WSN ERGONOMIC SAFETY TALK #4

Hand Tools

What is a safety talk?

This safety talk is one of a series of brief meetings held on regular basis with workers and their supervisors to discuss problems and concerns about health and safety. All safety talks involve an informal presentation on a specific subject to the group by a person chosen to lead the session, followed by a discussion of the topic, how it fits into your workplace and what it means to the people who work there.

This document consists of the information with which the person who's delivering the safety talk needs to be familiar, followed by a Presentation Guide which can be used during the actual safety talk.

Background information

Why worry about hands?

There are 27 bones in each hand and wrist. Most of the muscles that operate the hand are in the forearm. Blood vessels and nerves pass though a small tunnel at the base of your hand that is known as the "carpal tunnel". Because many hand tools cause the wrist to bend, a great deal of stress is placed on the tendons, nerves and blood vessels.

Ergonomics examines how the combination of force, repetition, duration and awkward postures increases the likelihood of an injury. Your upper limbs are especially vulnerable to injury from a combination of those factors. The symptoms of upper limb injuries can occur quickly or they can develop over time, so it's important to report any discomfort to your supervisor before the problem gets worse.

Damage occurs to the soft tissue of the hand when the palm of the hand is used as a hammer or the tools that are being used press into the palm. The soft tissue damage can result in bruising, numbness and/or tingling in your fingers.

Grips

Tools that are too heavy or improperly balanced, grip spans that are too large, too small, slippery or the wrong shape can lead to injuries of the neck, upper back, shoulders, elbows, wrist and fingers. This is also the case when you use the wrong tool for a job. Avoid tools that cause your wrist to be in flexion (bending your wrist downward) or extension (bending your wrist upward). Your tool should do the bending, not your wrist.

A power grip, with the whole hand wrapped around the handle, should be used whenever possible instead of a pinch grip, with the handle held between your thumb and index finger. The power grip allows the greatest force with the least amount of strain on the forearm, wrist and hand muscles, ligaments and joints. If a pinch grip has to be used, the amount of force, the length of time holding the object and the number of repetitions required need to be evaluated for ergonomic risk factors. Overall, a properly designed grip will reduce fatigue on the muscles and joints and decrease any pain.

Weight

When making hand tools, manufacturers take into account the weight of the tool and the location of the centre of gravity. Weight is important, because the heavier the tool, the more fatigue on the muscles and ligaments, thereby increasing the difficulty to control

the tool. It is generally recommended that the hand tool weigh no more then 2.3 lbs. (1 kg). If the tool weighs more than what is comfortable for the worker, it might be worthwhile to investigate suspending it overhead to reduce the amount of force required.

If the centre of gravity is far away from the wrist the maximum weight should be reduced. Ideally the centre of gravity should be aligned with the centre of the hand gripping the tool. The tool should feel easy to use with the hand doing the job.

Handle Size

Handles are also important. A rubber handle is generally more comfortable and allows any pressure to be shared by your palm and fingers. Foam-wrapped or rubber-handled tools reduce the amount of vibration felt in the hands and arms. The handle should allow the hand to go more then halfway around the handle without the thumb and finger meeting. When using gloves, the overall size of the handles must be evaluated to ensure that the tool can accommodate the larger palm size.

Grip Surface

The most ideal grip surface is one that is smooth, non-conductive and is able to slightly compress to dampen the vibration on the hand and fingers. Ideally, the end of the handle should not rest in the palm of your hand. Rounded handles will reduce any compression. Tools with indentations should be avoided, as hand size varies from person to person.

Spring-assisted tools such as pliers require less finger and hand effort because they open automatically. The spring distance should ideally be 50 to 60 mm (2 to 2.3 inches) as this will accommodate most male and female workers. A larger or smaller distance will increase the grip strength required to use the tool, thereby increasing the chance of a wrist injury.

Trigger finger, a swelling of the tendon in the palm of the hand that bends the finger, can occur when the tool requires the index finger or thumb to activate the tool. It is recommended that the trigger be longer to allow for more fingers to activate the tool. An example of where this may happen is when someone is using a nail gun or drill to complete the tasks required.

Other Factors

Companies also have to think of the left-handed worker. Why not look into a tool that can be used by both hands? Most left-handed people generally have to adapt to awkward positions to accomplish the job.

Maintenance of tools is just as important. When a tool is not properly maintained, there is an increased chance of an injury. Dull tools require more force from the user to get the required result. A regular maintenance schedule is important for health and safety. Replace old or worn out tools with new ones to reduce the overall risk.

Presentation guide

General information

- Damage occurs to the soft tissue of the hand when the palm of the hand is used as a hammer or the tools that are being used press into the palm
- Soft tissue damage can result in bruising, numbness and/or tingling in your fingers

Grips

- Tools that are too heavy or improperly balanced, grip spans that are too large, too small, slippery or the wrong shape can lead to injuries of the neck, upper back, shoulders, elbows, wrist and fingers
- Avoid tools that cause your wrist to be in flexion (bending your wrist downward) or extension (bending your wrist upward)
- Your tool should do the bending, not your wrist
- Power grip (hand wrapped around the handle) should be used over a pinch grip (item held between the thumb and index finger)
- Power grip allows the greatest amount of force with the least amount of strain on the forearm, wrist and hand muscles, ligaments and joints
- If a pinch grip has to be used, the amount of force required, the length of time holding the object and the number of repetitions need to be evaluated for ergonomic risk factors

Weight

- The heavier the tool, the more fatigue on the muscles and ligaments
- When there is more fatigue on the muscles and ligaments it is more difficult to control the tool
- Hand tools should weigh no more then 2.3 lbs (1 kg)
- If the tools is uncomfortable for the worker to use, it might be worthwhile to investigate suspending it overhead to reduce the amount of force required
- Ideally the centre of gravity should be aligned with the centre of the hand gripping the tool
- The tool should feel easy to use with the hand doing the job

Handle Size

- A rubber handle is generally more comfortable and allows any pressure to be shared by your palm and fingers
- Foam-wrapped or rubber-handled tools reduce the amount of vibration felt in the hands and arms
- The handle should allow the hand to go more then halfway around the handle without the thumb and finger meeting
- If gloves are being worn for the task, the handles must be evaluated to ensure the tool can accommodate the larger palm size

Grip Surfaces

- Ideal grip surface is smooth, non-conductive and able to slightly compress to dampen the vibration in the hands and fingers
- Rounded handles will reduce any compression
- Indentations should be avoided, as the hand size varies from person to person
- The end of the handle should never rest in the palm of your hand
- Spring-assisted tools require less finger and hand effort because they automatically open
- The spring distance should be 50 to 60 mm (2 to 2.3 inches) as this will accommodate most male and female hands
- Trigger finger can occur when the tool requires the index finger or thumb to activate the tool
- The trigger should be longer to allow more fingers to activate the tool when possible

Other Factors:

- Most left-handed people generally have to adapt to awkward positions to accomplish the job as most tools are made for right-handed people
- Maintenance of tools is very important. When a tool is not properly maintained, there is an increased chance of injury.
- Dull tools require the worker to use more force to accomplish the task
- Replace old or worn-out tools with new ones to reduce the overall risk
- A regular maintenance schedule is important for health and safety