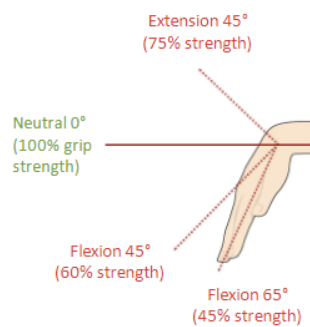
Tip 1: Utilize the Neutral Postures for Better Capability

WHY?

WHAT?

HOW?

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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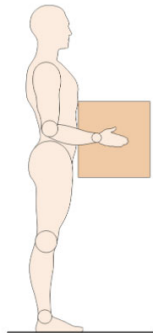
Tip 2: NIOSH Lifting Equation - Force

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



3 points contact



Spine in line



Head up



Stagger feet



Use whole body



Spine straight

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

Resource : VelocityEHS

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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

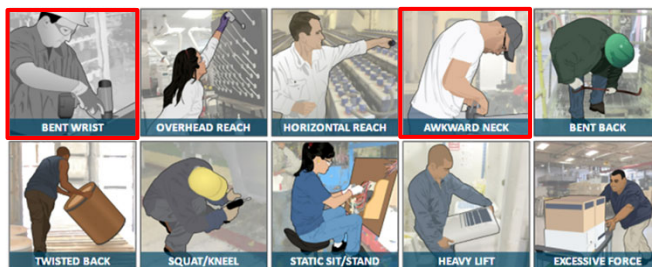
Traditional Fish Tape



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Observation

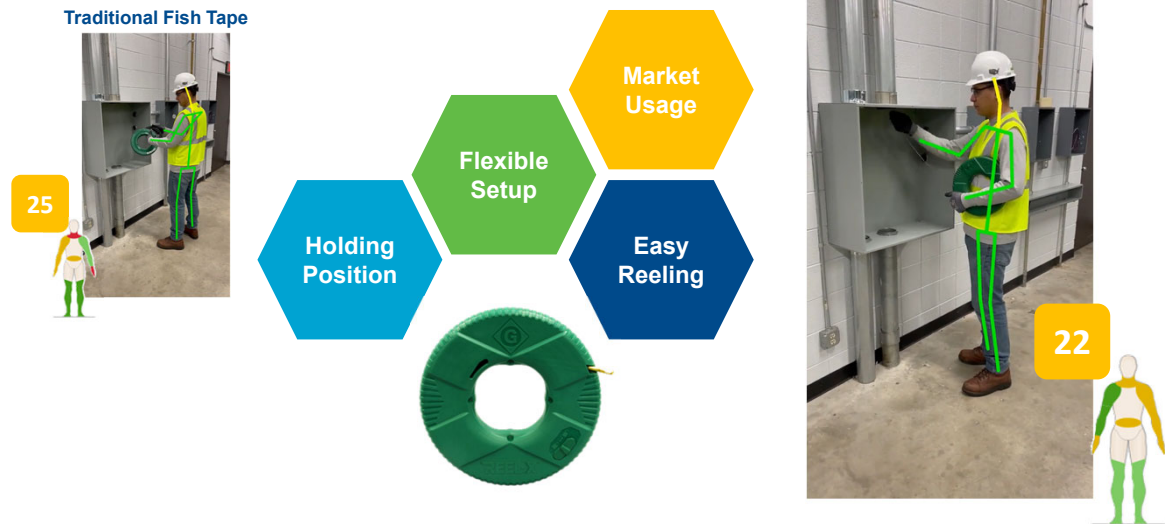


Resource : VelocityEHS

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Example 1 - Conduit Fishing Process



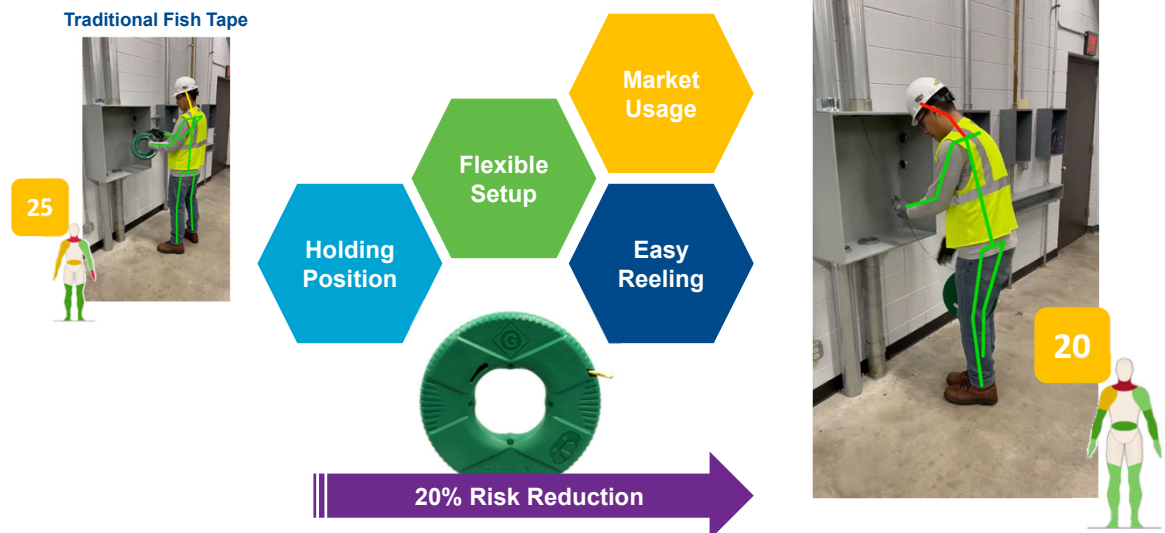
Resource : VelocityEHS

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Example 1 - Conduit Fishing Process



Resource : VelocityEHS

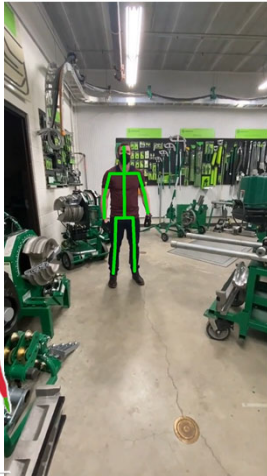
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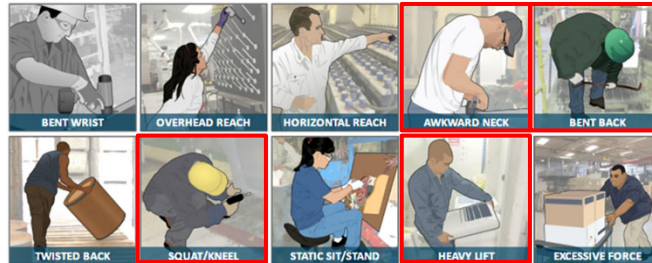
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Example 2 - Setting Up The Hydraulic Bender

Before



Observation



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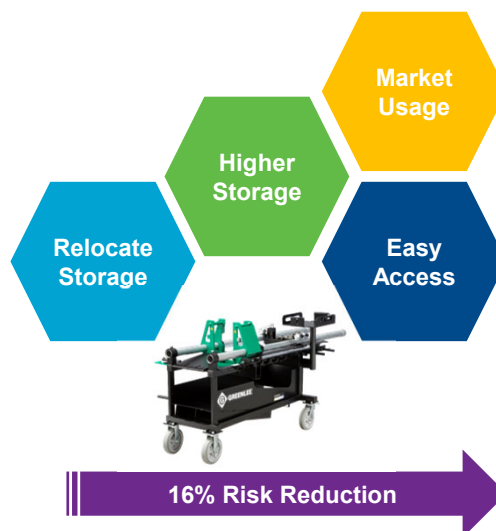
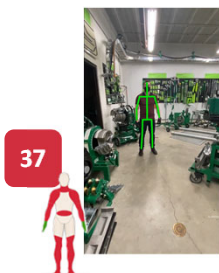
Resource : VelocityEHS

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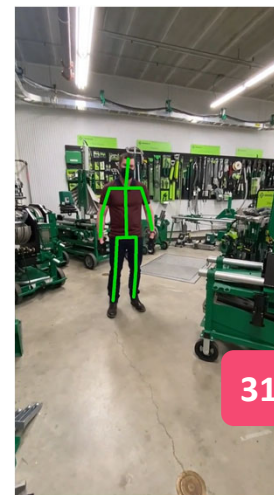
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Example 2 - Setting Up The Hydraulic Bender

Before



After



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Example 3 - Heavy Cable Pull Setup Process

Manual Pull



Resource : VelocityEHS

Observation

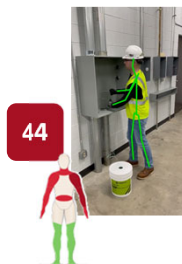


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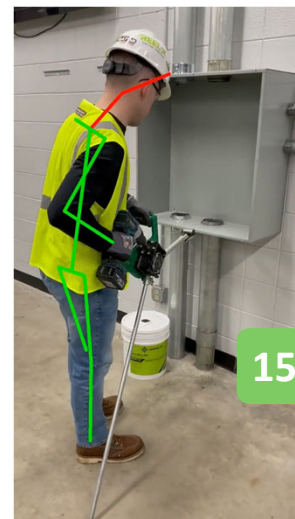
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Example 3 - Heavy Cable Pull Setup Process

Manual Pull



Drill Powered Tugger



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Example 4 - Heavy Electrical Cable Pull Process

Manual Tug



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Resource : VelocityEHS

Observation

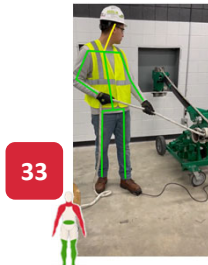


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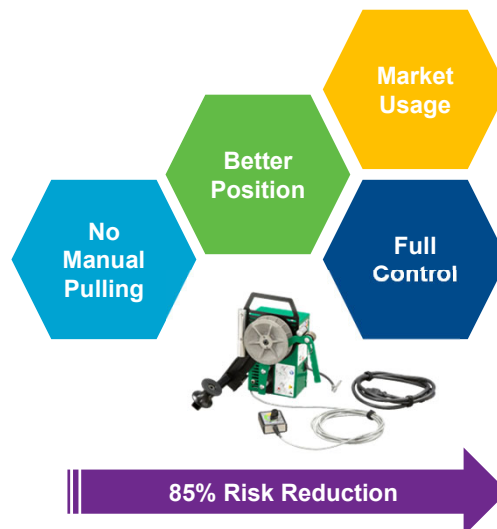
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Example 4 - Heavy Electrical Cable Pull Process

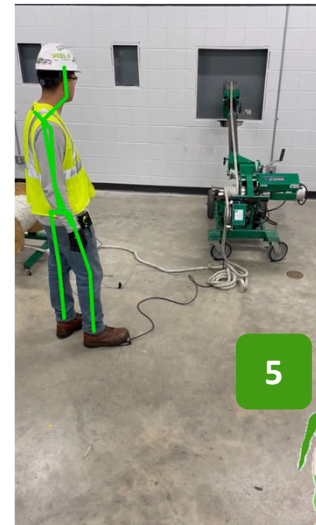
Manual Tug



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Hands-Free Tug



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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

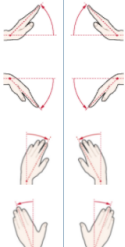
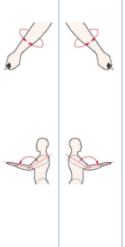












Other tools



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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)
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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