

# Voisey's Bay: Musculoskeletal Disorders Orientation

## 1. Mandatory - MSD Hazard Awareness May 17, 2021

### 1.1 MSD Hazard Awareness



## MSD Hazard Awareness

VNL Labrador Operations



## 1.2 Untitled Slide

- ❖ Definition of Musculoskeletal Disorders (MSDs)
- ❖ Musculoskeletal System
- ❖ Roles & Legislative Requirements
- ❖ Types of MSD Injuries
- ❖ Causes of MSDs
- ❖ MSD Statistics
- ❖ Hazard Recognition, Evaluation & Controls
- ❖ Stretching Physiology
- ❖ Lifting Safety & Safe Lifting Techniques

# Agenda

### **1.3 Definition of Musculoskeletal Disorders**

## Definition of Musculoskeletal Disorders

Musculoskeletal Disorders or MSDs are injuries and disorders that affect the human body's movement or musculoskeletal system.

A musculoskeletal injury (MSI) is an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue, including a sprain, strain and inflammation, which may be caused or aggravated by work.



## 1.4 Definition of MSDs

### Definition of MSDs

The term MSI is used in Newfoundland and Labrador. Other terms with similar meanings include:

- Soft-tissue injury (STI)
- Musculoskeletal disorder (MSD)
- Work-related musculoskeletal disorder (WMSD)
- Repetitive strain injury (RSI)
- Repetitive motion injury (RMI)
- Occupational overuse syndrome (OOS)
- Cumulative trauma disorder (CTD)

What systems of the body make up the Musculoskeletal system?



## 1.5 The Musculoskeletal System

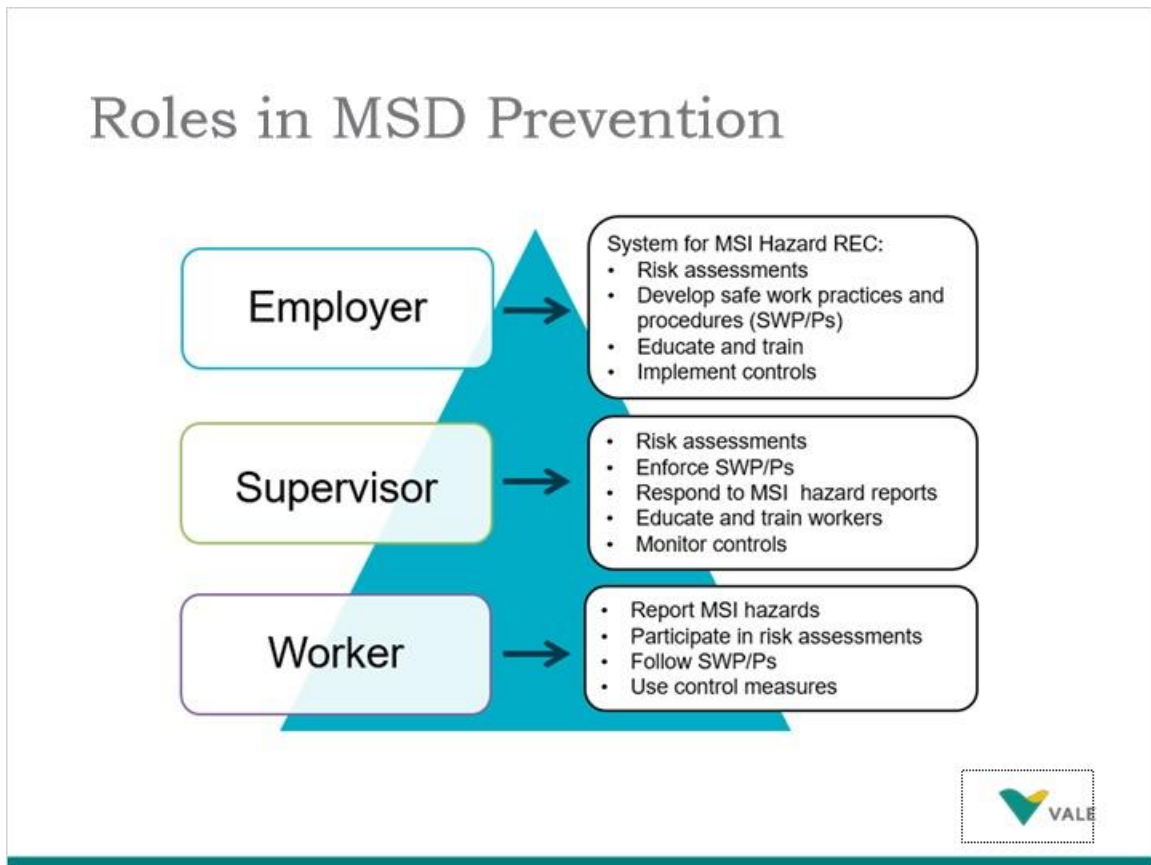
# The Musculoskeletal System

The **musculoskeletal system** is made up of the body's bones (the skeleton), muscles, cartilage, tendons, ligaments, joints, and other connective tissue that supports and binds tissues and organs together.

Its primary functions include supporting the body, allowing motion, and protecting vital organs.



## 1.6 Roles in MSD Prevention



## 1.7 NL OHS Regulations

# NL OHS Regulations

### Sections 50-54

- Recognize, evaluate and control MSI risks
- Educate workers
- Monitor effectiveness of controls
- Consult with workers

Section 55 - Seating or standing

Section 56 - Lifting and handling



## 1.8 The Cause of Musculoskeletal Disorders

### The Cause of Musculoskeletal Disorders

MSDs can occur anywhere in the body; but often involve the back, wrist, elbow or shoulder.

They can result from a single traumatic event, such as lifting a heavy load; or they can develop over a period of time as a result of cumulative damage.





## 1.9 The Impact of MSDs in NL

# The Impact of MSDs in NL

On average, MSIs in Newfoundland and Labrador account for:



## **1.10 Work-Related Musculoskeletal Disorders**

### Work-Related Musculoskeletal Disorders

A work-related musculoskeletal disorder (WMSD) is an injury of the muscles, tendons, ligaments, nerves, joints, cartilage, bones, or blood vessels in the arms, legs, head, neck, or back that is caused or aggravated by work tasks such as lifting, pushing, and pulling.

The Most Common Types of Work-Related Musculoskeletal Disorders include:

1. Work-Related Upper Limb Musculoskeletal Disorders
2. Low Back Work-Related Musculoskeletal Disorders
3. Work-Related Lower Limb Musculoskeletal Disorders



## 1.11 Work-Related Upper Limb MSDs

# Work-Related Upper Limb MSDs

Work-related upper limb musculoskeletal disorders can affect any region of the neck, shoulders, arms, forearms, wrists, and hands.

The most common work-related upper limb musculoskeletal disorders by upper limb region are:

- **Neck:** Tension Neck Syndrome and Cervical Spine Syndrome
- **Shoulder:** Shoulder Tendinitis and Shoulder Bursitis
- **Elbow:** Epicondylitis and Radial Syndrome
- **Wrist/Hand:** Trigger Finger, Carpel Tunnel Syndrome, and Hand-Arm Vibration Syndrome



## 1.12 Low Back Work-Related MSDs

### Low Back Work-Related MSDs

Low back work-related musculoskeletal disorders are associated with spinal disc problems, and muscle and soft tissue injuries.

These disorders often arise due to strenuous physical work, where static and awkward postures, repetitive motion, and whole-body vibration are present.



## 1.13 Work-Related Lower Limb MSDs

# Work-Related Lower Limb MSDs

Work-related lower limb musculoskeletal disorders affect the hips, knees, and legs.

Workers who are most at risk of developing work-related lower limb musculoskeletal disorders are those whose job task requires them to work over a long period in standing or kneeling positions, as well as those that include repetitive kneeling or squatting, and frequent jumping from a height.



## 1.14 Work-Related Lower Limb MSDs

# Work-Related Lower Limb MSDs

The most common work-related lower limb musculoskeletal disorders by lower limb region are:

- **Hip/Thigh:** Osteoarthritis, Hamstring Strains, and Sacroiliac Joint Pain
- **Knee/Lower Leg:** Osteoarthritis, Bursitis, Pre-patellar Tendinitis, Shin Splints, Infra-patellar Tendinitis, and Stress Fractures
- **Ankle/Foot:** Achilles Tendinitis, Sprained Ankle, Stress Fractures, and Varicose Veins



## 1.15 Common MSIs

### Common MSIs



What percentage of all our injuries are caused by MSD hazards?



## 1.16 MSD Risk Factors

### MSD Risk Factors





## 1.17 Work-Related Risk Factors

# Work-Related Risk Factors

There are three primary ergonomic risk factors:

- High task repetition
- Forceful exertions
- Repetitive or sustained awkward postures



**High task repetition.** Many work tasks and cycles are repetitive in nature, and are frequently controlled by hourly or daily production targets and work processes. High task repetition, when combined with other risk factors such as high force and/or awkward postures, can contribute to the formation of an MSD. A job is considered highly repetitive if the cycle time is 30 seconds or less.



## 1.18 Work-Related Risk Factors

### Work-Related Risk Factors

**Forceful exertions.** Many work tasks require high force loads on the human body. Muscle effort increases in response to high force requirements, increasing associated fatigue which can lead to MSDs.

**For example:**

- Lifting
- Carrying
- Pushing
- Pulling
- Squeezing
- Gripping



## 1.19 Work-Related Risk Factors

# Work-Related Risk Factors

**Repetitive or sustained awkward postures.** Awkward postures place excessive force on joints and overload the muscles and tendons around the effected joint. Joints of the body are most efficient when they operate closest to the mid-range motion of the joint.

Risk of MSD is increased when joints are worked outside of this mid-range repetitively or for sustained periods of time without adequate recovery time.

Activities that increase this risk include:

- Lifting
- Pushing
- Pulling
- Frequent bent or twisted positions
- Sitting and standing for long periods of time without changing your posture



## 1.20 Secondary Risk Factors

# Secondary Risk Factors

### Contact pressure

Is any external pressure applied to soft tissues of the body. Holding tools where handles press into parts of the hand is an example of contact pressure.

### Vibration

Can cause damage to nerves and blood vessels as well as other soft tissues. Gloves can be a risk factor if they don't fit properly or if they restrict movement of the fingers and hands.

### Temperature

Cold can reduce the range of motion and flexibility of muscles. Heat can increase fatigue and limit muscle recovery.



## 1.21 Individual Risk Factors

### Individual Risk Factors

We need to address *both* workplace risk factors *and* individual risk factors.

Individual risk factors include:

- Poor work practices
- Poor overall health habits
- Poor rest and recovery
- Poor nutrition, fitness and hydration



## **1.22 Individual Risk Factors**

### Individual Risk Factors

Exposure to these individual risk factors puts workers at a higher level of MSD risk.

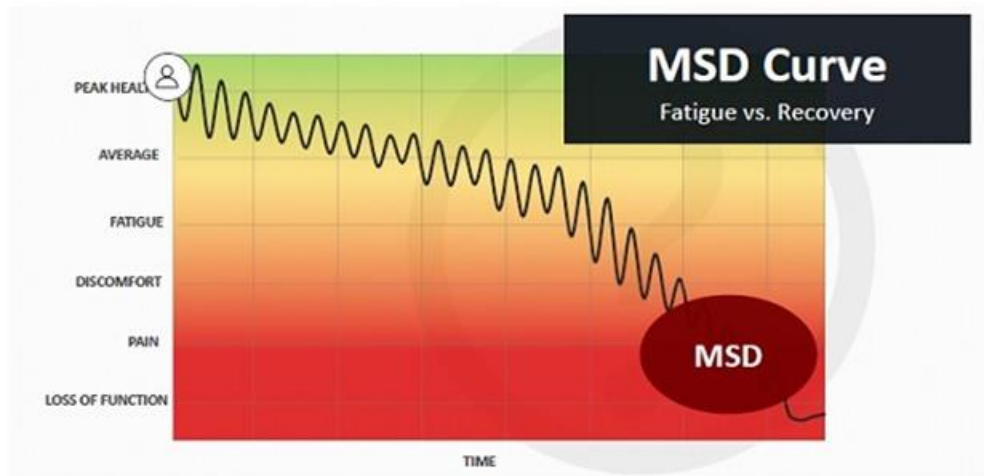
Just like workplace risk factors, individual risk factors are common sense: when a worker uses poor work practice, has bad health habits, doesn't get adequate rest and recovery and doesn't take care of their bodies with a good nutrition and fitness regimen, they are at greater risk for fatigue to outrun their recovery system.

Having a poor overall health profile puts them at greater risk of developing a musculoskeletal imbalance and eventually an MSD.



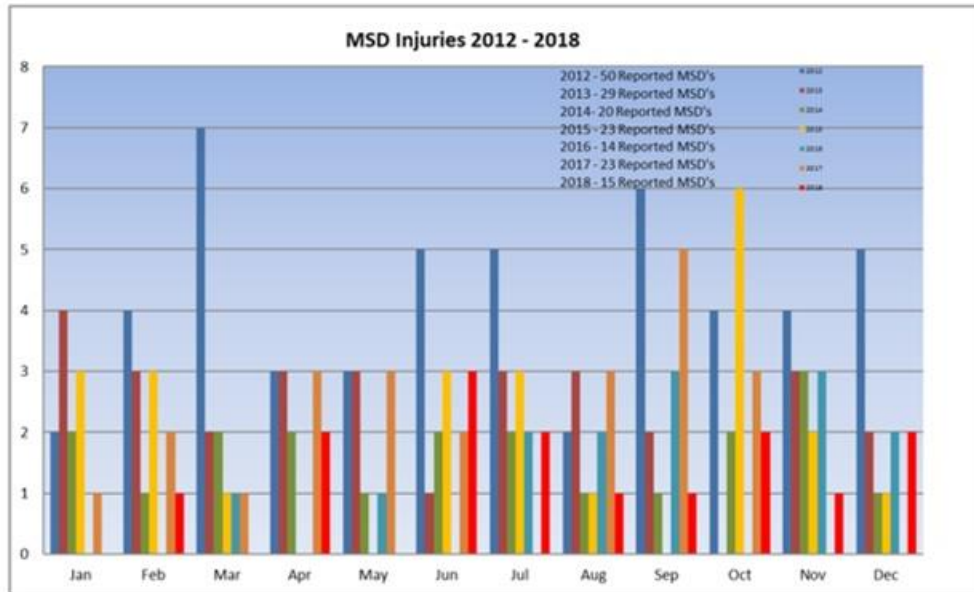
### 1.23 MSD Curve

## MSD Curve



## 1.24 VNL MSD Statistics

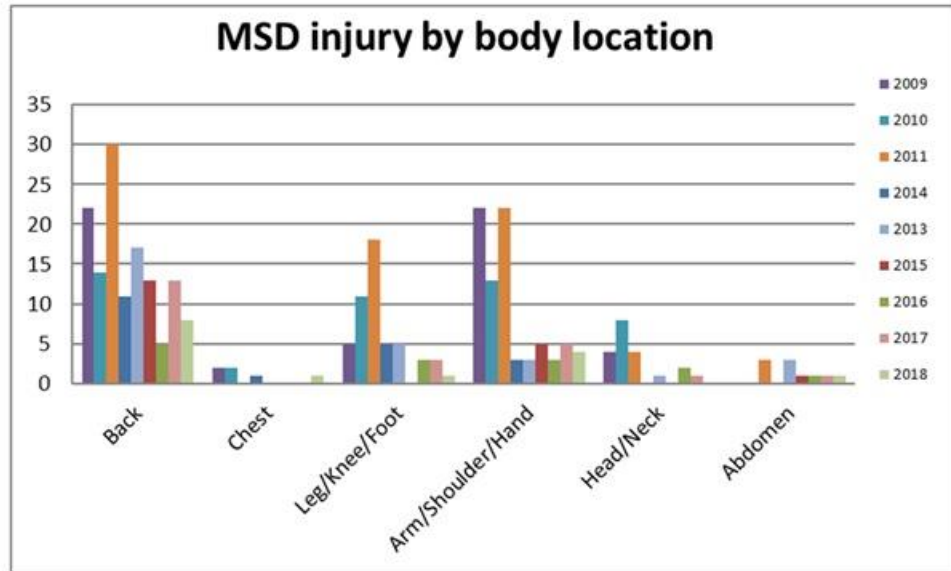
### VNL MSD Statistics





## 1.25 VNL MSD Characteristics

### VNL MSD Characteristics



## 1.26 Signs and Symptoms

### Signs and Symptoms



- Pain/ache/tenderness
- Tightness
- Stiffness
- Numbness
- Redness/swelling
- Shooting/burning
- Muscle weakness
- Decreased movement
- Loss of strength/function

## 1.27 Signs and Symptoms of MSDs

### Signs and Symptoms of MSDs

Pain is the most common symptom associated with WMSDs. In some cases there may be joint stiffness, muscle tightness, redness and swelling of the affected area. Some workers may also experience sensations of "pins and needles," numbness, skin color changes, and decreased sweating of the hands.

WMSDs may progress in stages from mild to severe.

**Early stage:** Aching and tiredness of the affected limb occur during the work shift but disappear at night and during days off work. No reduction of work performance.

**Intermediate stage:** Aching and tiredness occur early in the work shift and persist at night. Reduced capacity for repetitive work.

**Late stage:** Aching, fatigue, and weakness persist at rest. Inability to sleep and to perform light duties.

***Report early signs and symptoms of MSD to your supervisor.***



## Hazard Recognition, Evaluation, and Control Process

### Step 1: RECOGNIZE HAZARDS

- Identify hazards that expose workers to risk of MSI

### Step 2: EVALUATE HAZARDS

- Evaluate MSI risk to workers from the hazards

### Step 3: CONTROL HAZARDS

- Identify and implement controls to eliminate hazards or minimize risk

### Step 4: MONITOR AND EVALUATE CONTROLS

- Monitor and evaluate controls for effectiveness; implement new controls where necessary



## 1.29 Hazard Recognition

# Hazard Recognition

### Daily Safety Message – Musculoskeletal Disorders (MSD's)

Audit Date: \_\_\_\_\_ Auditor's Name: \_\_\_\_\_  
 Plant: \_\_\_\_\_ Auditor's Company: \_\_\_\_\_  
 Area: \_\_\_\_\_ Site Supervisor: \_\_\_\_\_  
 Project #: \_\_\_\_\_ Project Name: \_\_\_\_\_

Interactive Audit - Discussion Topics		Interactive Audit – Results	
1	Did you receive a safety message today?	How Many Workers Did You Talk To?	
2	What was the topic of the safety message?		
3	What kinds of MSD injury hazards might come up in your work?		
4	What kinds of MSD prevention measures will you use today for your work?		
5	Do you have access to all of the tools and PPE that you might need?		
		# of Responses that Required Coaching	
<b>Notes</b>			



## 1.30 Hazard Recognition

# Hazard Recognition

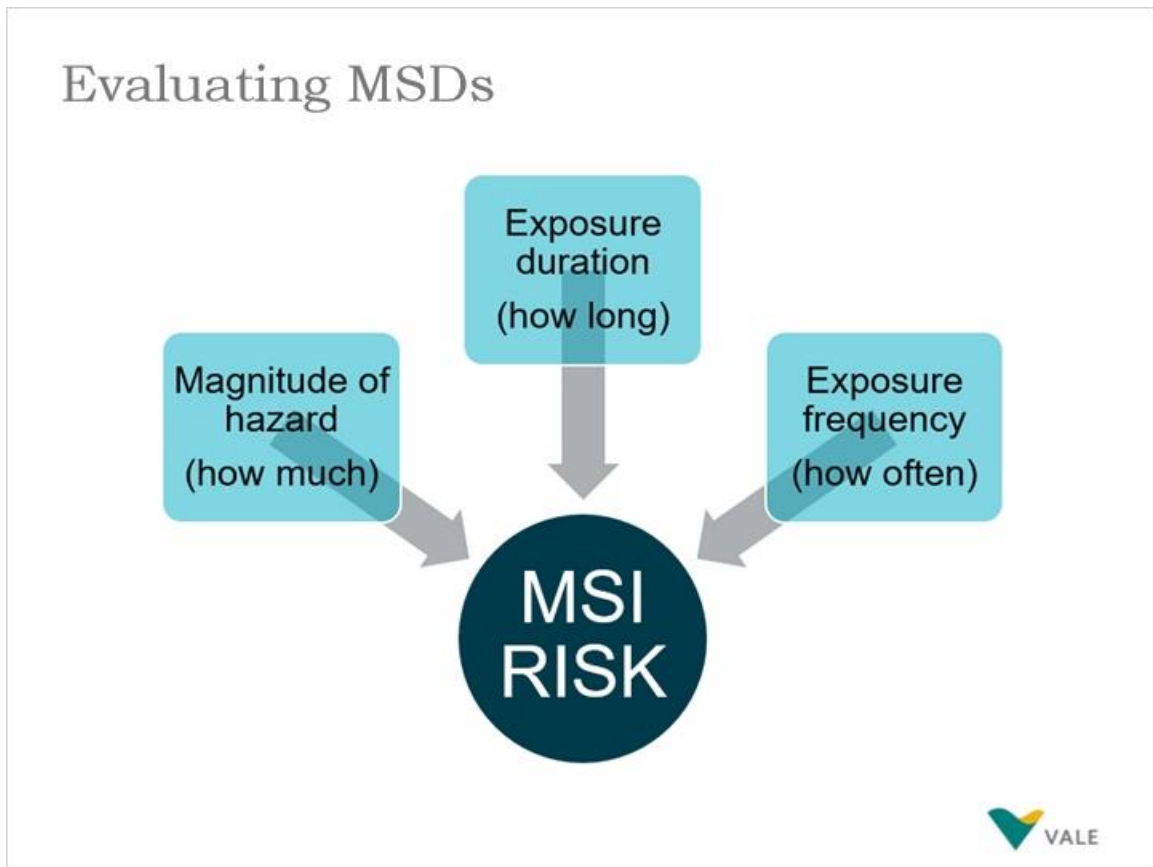
### Daily Safety Message – Musculoskeletal Disorders (MSD's)

Audit Date: \_\_\_\_\_ Auditor's Name: \_\_\_\_\_  
 Plant: \_\_\_\_\_ Auditor's Company: \_\_\_\_\_  
 Area: \_\_\_\_\_ Site Supervisor: \_\_\_\_\_  
 Project #: \_\_\_\_\_ Project Name: \_\_\_\_\_

Field Conditions Audit		# Acceptable	# Unacceptable
1	Exerting High Forces		
2	Work in Awkward Positions		
3	Repetitive Tasks		
4	Vibration Exposure		
5	Jobsite Setup <i>(material handling, access to work areas)</i>		
6	Materials <i>(package sizes, storage for easy access)</i>		
7	Tools <i>(anti-vibration mounts, comfortable grips, lightweight)</i>		
8			
9			
10			
<b>Notes</b>			



### 1.31 Evaluating MSDs



## 1.32 MSD Prevention

### MSD Prevention

Work-related musculoskeletal disorders can be caused by multiple risk factors, whether they're biomechanical, organizational and psychosocial, or bio-behavioral in nature. Your prevention strategy should, therefore, take an integrated, holistic approach.

Preventive strategies should be taken at three levels:

1. Primary prevention with a combined focus on the risk assessment process and implementation of technical, organizational, and person-oriented measures.
2. Secondary prevention targeting early identification and intervention.
3. Tertiary prevention aiming to stimulate and facilitate the return-to-work process of workers being absent from work due to a musculoskeletal disorder.





### **1.33 MSD Prevention**

## MSD Prevention

Hazards are best eliminated at the source; this is a fundamental principle of occupational health and safety.

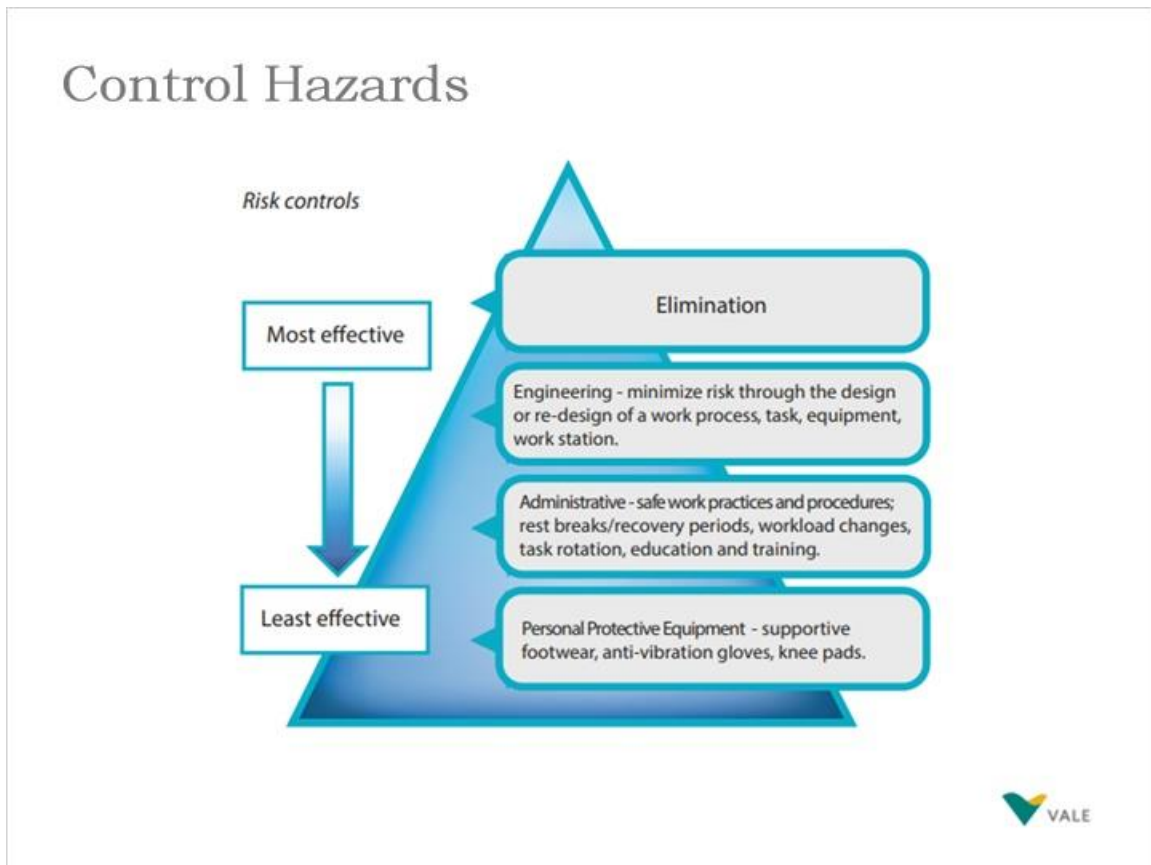
In the case of WMSDs, the prime source of hazard is the repetitiveness of work. Other components of work such as the applied force, fixed body positions, and the pace of work are also contributing factors.

Therefore the main effort to protect workers from WMSDs should focus on avoiding repetitive patterns of work through job design which may include mechanization, job rotation, job enlargement and enrichment or teamwork.

Where elimination of the repetitive patterns of work is not possible or practical, prevention strategies involving workplace layout, tool and equipment design, and work practices should be considered.



## 1.34 Control Hazards



## 1.35 Worker's Capabilities and Work Characteristics

### Worker's Capabilities and Work Characteristics

Ergonomics is a science dedicated to designing jobs, tasks, products, environments, and systems to make them compatible with the needs, abilities and limitations of people.

The overarching statement that is often used to describe ergonomics is fitting the job to the person, and not the person to the job.



## **1.36 Worker's Capabilities and Work Characteristics**

### Worker's Capabilities and Work Characteristics

In order for people to work effectively, we have to design work according to the physical size and shape of people, and their capabilities in relation to work characteristics.

Proper ergonomics considers the shapes and sizes of the workers (height, weight, reach), the physical capabilities of the workers (strength, endurance, ability to move freely) as well as the characteristics of the work (work processes, tools used, work environment, the pace, layout and flow of work). These capabilities and work characteristics will differ from one individual to another.

People who design work must break the work down into individual tasks and determine how the job is done and potential stresses that may be placed on the body. MSI hazards are created when the workplace design and work organization fail to meet the worker's physical and mental needs.



## 1.37 Stretching Physiology

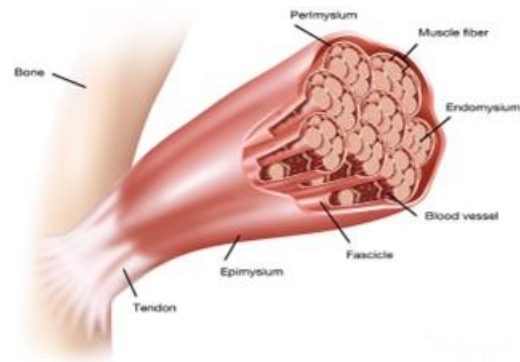
### Stretching Physiology

When we stretch we lengthen our muscle fibres and allow blood to flow in and out of our muscles and surrounding tissues, removing waste and supplying oxygen and nutrients.

Stretching produces heat in our muscles, warming them up.

Warm muscles are less likely to sustain injury.

Structure of a Skeletal Muscle



## 1.38 Lifting Safety – Warm Up

# Lifting Safety – Warm Up

Movement exercises make sure muscles and other soft tissues are ready to move and handle loads

### Warm up

- at the start of work
- after breaks
- after sitting for prolonged periods
- when your body is cold or stiff
- post work day



## 1.39 Lifting Safety

### Lifting Safety

# Lift, Lower, and Carry

Stop

Think

Plan

Do you  
need to  
handle it  
at all?

Is there  
another  
way to  
handle it?

Which is  
the safest  
way?

Where will the load be  
placed?

Assistive  
device?  
Push?  
Pull?  
Slide?

Squat lift?  
Lunge lift?  
Team lift?

Clear path?

Warmed up?



## **1.40 General Lifting Safety Suggestions**

### General Lifting Safety Suggestions

- Warm up cold muscles with gentle stretches before engaging in any manual work.
- Lift and carry heavy loads correctly by keeping the load close to the body and lifting with the thigh muscles. (see safe lifting practices below).
- Increased risk when load is greater than 10 inches in front of the toes.
- Limit forceful exertions such as lifting objects from beneath the knees, above the shoulders, or more than 20 degrees to the side.
- Check the weight and distribution of the load.
- Never attempt to lift or carry loads if you think they are too heavy.





## **1.41 General Lifting Safety Suggestions**

### General Lifting Safety Suggestions

- Pushing a load (using your body weight to assist) will be less stressful on your body than pulling a load
- Use mechanical aids or get help to lift or carry a heavy load whenever possible
- Organize the work area to reduce the amount of bending, twisting and stretching required
- Take frequent breaks
- Cool down after heavy work with gentle, sustained stretches
- Exercise regularly to strengthen muscles and ligaments



## 1.42 Proper Lifting Technique

### Proper Lifting Technique

- Get load as close to the body as possible. Do not reach for a load
- Object should be staggered between legs
- Take a balanced stance with feet about shoulder width apart. One foot can be behind the object and the other next to it
- Staggered stance can help get the load closer to the body decreasing load on the lower back for awkward lifts
- Squat down bending mostly at the knees to lift the object. Get as close to the object as possible



### **1.43 Proper Lifting Technique cont.**

## Proper Lifting Technique cont.

- Use your palms not fingers to grasp and hold the object
- Use legs and a strong core to lift the object do not twist in the middle of the lift
- Use intermediate rest points for heavier lifts, if possible, to provide a quick rest for muscles
- When finished the lift turn entire body when changing the directions. Do not twist or rotate the object to another person or location
- When laying the object down do proper lifting procedure in reverse



## **1.44 Attitude**

# Attitude

Attitude influences behaviour

Examples

- Using proper body mechanics
- Using safe lifting techniques
- Wearing personal protective equipment

The mindset that all work-related injuries and illnesses are preventable is necessary to create a stronger safety culture.



## 1.45 Exercise...

### Exercise...

What are the MSD hazards?



## 1.46 Quiz

### Quiz

1. What should you do if you are experiencing signs and symptoms of MSD?  
  
a) Tell no one and “tough-it-out”, or  
b) Report it to your supervisor
2. If you have identified MSD hazards and you don't have the tools or training to eliminate or control them on your own, then who should you talk to?
3. What are the 3 key hazards in relation to MSD that you will consider when completing your SLAM ?

