



Ergonomics

MSD Risk Factors – Solutions

Introduction

The previous newsletters have provided important information on musculoskeletal disorders (MSDs) and the risk factors that may lead to MSDs. This newsletter will provide practical solutions to reduce MSD risk factors.

In review, MSD is the term often used to describe medical conditions affecting the soft tissues of the body including muscles, tendons (connect muscles to bones), ligaments (connect bones together), cartilage (often between bones such as the knee and ribs) and nerves. Some common types of MSDs include strains, sprains, tendonitis and ligament damage. The body parts that are most commonly affected include the low back, knees, shoulders, arms and hands.

An MSD risk factor is an action or condition found to contribute to worker discomfort or development of MSDs. Therefore, to avoid getting an MSD, we try to minimize the risk factors that can be controlled. While there are many risk factors for MSDs, the following are commonly observed during mining tasks - **Forceful Exertions, Awkward/Static Postures, Repetitive Motions, Vibrations, Contact Stress/Pressure Points and Torque Reaction**.

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Forceful Exertion - lifting 50 lb bag



Awkward Postures - reaching backward & twisting neck



Repetitive Motion - joystick operated equipment



Whole Body Vibration - operating haul truck



Contact Stress/Pressure Points - using a tool with a too short handle



Torque Reaction/Hand-Arm Vibration - using a powered hand tool

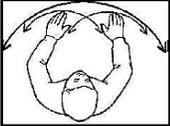
Look out for Risk Factors!

Risk for injury increases when multiple risk factors are present.

Solutions for Reducing MSD Risk Factors

There are many solutions for reducing MSD risk factors. The following table lists some possible solutions to the most common risk factors seen in mining. However, it is important to realize that the first step to reducing exposure to risk factors is worker awareness.

Solutions for Reducing MSD Risk Factors Cont.

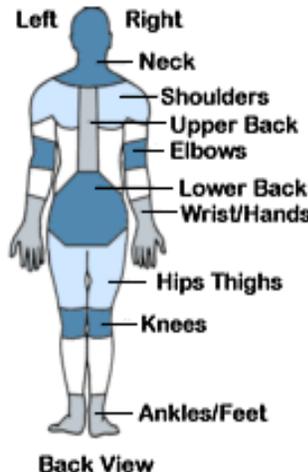
Risk Factor	Definition	Solutions (1,2)	
Forceful Exertions	Work requiring a lot of physical effort	<ul style="list-style-type: none"> •Reduce object weight •Hold the object close to your body •Push carts on smooth, level surfaces •Make sure there are easy ways to handle the object •Get help – use another person to help lift •Organize storage areas to reduce heavy lifting •Use leverage and/or gravity when possible 	 <p>Hand Trucks Help Move Heavy Objects</p>
Awkward or Static Postures	Positioning the body in extreme postures or staying in the same posture for a long period of time	<ul style="list-style-type: none"> •Change height, reach or orientation of work, workstation/equipment/tools or worker •Use adjustable stands •Use turntables or conveyors to bring items closer •Ensure adequate vision – check lighting •Use tilted work and/or spring-loaded surfaces •Design hand tools for neutral wrist/thumb posture •Use fixtures and clamps to hold materials and suspend tools •Provide armrests where arms are elevated •Use job rotation •Use extra side and rear-view mirrors on vehicles to reduce twisting and bending •Remove barriers to improve access to materials •Use anti-fatigue matting and/or footrests for prolonged standing •Alternate standing and sitting 	 <p>Tilted Work Surface</p>  <p>Keep Work Close</p>  <p>Tools for Neutral Posture</p>
Vibration	Occurs when an object oscillates or rapidly moves back and forth about its stationary point. Includes hand-arm vibration, whole body vibration and jolting/jarring	<ul style="list-style-type: none"> •Keep roadways smooth and reduce vehicle speed •Improve vehicle seating – suspension and padding •Perform frequent tool maintenance and bit replacement •Select tools with vibration dampening, vibration-absorbing grips or handles made from high-friction materials •Change tool rotation speed or gears to use anti-vibration gloves •Use tools with a larger handle diameter or tool support 	 <p>Anti-vibration Gloves</p>  <p>Improved Seating</p>
Repetition	Work requiring the same movements with the same muscle groups many times	<ul style="list-style-type: none"> •Combine or eliminate some parts of the task •Decrease the number of pieces handled •Ensure worker has some flexibility over pace and breaks •Have worker put away whatever is processed for recovery time •Use several dedicated tools rather than one adjustable tool •Use power tools whenever possible 	 <p>Power Tools</p>
Contact Stress / Pressure Points	A body part is pressed against a sharp edge or ridge; A body part contacts a hard surface and pressure increases usually due to the weight of the body part	<ul style="list-style-type: none"> •Distribute pressure over as wide an area as possible •Use tools with long enough handles and round surfaces •Pad surfaces with softer material 	 <p>Hand Tool With Long Handle and Round Surfaces</p>
Torque Reaction	The arm is jerked by a power tool as the rotating socket stops quickly	<ul style="list-style-type: none"> •Use a tool stand, holding device and/or torque reaction arm •Use two hands when possible •Automate tasks where feasible 	 <p>Torque Reaction Arm</p>

What Can You Do?

Now that you have learned about MSDs, MSD risk factors and possible solutions to reduce MSD risk factors, what can you do? You can make sure that you’ve been trained to do your job safely and that you know the MSD risk factors associated with the job you do. You can also take steps to control or eliminate MSD risk factors and participate in making your workplace safer by following the guidelines below (3).

- Report MSD risk factors, MSD symptoms and/or concerns to your supervisor
- Use the equipment/tools provided to reduce MSD risk factors
- Make adjustments to your workstation to fit you and the work you do
- Take breaks, move around and change positions occasionally
- Offer suggestions to improve working conditions

A simple way to assess your work area for MSD risk factors is by filling out a Risk Factor Report Card (below). Once you have completed the report card, talk to your supervisor about any concerns you may have. Work together to find ways to reduce your exposure to MSD risk factors by changing the way the job is done or the design of the work area.

RISK FACTOR REPORT CARD	Name: _____
1. Work area: _____	
2. Describe task: _____ _____	
3. Check all risk factors that apply:	4. Place X on affected areas.
<input type="checkbox"/> Poor Posture <input type="checkbox"/> Forceful Gripping <input type="checkbox"/> Repetitive Work <input type="checkbox"/> Heavy Lifting/Carrying <input type="checkbox"/> Vibrating Tools <input type="checkbox"/> Bouncing/Jarring <input type="checkbox"/> Static Position <input type="checkbox"/> Heavy Shoveling	
Other risk factors: _____	
5. Comments/suggestions: _____ _____	
6. Plant/Mine Name: _____	

References:

1. Work Safe BC (2007). *Making It Right – Preventing Musculoskeletal Injuries in Manufacturing*. Pub. No. BK110
2. Dan MacLeod (2008). 10 Principles of Ergonomics. [http://www.danmacleod.com/ErgoForYou/10_principles_of_ergonomics.htm]. Date accessed: April 2011.
3. Workplace Safety & Insurance Board (2006). *MSD Prevention – Workers*. Pub. No. 5193A