



Ergonomics

Risk Factors - Introduction

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Introduction

Forceful Exertions
Awkward Postures
Vibration
Repetition

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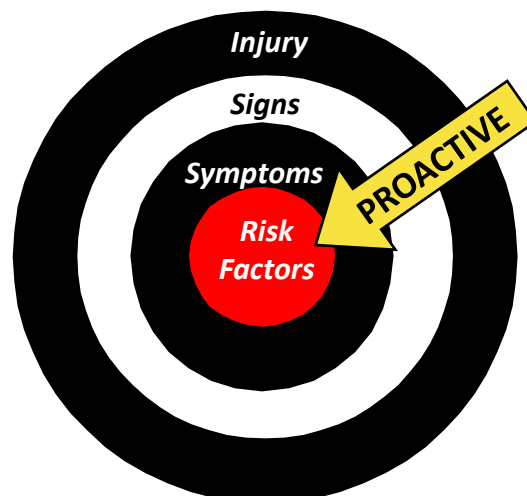
Risk Factors

Usually, when we think about doing manual tasks, we think of heavy lifting or pushing with a great deal of effort. However, manual tasks involve a lot more - they require workers to *lift, push, pull, carry, move, manipulate, hold, pound, or restrain* an item.

To manage risk associated with these types of tasks, it is important to identify conditions and causes that could lead to the development of musculoskeletal disorders (MSDs), like tendonitis of the elbow, carpal tunnel syndrome or a sprain or strain. These conditions are called risk factors.

To keep workers safe and healthy, it is important to take a comprehensive approach - for safety we identify and eliminate safety hazards, for industrial hygiene we identify and control health hazards, and for ergonomics, it is also important to identify and control MSD risk factors. Be proactive. Control risk factors before workers experience discomfort or an injury.

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What do we know about Risk Factors?

The term “risk” implies there exists some potential or probability for an effect to occur. We all have heard about risk factors for heart disease, such as high cholesterol or high blood pressure. Having these risk factors increases our chances of getting the disease. Therefore, to avoid getting these diseases, we try to minimize the risk factors that we can control. Risk factors for musculoskeletal should be viewed in the same way.

Some workers who are exposed to MSD risk factors eventually develop an MSD, while other workers do not. We do know that an effect from an exposure to a risk factor is more likely if:

- a worker is exposed to extreme levels of the risk factor
- more than one risk factor is present
- the worker has a pre-existing weakness due to genetics, or a previous injury or illness

The effect from exposure to MSD risk factors is difficult to predict, and depends on many things, such as:

- who is being exposed (gender, age, physical condition)
- the level or intensity of the exposure
- the frequency of the exposure
- the duration of the exposure
- the combination of risk factors present

Although we can not define what is a safe or unsafe level for most MSD risk factors, we do **know**:

- What risk factors are associated with MSDs.
- That well designed equipment, workstations, tasks and procedures can help prevent MSDs.
- That early medical care reduces the severity of MSDs

Risk factors for MSDs should be viewed in the same way as risk factors for other diseases, such as heart disease. To reduce your chance of getting the MSD, eliminate or reduce the risk factor.

The earlier action is taken to prevent an MSD, the greater likelihood of success!

Risk Factors and Mining

Risk factor exposures occurring during mining tasks are often the same as other industries. While there are many risk factors for MSDs, four are often observed during mining tasks. These include:



Forceful Exertion – lifting bag weighting 50 pounds



Awkward Postures – reaching backwards and twisting the neck



Repetitive Motion – using a joystick to operate mining equipment



Hand Arm Vibration – operating a pneumatic wrench

- **Forceful Exertions** - work requiring a lot of physical effort
- **Awkward or Static Postures** - positioning the body in extreme postures or staying in the same posture for a long period of time
- **Repetitive Motions** - work requiring the same movements with the same muscle groups many times
- **Vibration** - includes hand-arm vibration, whole body vibration and jolting / jarring

Some other risk factors that you may observe during mining tasks could include:

- **Contact Stress** - a body part is pressed against a sharp edge or ridge
- **Pressure Points** - a body part contacts a hard surface and pressure increases usually due to the weight of the body part
- **Torque Reaction** - the arm is jerked by a power tool as the rotating socket stops quickly

There are also some work conditions that may increase risk factor exposures. For example, restricted work spaces may force a worker to use awkward postures, or prevent the use of equipment that could reduce or eliminate the risk factor exposure. Another example is inadequate lighting. This condition could also force a worker to use awkward postures.

Ergonomics also addresses risk factors that result in illness other than MSDs. These risk factors deal with the environment where the work is performed, and include heat stress, cold stress and altitude.

Why do Risk Factors Occur?

Mining conditions and processes sometimes make it more difficult to eliminate exposures to risk factors, but the exposures can usually be reduced. In order to control risk factors, one has to know why there are occurring - what is the root cause of the risk factor?

When determining the root cause, information is needed about the task, how the task is done, and what tools and equipment are needed to do the tasks. The following list includes factors to consider when determining the root cause:

- Process used to do the task
- Effort or strength required
- Location of parts, equipment or tools
- Position of parts, equipment or tools
- Design of parts, equipment or tools
- Frequency of task
- Duration of task
- Speed of work or time to do each cycle
- Environmental factors
- Training provided to workers
- Personal protective equipment worn during task
- Productivity requirements

What's Next?

Now that you know what a risk factor is and what to start looking for when you are observing tasks, the next few issues of the newsletter will provide more details about each main risk factor. This will help you to sharpen your observation skills when looking for risk factors. The next newsletter will focus on forceful exertions.

ROOT CAUSE

One of many factors that contributes or creates an undesired outcome, and if eliminated would have prevented the undesired outcome.

Root causes are specific underlying causes or sources of a problem.



Sometimes it is easy to understand the root cause. For example, in the photo the worker is moving a box from the storage shelf to a dolly. Using the dolly eliminates forceful exertions needed to carry the box, but when he moves the box to the dolly he is exposed to two risk factors - forceful exertion and twisting his trunk. What causes these risk factors to occur? The weight of the box causes the forceful exertion; the twisting is caused due to the location of the box on the storage shelf and the position of the dolly.