Musculoskeletal injuries prevention guide

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Safety • Health • Well-being

Table of contents

Acknowledgement:

This publication was adapted with permission from *The Prevention of Musculoskeletal Injuries for Manitoba,* a publication of the Workplace Health and Safety Division of Manitoba Labour and Regulatory Services.

Introduction

In Saskatchewan, musculoskeletal injuries accounted for one-third of all accepted claims within the province from 2020 to 2024, according to the Saskatchewan Workers' Compensation Board. Musculoskeletal injuries affect human body movement and can be acute or cumulative. Acute musculoskeletal injuries usually involve a specific area of the body and usually arise from a slip, fall or a single overexertion. Cumulative musculoskeletal injuries usually involve an overexposure where the tissues have little time to recover and the tolerance of the tissues declines. Within the workplace, musculoskeletal injuries often result in time away from work or require a return-to-work plan.

The Saskatchewan government defines musculoskeletal injuries within the Occupational Health and Safety Regulations as "an injury or disorder of the muscles, tendons, ligaments, nerves, joints, bones or supporting vasculature that may be caused or aggravated by any of the following:

(a) repetitive motions;
(b) forceful exertions;
(c) vibration;
(d) mechanical compression;
(e) sustained or awkward postures;
(f) limitations on motion or action;
(g) other ergonomic stressors."

A musculoskeletal disorder is defined by The Canadian Standards Association as "injuries and disorders of the musculoskeletal system including the muscles, tendons, tendon sheaths, nerves, bursa, blood vessels, joints/spinal disks, and ligaments that may be caused or aggravated by various hazards or risk factors in the workplace." This name may be used in place of musculoskeletal injuries. Other names that are also used are repetitive strain injuries, occupational overuse syndrome, work-related musculoskeletal injury and cumulative trauma disorders.

The musculoskeletal system includes:

- Bones and joints – bear the weight and give us structure and support.
- Muscles – contract to move our bones or hold a position.
- Tendons – connect muscle to bones.
- Ligaments – connect bone to bone and stabilize joints.
- Cartilage – provides cushioning between bones.
- Nerves – communicate to the brain and the musculoskeletal system.
- Blood vessels – delivers oxygen, fuel, nutrients and removes waste.

Musculoskeletal injury examples:

- Bones and joints – breaks, fractures, dislocations, separations.
- Muscles – strains, tears, ruptures.
- Tendons – tendonitis, tears, ruptures, trigger finger, epicondylitis (tennis elbow), rotator cuff syndrome.
- Ligaments – sprains, tears, ruptures, ligament creep.
- Cartilage – herniated or ruptured disc, meniscus tears, arthritis, degenerative disc disease.
- Nerves – pinched or impinged nerve, carpal tunnel syndrome.
- Blood vessels – commotio cordis, myocardial contusion, Raynaud's syndrome (white finger).

Work-related musculoskeletal injuries tend to occur when the physical demands of the action, task, movement or job exceeds the body's tissue tolerance. To reduce the risk of a work-related musculoskeletal injury or minimize the discomfort of an existing musculoskeletal injury, employers should make modifications or changes to workers' workstations, equipment, tools, work practices, work rate and body movements. Employers should provide worker training along with rest and recover periods through formal breaks, micro breaks and work activity changes as needed to reduce the risk of injury.

Occupational Health and Safety requirements

Requirements for employers and contractors:

Section 6-15, of the Regulations, Lifting and handling loads

Ensure suitable equipment and training is provided, maintained and used for the handling of heavy and awkward loads.

Section 6-16, of the Regulations, Standing

Provide and maintain adequate anti-fatigue mats, footrests or other suitable devices if workers are required to stand for long periods.

Provide and maintain reasonable drainage, false floors, platforms, mats or dry standing places when wet processes are used.

Section 6-17, of the Regulations, Sitting

Provide and maintain a suitably designed, constructed, dimensioned and supported seat for workers who do a substantial amount of work seated.

Provide and maintain seating for workers who have reasonable opportunities to sit during work.

Section 6-18, of the Regulations, Musculoskeletal injuries

Regularly review, in consultation with the committee, the work that may cause or aggravate musculoskeletal injuries.

If the risk of musculoskeletal injuries is present, inform the workers of the signs and symptoms, and provide protection by implementing appropriate work practices and procedures, appropriate rest schedules, provide equipment designed to reduce the risk of musculoskeletal injuries. Also provide training on the appropriate work practices and procedures, equipment and personal protective equipment

When a worker has symptoms of a musculoskeletal injury, advise them to consult a physician or health-care professional, and assess the tasks of that worker and any other workers doing similar tasks to identify the cause of the symptoms and take corrective action.

Section 6-19, of the Regulations, Shift work and constant effort and exertion

Assess the risks, in consultation with the committee, and inform the worker of the risks and the ways to eliminate or reduce the risk of a musculoskeletal injury.

Section 6-20, of the Regulations, Visually demanding tasks

Assess the risks, in consultation with the committee, and take all practical steps to reduce the harmful visual demand on a worker. Inform the worker of the risks and advise the worker to consult a physician or optometrist, within normal working hours if needed, and reimburse the worker for the costs of the consultation, if they cannot recover the cost.

See Appendix A for a comprehensive list of the regulations related to musculoskeletal injuries.

Reviewing work activities and associated risks

The employer should review the activities with the help of workers who may be at risk of musculoskeletal injuries and in consultation with the committee. For example, workers can identify which activities pose a risk or could result in an musculoskeletal injury. There are many signs and symptoms of musculoskeletal injuries that should be communicated to employers and workers to aid in addressing the potential injury as soon as possible.

Common symptoms may include:

- pain, fatigue
- loss of joint/muscle function, weakness, stiffness
- numbness, tingling, white fingers
- swelling, redness, warmth, inflammation
- nocturnal wakening

Common signs may include:

- rubbing, massaging, shaking or holding a body part
- performing tasks using different postures
- switching hands to perform tasks
- using quick jerky movements
- modifying tools

When an employer is aware of or has been told that a work activity poses an musculoskeletal injury risk, they must ensure the activity is included in the review.

The review must identify:

- Physical demands on the worker, also referred to as risk factors (for example, forceful exertion).
- Areas of the body at risk of musculoskeletal injury (for example, lower back).
- Source of risks (for example, lifting boxes).

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Risk factors (physical demands)

Below is a list of the most common musculoskeletal injury risk factors. To properly identify and control the risk, it is important to recognize why these factors create a risk of injury. Any combination of the listed factors will increase the risk of injury.

Awkward or sustained posture

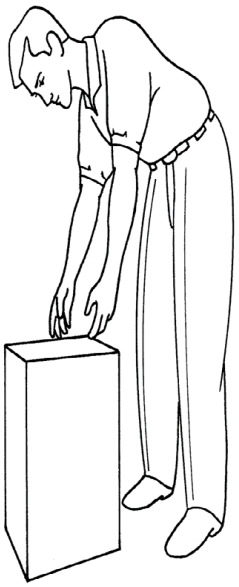
Awkward posture occurs whenever the body is not in neutral posture. **Neutral posture** is a relaxed body standing upright, head facing forward, arms hanging comfortably at the side with palms facing the thighs, legs together and feet pointed forward. We use awkward postures during our daily lives and within the workplace, as we cannot function only using neutral posture. Even neutral postures that are sustained for too long can be a risk factor because muscles are contracted, not moving, and are receiving no rest.

Examples of awkward or sustained postures include:

- Stoop-lift (bending forward at the waist).
- Slouching, not maintaining the S-curve in the spine.
- Twisting the trunk (especially while lifting).
- Elbows away from the body (side, front, or behind).
- Reaching (outstretched or overhead).
- Neck bent up, down, sideways or tilting.
- Wrist bent up, down or to the side.
- Maintaining any posture or force for extended periods of time.

Awkward or sustained postures can increase the workload on the musculoskeletal system because they add hidden loads that increase the risk of injury. When we bend forward at the waist to pick up an object, we are lifting that object, but we are also lifting are head, neck, arms, and truck. These are the hidden loads. These hidden load weights are easily missed when considering the workload.

Awkward or sustained postures reduce blood flow by compressing blood vessels which reduces the delivery of nutrients, fuel and oxygen to the tissues, causing a greater risk of injury. Awkward postures tend to be using forces further away from the body, such as reaching or lifting overhead. The greater the distance, the more force that is needed and the more increase to risk of injury. For example, an object held away from the body is harder to hold than one held closer to the body).



The risk of injury is increased when lifting above shoulder height or below knee height.

Forceful exertions

These occur when workers must perform actions that have the potential to overload the musculoskeletal system. There is a physical limit to the amount of stress the musculoskeletal system can endure before tissue damage occurs. It is much like a metal chain lifting more than its rated capacity and one of the links fails as a result. Depending on the posture during the forceful exertion, the link which fails may be the wrist, elbow, shoulder, lower back or any other part of the musculoskeletal system. Forceful exertions may cause failure on the gross scale (for example, a herniated or slipped disc) or the micro scale (for example, microscopic tears in the muscles, tendons or ligaments), which may develop into a musculoskeletal injury over time.

Some forceful exertions used during work include:

- lifting objects (depending on position of lift, weight of the object)
- pushing or pulling an object
- carrying objects
- gripping objects
- large one-time movements (rapid, forceful and/or extreme).

Repetitive motions

These occur when workers must perform the same sequence of actions for extended periods with little or no variation in the muscles used. They may also occur when a worker performs multiple tasks that require the same musculature/joints to be used. Repeated movements, without notable change in work activity, may cause the musculoskeletal system of the body to suffer minor, reversible injuries. With repeated exposure, these injuries may develop into a more chronic or irreversible type of injury.

Some repetitive motions used during work include:

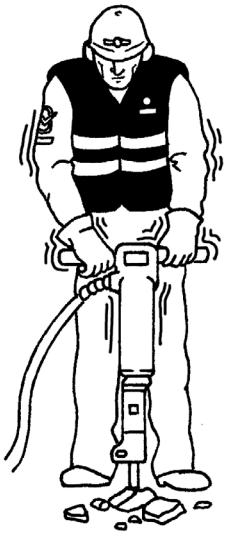
- Rapid, or often repeated, movement of the fingers, hands, wrists and/or arms.
- Operating controls, power tools or hand tools repeatedly.
- Moving, lifting, carrying loads repeatedly.
- Mopping, sweeping.
- Typing, mousing.
- Working on a production line.

Vibration

This is the transfer of vibration to the body from an external source, such as a vehicle, machine or tool. Vibration can cause the muscles to tighten, a decrease in the body's circulation, and damage to the blood vessels and nerves.

Hand-arm vibration — This is vibration transmitted to the body through the hands and arms. Hand-arm vibration can cause several symptoms and signs in the hands and forearms, such as white knuckles.

Whole-body vibration — This is vibration transmitted to the body through the feet, legs and buttocks, caused by sitting or standing on a piece of vibrating equipment. Whole-body vibration can cause several signs and symptoms, including damage to the lower back.



Hand-arm vibration

Whole body vibration

Mechanical compression (contact stress)

This occurs when there is external pressure on the soft tissues, either at high forces and/ or for prolonged periods of time (for example, leaning on a barrier, resting wrists on a desk while typing, using tools that dig into the hand). When there is external pressure on the soft tissues, the blood flow and nerve function may be affected.

Fine finger movements

These are found in jobs that require very precise or delicate task to be completed, like a jeweller or watchmaker. The whole muscle may not be fatigued but some of the muscle fibres within the muscle may become fatigued and at risk for injury.

Temperature

When we are cold, our blood vessels are constricted to force more blood to our vital organs. When we are hot, our blood vessels are dilated to force more blood to our skin to cool our body. This decrease in blood flow to our musculoskeletal system increases the risk of injury. We need more grip force when it is cold because tactile sensation is decreased and when it is hot, we tend to grip harder because we sweat more and objects become slippery.

Reaction forces

When using power tools, a "kick-back" may occur when the tool stops moving and kicks back in the reverse direction. The body tends to resist the kick back and this can physically damage tissues.

When walking on hard surfaces, each step has an equal and opposite force that will travel through the foot and up the leg. Tissues of the foot, lower leg, knee, hip and possibly the lower back can be physically damaged, depending on how much force is applied to the hard surface and how hard the hard surface is.

Review methods

1. Musculoskeletal injury survey or interview

A musculoskeletal injury survey or interview is an important first step. Employers should have each worker for all positions complete this and then document it. The musculoskeletal injury survey/interview results may reveal which job tasks to prioritize for an ergonomic task analysis. NA musculoskeletal injury survey/interview is not a complete review of all the activities in the workplace that could cause or aggravate a musculoskeletal injury.

Completing a survey/interview may identify small risks that can be easily corrected. Making ergonomic improvements to job tasks that are causing musculoskeletal injury symptoms often prevent the early warning symptoms from developing into a serious injury.

After corrections are made to equipment, tools and job procedures, it is important to follow up after a few days, weeks and months to see if the problem has been resolved. In a few situations, the changes may not result in improvements. In those cases, further changes will be needed.

Note: It is recommended that employers redo a musculoskeletal injury survey/interview approximately once a year to monitor musculoskeletal injury symptoms that are occurring among the workforce and to assess the effectiveness of any changes that have been made.

See Appendix A for more information and a sample musculoskeletal injury survey/ interview form.

2. Ergonomic task analysis

What: This is a risk assessment tool used as an approach to provide the information needed to suggest controls to possibly prevent a musculoskeletal injury from occurring or potentially increasing in severity.

Who: Someone who has an understanding of ergonomics and/or familiarity with the task they are analyzing and in conjunction with the committee should conduct the ergonomic task analysis.

Why: Complete the ergonomic task for the highest risk job tasks within a job position according to injury statistics or the completion of the musculoskeletal injury survey/ interview. Also use this for compliance with Section 6-18(3)(b), of the Regulations, Musculoskeletal injuries.

When: Use this analysis when changes may be needed or the possibility of a musculoskeletal injury has been identified. This tool provides the means to document the identification, assessment and corrective actions of an identified hazard within the workplace. Use this tool before developing safe work procedures, or standard operating procedures for a task, when updating or reviewing existing procedures, when processes change or as needed.

See Appendix B for more information and a sample ergonomic task analysis form.

3. Physical demands description

What: A physical demands description is a clear and complete list of the movements and other physical requirements needed to perform a task. This list describes the weights, forces, frequencies and postures employees will be exposed to during their work.

Who: Someone who can analyze human movement, such as a kinesiologist, physiotherapist or occupational therapist, primarily use a physical demands description. Although these types of resources are present in some workplaces (for example, health care), they are more typically externally sought resources.

Why: Breaking down and understanding the physical demands of a task is important to help identify risks of injury.

When: This tool can be used when a complete list of the physical demands of a task is needed. For example, if a worker has been injured and is going to be returning to work, having a physical demands description completed and sent to their health-care professional will help ensure that the worker can safely perform the required tasks. This tool may also help a worker give an effective description of their job to a health-care provider to assist with an effective return to work plan.

See Appendix C for more information and an example physical demands description form.

4. Ergonomic risk factor checklist

What: An ergonomic risk factor checklist is designed to identify specific risks for musculoskeletal injury in industrial environments. This checklist assigns scores to each risk factor, which are added together for an overall job score. This information is useful for prioritizing and identifying tasks and movements with increased risk of a musculoskeletal injury.

Who: Someone trained in the field of ergonomics should use this tool. This may include in-house staff who have taken a course(s) in ergonomics. Although these types of resources are present in some workplaces, they are often externally sought resources.

Why: This checklist can identify risks for musculoskeletal injuries present in a specific aspect of a task or in the task as a whole. It allows employees to assign a score to each movement, which you can use to identify the high-risk aspects of task (or whole tasks) which require adjustments. These scores can also serve as a benchmark for any further modifications.

When: Use this tool during the review of tasks that may lead to a musculoskeletal injury. When any adjustments are made to the physical demands of the work, use this checklist to see if the adjustments are effective.

See Appendix D for more information and a sample ergonomic risk factor checklist.

Control measures

When applied to musculoskeletal injuries, control measures are deliberate changes to a task to reduce the workers' risk of suffering a musculoskeletal injury.

The aim of these changes is to reduce the physical demands of work to a level at, or below, the physical capabilities of the worker. You may make changes to the:

- Physical design of the workspace and equipment.
- Procedures and body movements used to perform the work.
- Pace at which the worker performs the work.
- Personal protective equipment (PPE).

It is preferable to use a combination of these controls when considering the best method to reduce the risk of worker injury. There are two main types of control measures that employers can use – engineering controls and administrative controls. PPE such as respirators, gloves and protective clothing are less appropriate for controlling musculoskeletal injury risks.

Engineering controls

Engineering controls refer to the design of the equipment, process and/or environment where a worker works. Since musculoskeletal injuries occur when a worker exceeds their physical capabilities, making changes to the equipment, work process or area are effective ways to reduce the risk of injury. Consider ways to reduce physical demands. Keep in mind that the weight of objects (for example, boxes or tools) can increase the risk of injury when workers use awkward postures. Successful engineering controls should focus on reducing repetition, force and exposure to awkward postures.

To reduce the physical demands on a worker's body, consider changing the:

- Weight of materials, tools and equipment.
- Force required for holding, grasping, turning, moving or carrying any materials, tools and equipment.
- Distances workers need to reach, bend, lift and carry.
- Postures used during work (for example, stoop-lift, squat-lift, non-neutral shoulder and wrist position and joint angles).

In some cases, Regulation 6-15 requires an employer or contractor to provide mechanical lifting devices or adapt heavy or awkward loads. See Appendix A for this regulation.

Ergonomic aids are an engineering control as well because they physically change the workplace, the equipment or process, to eliminate or reduce musculoskeletal injuries from occurring. Some examples are mechanical lifting devices such as hoists, lift tables or carts, or adjustable workstations/tools, such as height-adjustable desks, ergonomic chairs or redesigned tools that allow workers to maintain a neutral posture. Simple low-cost solutions are often available to solve problems with ergonomics.

Administrative controls

Administrative controls should be used to reduce workers' exposure to risks when physical changes are not practical.

Administrative controls decrease the risk of musculoskeletal injuries by changing the way work is performed, even for a brief part of the day. Successful administrative controls reduce the risk of musculoskeletal injuries by eliminating unnecessary movements and providing increased rest and recovery periods between tasks.

Administrative controls include work schedules and rest breaks. The risk of musculoskeletal injuries increases when workers are overtired or do not have enough time to take a short break. Schedules can be changed to reduce the severity, frequency or duration of activities that can lead to a musculoskeletal injury.

Consider reducing the rate at which workers perform their tasks. Design work that gives workers time for several seconds of rest in between and after each task as needed. Allow workers to lower their arms and hands instead of staying in the ready position. Encourage workers to use proper micro-breaks, where they pause and rest at their workstations.

Micro-breaks can last several seconds and up to two minutes.

The risk of musculoskeletal injury increases when workers do not have enough variability in their movements. Wherever practical, have workers on a job rotation schedule. Job rotation involves switching tasks with other workers during the shift. This is usually done after a break. Job rotation may be effective in reducing the risk of musculoskeletal injuries from awkward postures and repetitive movements, but not from forceful exertions.

This rotation schedule must have workers rotating to tasks with significantly different physical demands and movements.

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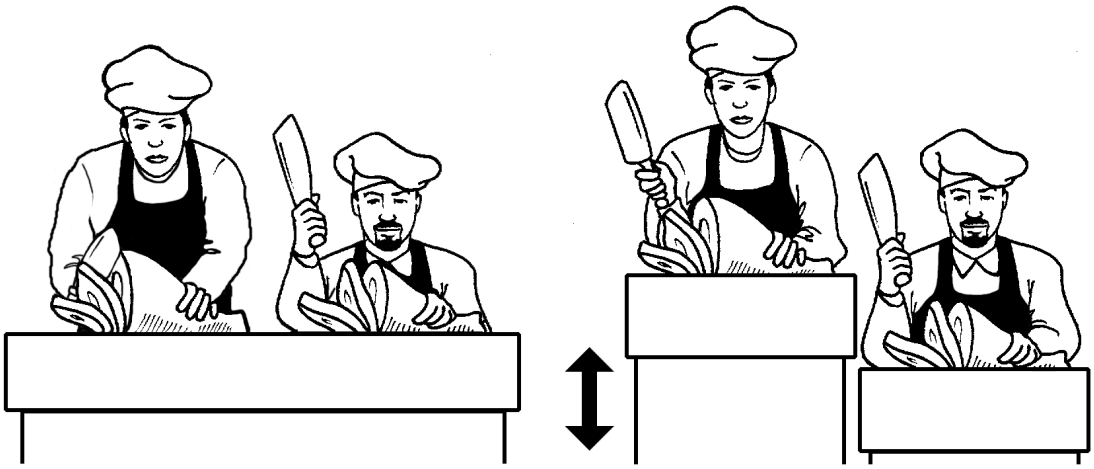
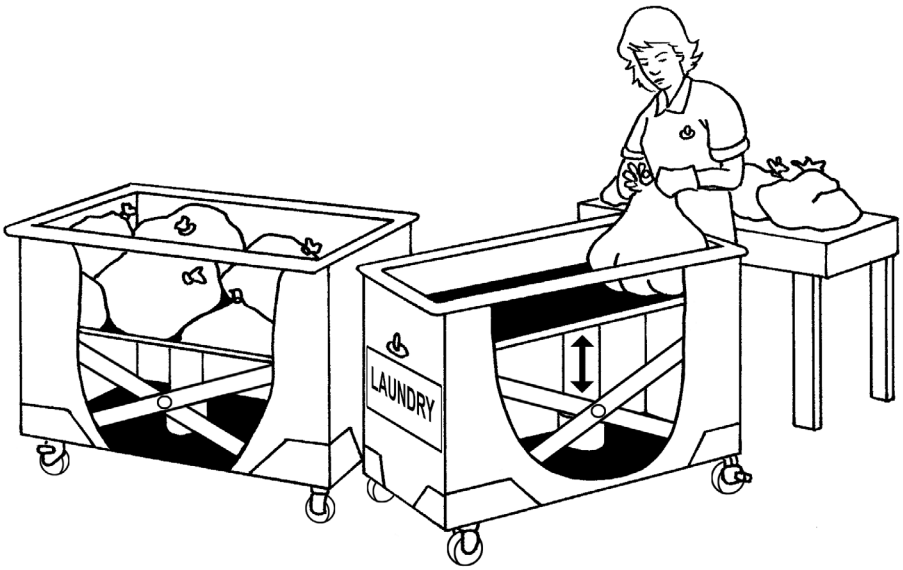
Examples of engineering and administrative controls

Control measures for awkward postures

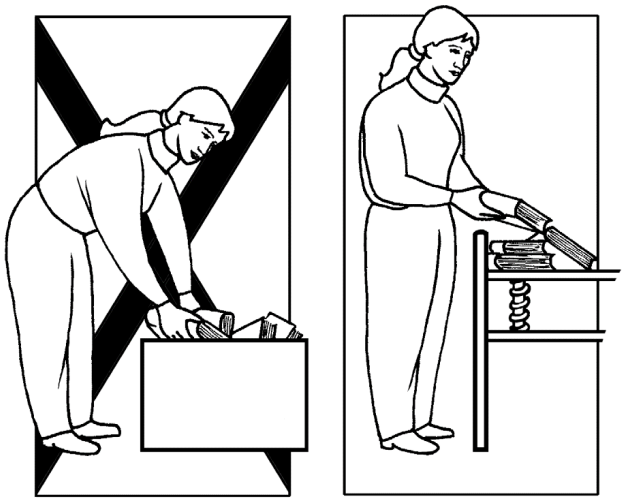
Often the most effective solution to an awkward posture is adjusting the work environment for the worker performing the task. This means arranging the work area so that the worker can work with their hands at or near elbow height and at or near the centre line of the body.



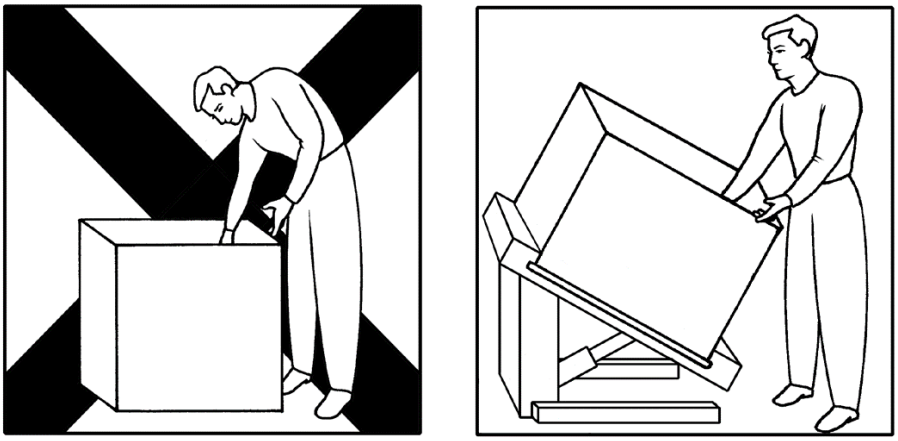
Workers of a different stature will often need to work at two different heights to reduce awkward postures. Using height-adjustable work surfaces can minimize the need for bending and other awkward postures.



Using spring-loaded carts can minimize bending when lifting.



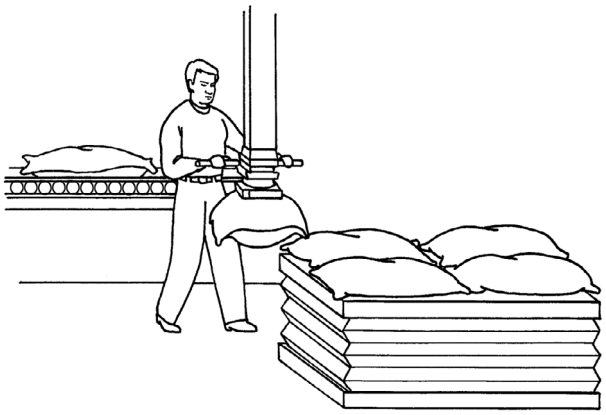
Using spring-loaded tables can minimize bending when lifting.

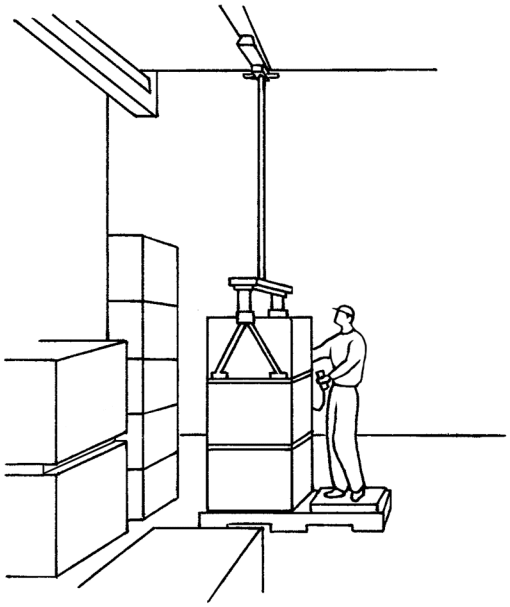


Bending at the waist is an awkward posture, which you can eliminate with equipment or a process change.

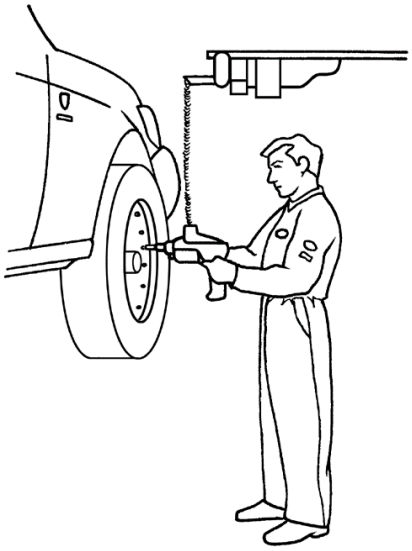
Control measures for forceful exertions

If a task performed by a worker requires too much force (such as pushing a cart that is too heavy or lifting a box that weighs too much), take steps to reduce force requirements. You can do this by introducing a mechanical lifting aid or using a second worker to help perform the task. To reduce the risk of injury, consider decreasing the physical effort required to perform tasks.

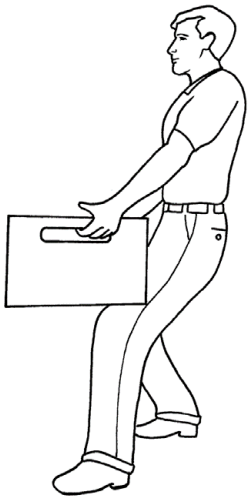




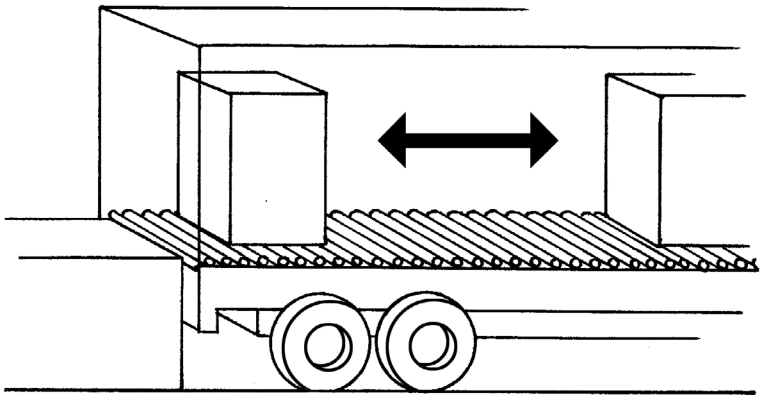
Manual material handling often involves a large amount of force, which you can reduce with the implementation of mechanical help.



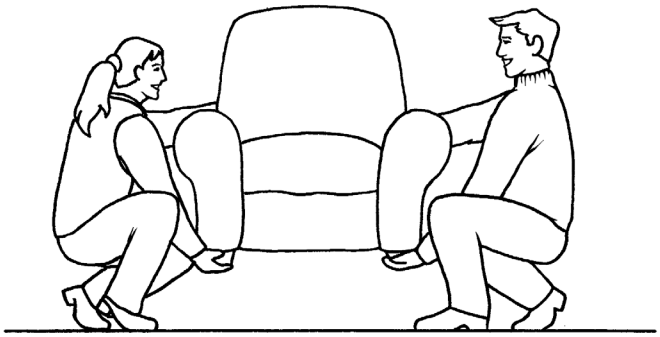
Using tool balancers can minimize the force needed to hold tools while working.



Installing handles on boxes/crates workers are lifting decreases the risk of injury when lifting.



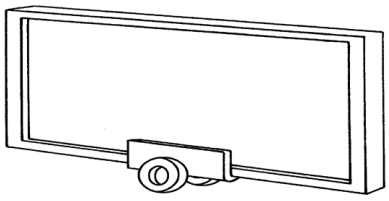
The implementation of rollers and conveyors can minimize the handling of objects.

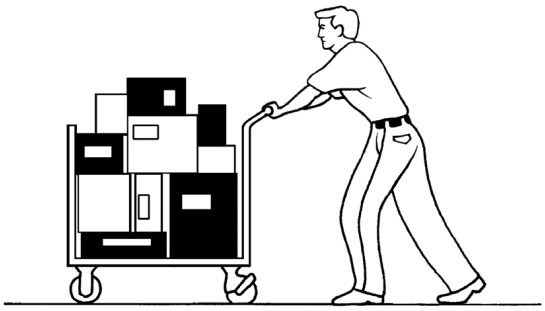


Lifting large objects in teams will minimize the forces associated with lifting.

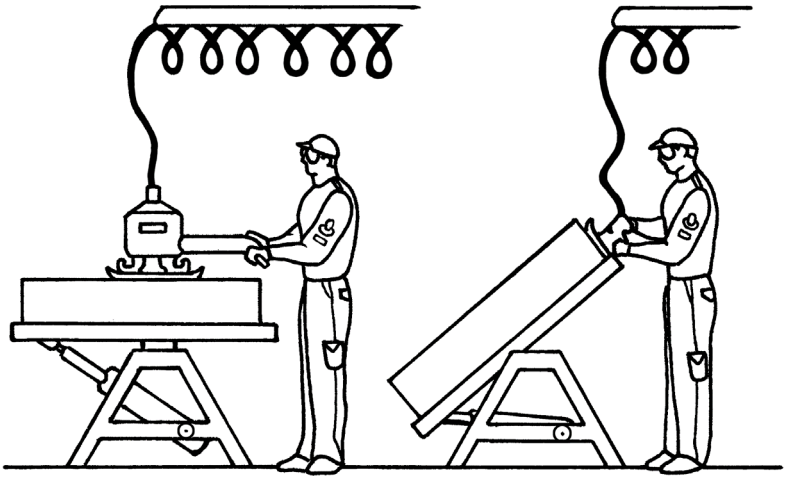
Control measures for repetitive motions

The more often you use a joint or body part, the more likely it is that the joint or body part will break down. If it appears that repetition is a risk factor, often the most effective solution is to ensure that workers are only performing movements that are necessary to complete the required task. If repetition is still a concern, job rotation or automation can be introduced.





Use carts or rollers to reduce the repetition of lifting and handling materials.



The risks associated with repetition are decreased by reducing awkward postures.

Control measures for vibration

When workers are exposed to hand-arm vibration, consider reducing the exposure, alternating tasks, increasing break frequency, using tools with less vibration, wrapping tools with anti-vibration wrap, addition of anti-vibration handles or jigs and ensuring machinery is well-serviced to reduce vibration. Tools that may produce hand-arm vibration are chainsaws, jackhammers, grinders, sanders, lawnmowers, leaf blowers, impact drills and wrenches and any other similar tools or materials that are held or being processed that vibrate.

When workers are exposed to whole-body vibration, consider reducing exposure, alternating tasks, increasing break frequency, purchasing vehicles and equipment with lower vibration ratings, vibration attenuating seats, maintenance and service up to date, check tire inflation, and travel on smooth surfaces as much as possible. Exposure to whole-body vibration can be found operating buses, taxis, boats, long-haul transports, helicopters, forklifts, backhoes, bulldozers, dump trucks, tractors, asphalt pavers, graders, etc.

The risks associated with hand-arm vibration or whole-body vibration increases as the frequency of the vibration and/or the length of time increases.

Control measures for mechanical compression

If workers are exposed to mechanical compression, consider removing or changing barriers, using tools with improved design and putting padding on hard edges or surfaces.

Personal protective equipment (PPE)

PPE is most often used to prevent exposures to harmful substances or environmental conditions. It is less appropriate for controlling the physical demands of work that lead to musculoskeletal injuries. However, there are a few examples. You can use:

1. Anti-vibration gloves to reduce exposure of the hand and arm to vibration.

2. Knee pads to reduce tissue compression when kneeling.

When considering PPE to reduce the risk of a musculoskeletal injury, it is important that the equipment fits properly and does not hinder work. For example, placing a glove on a hand will increase the grip force needed to perform the work.

Training and education

Workers

You must train workers and supervisors and ensure they receive training updates on new or modified procedures when they are hired, moved to new worksites with different hazards or when new controls are implemented.

Include all relevant findings from the employer's review of work activities that could cause musculoskeletal injuries in worker training and education (see Regulation 6-18 for more information). Reliable sources of information for reviews are:

- previous injury reports
- ergonomic task analyses
- employee surveys/interviews about current or past pain or discomfort.

Most, but not all, musculoskeletal injuries develop gradually. Musculoskeletal injuries can be effectively prevented before signs and symptoms develop and when workers are still in the first stages of developing signs and symptoms.

This means training needs to address how to:

1. **Prevent, reduce and eliminate musculoskeletal injury risks before signs and symptoms develop.**

One of the most effective ways of preventing serious musculoskeletal injuries is to train workers in the signs and symptoms of musculoskeletal injuries and any risks of musculoskeletal injuries associated with their work. If a worker identifies a musculoskeletal injury risk, you must include the signs and symptoms of it in the training.

2. **Reduce, eliminate and prevent existing musculoskeletal injuries from developing further if they are known to occur or you suspect them to occur.**

Workers should know what to do if they suspect they are developing a musculoskeletal injury, including reporting it to their supervisor and the occupational health committee, and getting medical help.

Information and training for workers should include:

- The requirements of Section 6-18(4), of the Regulations, Musculoskeletal injuries.
- Changes made to their work and reasons for making the changes, including why previous methods are no longer suitable.
- Injuries that have occurred and controls implemented to prevent them in the future.

- Signs and symptoms of musculoskeletal injuries that workers may experience (workers who know the early warning signs of a musculoskeletal injury can get medical help sooner).
- All control measures implemented to reduce the risk. These include:
  - Physical changes to the design of the work and workspace.
  - Safe procedures and body movements to perform the job.
  - Changes to work rate, breaks, recovery pauses, job rotation schedules.
  - Use and maintenance of required PPE.

3. Training records

Keep workers' training records. New and experienced workers should receive training when you have implemented new or updated controls.

Supervisors

Employers must identify risks and the musculoskeletal injuries workers could develop from performing their regular duties. Employers should train supervisors in the same way as workers so they can identify risks, implement control measures and reinforce safe work procedures with workers. Training for supervisors must ensure they know their responsibilities.

Step-by-step training plan

Consider these procedures when training workers and supervisors about control measures for risk of a musculoskeletal injury.

Step 1: Prepare for training.

- Identify the purpose of the worker's tasks.
- Determine their current level of knowledge of their tasks.

Step 2: Exhibit and explain.

- Show the worker each movement and procedure step-by-step.
- Emphasize the important points, especially when teaching biomechanics.
- Explain clearly and entirely.

Step 3: Observe and examine.

- Ask the worker to demonstrate each skill back to you. Have them verbally explain the skills that they are demonstrating.
- Observe the demonstrations and comment on the effective and ineffective things they do.
- Repeat instruction if necessary.
- Have the worker show they can do the job and practice until you are certain they know how to perform each movement and procedure effectively.

Step 4: Monitor the worker.

- Give clear information on where to get further instruction on safe work procedures.
- Review the worker's understanding of the procedures after a few days or a week.
- Have the supervisor monitor the worker daily until the supervisor is confident the controls have become standard practice.

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Appendix A — Occupational Health and Safety regulations

The Occupational Health and Safety Regulations, 2020

Lifting and handling loads

Section 6-15(1) An employer or contractor shall ensure, if reasonably practicable, that suitable equipment is provided and used for the handling of heavy or awkward loads.

(2) If the use of equipment is not reasonably practicable, an employer or contractor shall take all practicable means to adapt heavy or awkward loads to facilitate lifting, holding or transporting by workers, or to otherwise minimize the manual handling required.

(3) An employer or contractor shall ensure that no worker engages in the manual lifting, holding or transporting of a load that, by reason of its weight, size or shape, or by any combination of these, or by reason of the frequency, speed or manner in which the load is lifted, held or transported, is likely to be injurious to the worker's health or safety .

(4) An employer or contractor shall ensure that a worker who is to engage in the lifting, holding or transporting of loads receives appropriate training in safe methods of lifting, holding or carrying of loads.

Standing

Section 6-16(1) If workers are required to stand for long periods in the course of their work, an employer or contractor shall provide adequate anti-fatigue mats, footrests or other suitable devices to give relief to workers.

(2) If wet processes are used, an employer or contractor shall ensure that reasonable drainage is maintained and that false floors, platforms, mats or other dry standing places are provided, maintained and kept clean.

Sitting

Section 6-17(1) If, in the course of their work, workers have reasonable opportunities for sitting without substantial detriment to their work, an employer or contractor shall provide and maintain for their use appropriate seating to enable the workers to sit.

(2) If a substantial portion of any work can properly be done sitting, an employer or contractor shall provide and maintain:

(a) a seat that is suitably designed, constructed, dimensioned and supported for the worker to do the work; and

(b) if needed, a footrest that can readily and comfortably support the worker's feet.

Musculoskeletal injuries

Section 6-18(1) In this section, “musculoskeletal injury” means an injury or disorder of the muscles, tendons, ligaments, nerves, joints, bones or supporting vasculature that may be caused or aggravated by any of the following:

(a) repetitive motions;

(b) forceful exertions;

(c) vibration;

(d) mechanical compression;

(e) sustained or awkward postures;

(f) limitations on motion or action;

(g) other ergonomic stressors.

(2) An employer or contractor, in consultation with the committee, shall regularly review the activities at the place of employment that may cause or aggravate musculoskeletal injuries.

(3) If a risk of musculoskeletal injury is identified, an employer or contractor shall:

(a) inform each worker who may be at risk of developing musculoskeletal injury of that risk and of the signs and common symptoms of any musculoskeletal injury associated with that worker’s work; and

(b) provide effective protection for each worker who may be at risk, which may include any of the following:

(i) providing equipment that is designed, constructed, positioned and maintained to reduce the harmful effects of an activity;

(ii) implementing appropriate work practices and procedures to reduce the harmful effects of an activity;

(iii) implementing work schedules that incorporate rest and recovery periods, changes in workload or other arrangements for alternating work to reduce the harmful effects of an activity .

(4) An employer or contractor shall ensure that workers who may be at risk of developing musculoskeletal injury are instructed in the safe performance of the worker’s work, including the use of appropriate work practices and procedures, equipment and personal protective equipment.

(5) If a worker has symptoms of musculoskeletal injury, an employer or contractor shall:

(a) advise the worker to consult a physician or a health care professional who is registered or licensed pursuant to an Act to practice any of the healing arts; and

(b) promptly review the activities of that worker and of other workers doing similar tasks to identify any cause of the symptoms and to take corrective measures to avoid further injuries.

Shift work and constant effort and exertion

Section 6-19 If a worker works shifts or a worker's work demands constant and uninterrupted mental effort or constant and uninterrupted physical exertion, an employer or contractor, in consultation with the committee, shall:

(a) assess the risks to the worker's health and safety of the worker's work, and

(b) inform the worker of the nature and extent of the risks mentioned in clause (a) and the ways to eliminate or reduce those risks.

Visually demanding tasks

Section 6-20(1) An employer or contractor, in consultation with the committee, shall identify any tasks that involve a potentially harmful visual demand on a worker.

(2) An employer or contractor shall:

- (a) take all practicable steps to reduce the harmful visual demand of those tasks;
- (b) inform the worker of the risk of performing those tasks;
- (c) advise the worker to consult a physician or an optometrist if any persistent vision impairment, disability or visual strain results from performing the tasks;
- (d) if a worker cannot attend a consultation mentioned in clause (c) during the worker's time off work, permit the worker to attend the consultation during normal working hours without loss of pay or other benefits; and
- (e) if a worker cannot recover the costs of a consultation mentioned in clause (c), reimburse the worker for the costs of the consultation that, in the opinion of the director, are reasonable.

Appendix B — Musculoskeletal survey/interview form

1. In which department do you work?_____ What is your job title? _____

2. How long have you worked in your present job?

   ☐ Less than 1 year ☐ 1 - 5 years ☐ More than 5 years

3. How many hours do you work at your job each week, not including lunch and coffee breaks? _____

4. How long are your daily breaks at work? _____

5. List the **two most** physically demanding tasks that you do at work and briefly describe how these tasks are completed.

Most demanding task:

_____

_____

Next most demanding task:

_____

_____

6. How often do you perform these tasks? _____

7. In the **last two months**, which of the following symptoms have **lasted more than a week that you believe are mainly caused by your work?**

   ☐ Pains ☐ Tingling ☐ Muscle tightness
   ☐ Aches ☐ Swelling ☐ Changes in skin colour
   ☐ Soreness ☐ Burning feelings ☐ Numbness
   ☐ Muscle weakness ☐ Difficulty grasping or holding objects

8. If you have had one or more of the symptoms listed in Question 7, circle the body part(s) affected.

   ☐ Hand (right or left) ☐ Shoulder (right or left) ☐ Knee (right or left)
   ☐ Wrist (right or left) ☐ Neck ☐ Lower leg (right or left)
   ☐ Forearm (right or left) ☐ Upper back ☐ Upper leg (right or left)
   ☐ Elbow (right or left) ☐ Lower back ☐ Foot (right or left)
   ☐ Upper arm (right or left) ☐ Ankle (right or left)

9. Have you had any of the symptoms listed in Question 7 in the last year? ☐ Yes ☐ No

10. If Yes, circle the body part(s) listed below:

   ☐ Hand (right or left) ☐ Shoulder (right or left) ☐ Knee (right or left)
   ☐ Wrist (right or left) ☐ Neck ☐ Lower leg (right or left)
   ☐ Forearm (right or left) ☐ Upper back ☐ Upper leg (right or left)
   ☐ Elbow (right or left) ☐ Lower back ☐ Foot (right or left)
   ☐ Upper arm (right or left) ☐ Ankle (right or left)

11. Have you had similar problems in any previous work areas? ☐ Yes ☐ No

12. Do you believe these symptoms are mainly: Caused by your job? ☐ Yes ☐ No
Due to other reasons? ☐ Yes ☐ No

13. At the end of your shift, are the symptoms:
☐ Same ☐ Better ☐ Worse

14. At the end of your work week, are the symptoms:
☐ Same ☐ Better ☐ Worse

15. After two or more days away from work, are the symptoms:
☐ Same ☐ Better ☐ Worse

16. Have the symptoms caused you to take any time off work? ☐ Yes ☐ No
If yes, how much time? _____

17. In the last three months have the symptoms:
☐ Stayed the same ☐ Gotten better ☐ Gotten worse

18. Have you reported the symptoms to a supervisor or other appropriate person at work? ☐ Yes ☐ No
If yes, what was their response? _____ (Optional)

19. Are you presently seeing a doctor or physiotherapist, etc. due to the symptoms? ☐ Yes ☐ No

20. Do the symptoms interfere with your work?
☐ None ☐ Some ☐ Moderately ☐ Severely

21. Do the symptoms interfere with your life outside of work?
☐ one ☐ Some ☐ Moderately ☐ Severely

22. Do the symptoms interfere with your sleep?
☐ None ☐ Some ☐ Moderately ☐ Severely

23. Indicate your age range:
☐ Under 20 ☐ 20 to 30 ☐ 31 to 40 ☐ 41 to 50 ☐ 51 to 60 ☐ Over 60

24. Are you:
☐ Right-handed ☐ Left-handed ☐ Both?

25. What is your height range?
☐ Less than 5’ ☐ 5’ to 5’6” ☐ 5’7” to 6’ ☐ 6’1” to 6’6” ☐ Taller than 6’7”

26. Please make any comments or suggestions about anything related to your work tasks or work area or environment that you think may have caused (or contributed to) your symptoms. Also include any suggestions that you have regarding changes to your work area or work tasks to prevent or alleviate any problems you have identified.

_____

_____

_____

Appendix C — Ergonomic task analysis

Conducting an ergonomic task analysis

Use an ergonomic task analysis to identify the ergonomic hazards present within a specific task that may cause a musculoskeletal injury and suggest corrective actions. Begin by choosing the highest risk task to analyze.

Remember, this is an analysis of the task only, not how the worker is performing the task that would require a physical demands description.

1. Break the task into a few steps, listing them in order of completion.
2. Identify the ergonomic hazard(s) present in each step.
3. Develop controls/corrective action for all risks you have identified.

Step 1: Breaking the task into steps.

It is essential to identify every step of the task. Ask for permission to take any photos or a video, which will be used only for completion of this document. List the steps needed to complete the task, list the steps in the order of completion of the task and name the steps with a short description.

Step 2: Identifying the ergonomic hazard(s).

Assess each step of the task for ergonomic hazards. Take each step of the task one at a time and identify the ergonomic hazard(s) that are associated with it. Ergonomic hazards are hazards that may cause musculoskeletal injuries such as repetitive motions, forceful exertions, vibration, mechanical compression, sustained or awkward postures, limitations on motion or action, and other ergonomic stressors. Each step of the task may have more than one ergonomic hazard associated with it and each ergonomic hazard may include motion detail such as lift, twist, push, pull, reach or bend.

Step 3: Identify the part(s) of the body at risk for developing a musculoskeletal injury.

For each step, identify the part of the body that is exposed to the ergonomic hazard, such as the hand, finger, lower back, shoulders or neck. One step may have many parts of the body at risk.

Step 4: Calculate the exposure time.

Consider the time spent on doing the task during an entire work shift.

Cycle = the single task completed from start to finish

Number of cycles per minute/hour and then convert to how many hours in the work shift.

Or

Percentage of work shift completing the task scoring example: 0-25 per cent, 25-50 per cent, 50-75 per cent, 75-100 per cent

Rate the exposure time for this single task as low, medium or high.

Step 5: Calculate the intensity.

Record the weights of objects involved in the specific step of the task and record the distance the object is moved.

Rate the intensity as not applicable (N/A), low, medium or high.

Example: A high exposure with N/A intensity may not be the step of the task to focus on, but a high exposure and medium intensity may be the step of the task to focus on.

Step 6: Consider what is causing this musculoskeletal injury hazard to exist.

Consider what causes you can easily spot and what causes might be underlying because of substandard acts or substandard conditions. Consider all contributing factors such as operating procedures, cycle times, size, weight, grip, workstation, techniques, temperature, noise, supervision, workplace culture and any other contributing factors that may increase the chance of musculoskeletal injuries occurring.

Step 7: Controls to reduce or eliminate the potential musculoskeletal injury hazard(s).

Brainstorm controls for the hazards you have identified. Once you have done this, you can categorize the controls into short-term and long-term categories. You can put these ideas forward as suggestions to eliminate the hazards or reduce the potential risks of musculoskeletal injuries.

For example, when picking up an object from ground level, the short-term control could be to deliver that object to the worker on stacked pallets so that it is at waist height. The long-term control could be to install a vacuum lift or overhead hoist at a workstation for the employee so they do not have to lift the object at all.

On the next page, view a sample job risk analysis form. Use it in its current format or adapt it to fit your workplace's needs.

Company Name:_____ Date: _____

Ergonomic task analysis form

Facility:	Department:	Job title:	Task:		Conducted by:	Follow up date:

Task Steps	Ergonomic hazards	Body part at risk	Exposure	Intensity	Ergonomic hazards of concern	Suggested controls

Appendix D — Physical demands description

What is a physical demands description?

A physical demands description is a document used to describe all the physical demands associated with a task. There are no standard physical demands description requirements. A physical demands description's purpose is to help a reader visualize all the physical demands a worker will encounter while performing the described task(s).

The job should be described on two levels: general and specific. The general description will explain the goals and duties of a job in detail, so the reader understands why the person is performing various tasks. The specific description will break the job down into required actions (for example, a worker picks up part A from bin B and places it on table C). Generally, these statements describe the person's movements and the frequency of movements. The more descriptive the specific part of the physical demands description, the better the reader will be able to recreate the actual task(s) in his/her mind. When completed, a physical demands description should provide the reader with a correct description of what a worker must do (with regards to force, repetition and posture) to complete the described task(s).

A physical demands description should include as much quantitative (numeric) information as possible. For example, if a task requires workers to lift objects, the description should include the number of lifts performed in a shift, the weight of the objects being lifted, the height of origin and destination of the lifts. This will provide the reader of the physical demands description with a correct description of what lifting requirements are for a worker performing this task. The physical demands description may also include pictures and/or video of the task being done and the equipment being used.

You may choose to use the sample physical demands description provided on the next page, create your own physical demands description or adapt a physical demands description that you like.

Physical demands			Not a component	Frequency[1]				Load (object/ tool)		Comments
				Seldom	Minor	Required	Major	Maximum (kg)	Usual (kg)	
Strength	Lifting									
	Carrying									
	Pushing									
	Pulling									
	Handling									
	Throwing									
	Gripping	Power grasp								
		Pinch grasp								
	Reaching	Above shoulder								
		Below shoulder								
		To the side								
Postures	Shoulder	Abduction								
		Flexion								
	Hip	Abduction								
	Wrist	Flexion/ Extension								
		Radial/ulnar deviation								
		Pronate/ supinate								
	Trunk	Flexion								
		Extension								
		Side bend								
		Twist								
	Neck	Flexion								
		Extension								
		Side bend								
		Twist								
Actions	Sitting									
	Standing									
	Walking									
	Climbing									
	Crawling									
	Crouching									
	Kneeling									
	Balancing									
	Foot action	One foot								
		Both feet								
	Fine finger movements									

[1]Frequency

Seldom = Not always performed during completion of job.
Minor = Performed less than 25 per cent of job.
Required = Frequent repetition for 25-50 per cent of job.
Major = Frequent repetition for more than 50 per cent of job.

Physical demands			Not a component	Frequency[1]				Comments
				Seldom	Minor	Required	Major	
Sensory/perceptual	Hearing	Conversations						
		Other sounds						
	Vision	Far						
		Near						
		Colour						
		Depth						
	Perception	Spatial organizational						
		Form recognition						
	Feeling							
	Reading							
	Writing							
	Keying/typing							
	Speech							
Work environment	Outside work							
	Hot							
	Cold							
	Humid							
	Dry							
	Dust							
	Vapour fumes							
	Noise							
	Vibration	Whole body						
		Upper extremity						
	Contact stress							
	Striking with hand/fist							
	Moving objects							
	Hazardous machines							
	Electrical							
	Sharp tools							
	Radiant/thermal energy							
	Slippery							
	Congested worksite							
	Chemical irritants							
Conditions	Work independent, but in group							
	Operate equipment/machinery							
	Machine paced							
	Production quotas							
	Deadline pressures							
	Irregular/extended hours							

[1]**Frequency**

Seldom = Not always performed during completion of job.
Minor = Performed less than 25 per cent of job.
Required = Frequent repetition for 25-50 per cent of job.
Major = Frequent repetition for more than 50 per cent of job.

Appendix E — Ergonomic risk factor checklist for industrial manufacturing

Guide to completing the ergonomic risk factor checklist for industrial manufacturing

Introduction

TThe ergonomic risk factor checklist is only one part of an ergonomic analysis. It works best as a preliminary tool for observing a job and identifying the levels of risk factors in a job. Although it does not provide answers, it helps identify what should be analyzed and indicates the factors that may cause musculoskeletal problems in a job.

The checklist was created for an industrial manufacturing environment. It emphasizes identification of a combination of risk factors common in industry and those that have higher risk. This checklist is divided into three parts:

1. Risk factors for the upper extremity.
2. Risk factors for the back and lower extremity.
3. Risk factors in manual material handling.

Within each of these parts, risk factors are given scores that increase with the amount of exposure time. Use the checklist to evaluate a work task and determine which, if any, risk factors are present, as well as the length of time the worker is exposed to each.

Scores for each combination of risk factor exposure/time for the upper limbs and lower back are added separately. They are kept separate because simultaneous exposure to risk factors for upper and lower extremities does not generally affect the same joint or anatomic region.

All components of the checklist should be completed for each job to ensure a thorough analysis.

Step 1: Familiarize yourself with the job.

Two key ways to do this are through observation and interview. Watch the worker do their job for a few minutes. Get a feel for the range of activities in a day. Talk with the worker and ask questions about their job. Then complete a physical demands description (Appendix C).

The goal of an ergonomic analysis is to ensure the job fits the worker. Input from the worker doing the job is a key part of the analysis. When analyzing a task, it is very important to talk with the worker and ask for any relevant information about the daily workings of the job. It is also valuable to physically try the job to get a better understanding of the requirements. Questions for the worker that may provide useful information include:

- Can you explain your work duties?
- Do you perform these duties all day or do they change at any time?
- If you could improve this job in any way, what would you change?

- Do you feel any aches or pains that may be related to your job?
- What parts of your job cause problems?

Step 2: Determine the risk factors.

The checklist is divided into columns, and it is best to start with the exposure column. It contains simple questions about whether the worker is being exposed to the various risk factors described in each row. Remember to read and understand the risk factor definitions before doing further steps.

Look at each risk factor and watch to see if the worker is exposed to this factor at any time. Once you have addressed all the risk factors, go to Step 3.

Step 3: Determine the time of exposure to the risk factors.

Step 2 shows what the worker is exposed to. The next step is to see how long the worker is exposed to each risk factor and mark it in the time column.

The time of exposure is not how long the worker performs a job, but how long he or she is exposed to the risk factor.

Example:

Joe performs a job on a production line that has a cycle time of 60 seconds. He does this job for eight hours per day. The job cycle involves these body movements:

1. For 45 seconds of every 60 second cycle, Joe works with his wrist deviated.
2. For 20 seconds of every 60 second cycle, Joe's elbow is above mid-torso level.
3. For five seconds of every 60 second cycle, Joe is bent forward greater than 45 degrees.

The 60-second cycle represents the entire day (for example, whatever Joe does for 60 seconds, he does for eight hours).

Therefore, if Joe's wrist is deviated for 45 seconds of every 60 second cycle, Joe spends 75 per cent of his day, or six hours, with his wrist deviated. Therefore, according to the time column on the ergonomic risk factor checklist, Joe has a score of three for wrist deviation.

Using the same formula, Joe spends approximately three hours per day with his elbow above mid-torso level and less than one hour per day with his torso bent forward greater than 45 degrees. This results in a score of two for shoulder posture and a score of one for trunk posture.

Regardless of the length of work cycle, the principle is the same for determining time of exposure.

Circle these combined scores in the appropriate column and write it down in the far-right column. When both the upper limb and the back and lower extremity checklists are done, look over each to ensure that every risk factor marked “yes” in the **exposure** column has a score in the **time** column. Similarly, every risk factor marked “no” in the **exposure** column should have a blank **time** column.

Step 4: Add up the checklist scores.

To find the total scores for the upper limb and back and lower extremity checklists, add the scores in the far-right column for each of the checklists and record them at the bottom of each checklist.

Step 5: Opportunities for improvement.

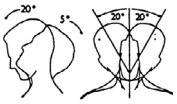
The final step is to record any actions that could improve the job. Note any recommendations after observing the worker do the job, while talking with the worker and after completing the checklist analysis. It may be useful to recommend looking at the job in more detail before making any decisions. The key is to record ideas while the information is fresh.

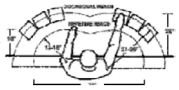
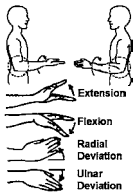
Ergonomic risk factor checklist form

(Adapted from *The Prevention of Musculoskeletal Injuries for Manitoba*)

Upper extremity risk factor checklist

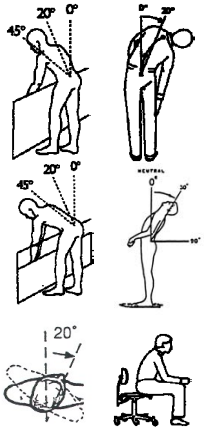
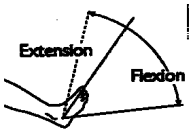
Date _____ **Analyst** _____ **Job** _____ **Location** _____

Risk factor category	Risk factors	Exposure Is the risk factor present within the job or task?	Time				Score
			0 per cent to 25 per cent of total time	25 per cent to 50 per cent of total time	50 per cent to 100 per cent of total time	If total time for job is more than 8 hours, add 0.5 points per hour	
Upper limb movements	1. Moderate: steady motion with regular pauses	☐ Yes ☐ No	0	1	2		
	2. Intensive: rapid steady motion without regular pauses	☐ Yes ☐ No	1	2	3		
Keyboard use 	3. Intermittent keying	☐ Yes ☐ No	0	0	1		
	4. Intensive keying	☐ Yes ☐ No	0	1	3		
Hand force (repetitive or static) 	5. Squeezing hard with the hand in a power grip	☐ Yes ☐ No	0	1	3		
	6. Pinch more than two pounds	☐ Yes ☐ No	1	2	3		
Awkward positions  	7. Neck: twist/bend (twisting neck > 20 degrees, bending neck forward > 20 degrees or back < 5 degrees)	☐ Yes ☐ No	0	1	2		
	8(a). Arm being used at or above shoulder level	☐ Yes ☐ No	1	2	3		

Risk factor category	Risk factors	Exposure Is the risk factor present within the job or task?	Time				Score
			0 per cent to 25 per cent of total time	25 per cent to 50 per cent of total time	50 per cent to 100 per cent of total time	If total time for job is more than 8 hours, add 0.5 points per hour	
	8(b).Reaching forward	☐ Yes ☐ No	1	2	3		
	9. Rapid forearm rotation	☐ Yes ☐ No	0	1	2		
	10. Wrist: bend or deviate	☐ Yes ☐ No	1	2	3		
Contact stress 	11. Hard/sharp objects press into skin	☐ Yes ☐ No	0	1	2		
	12. Using the palm or hand as a hammer	☐ Yes ☐ No	1	2	3		
Vibration  	13. Localized vibration (without anti-vibration PPE)	☐ Yes ☐ No	0	1	2		
	14. Whole-body vibration (without anti-vibration PPE)	☐ Yes ☐ No	1	2	3		
Environment	15. Lighting (poor illumination or glare)	☐ Yes ☐ No	0	0	1		
	16. Adverse temperatures	☐ Yes ☐ No	0	0	1		
Control over work pace	17. Zero control factors present = 3 One control factor present = 1 Two or more control factors present = 2	☐ Yes ☐ No	**Above column headers do not apply**				
Total upper extremity score							

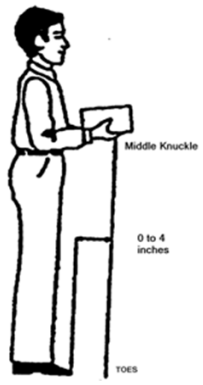
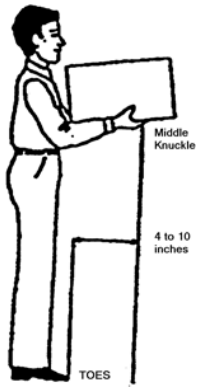
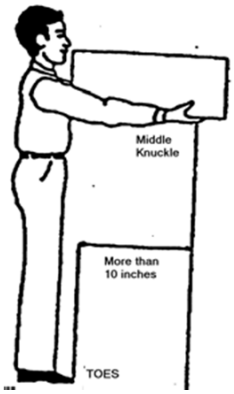
Back and lower extremity risk factor checklist

Date _____ Analyst _____ Job _____ Location _____

Risk factor category	Risk factors	Exposure Is the risk factor present within the job or task?	Time				Score
			0 per cent to 25 per cent of total time	25 per cent to 50 per cent of total time	50 per cent to 100 per cent of total time	If total time for job is more than 8 hours, add 0.5 points per hour	
Awkward postures 	18. Mild forward or side bending of torso more than 20 degrees; less than 45 degrees	☐ Yes ☐ No	0	1	2		
	19. Severe forward bending of torso more than 45 degrees	☐ Yes ☐ No	1	2	3		
	20. Backward bending of torso	☐ Yes ☐ No	0	1	2		
	21. Twisting of torso	☐ Yes ☐ No	1	2	3		
	22. Prolonged sitting without adequate back support	☐ Yes ☐ No	0	1	2		
	23. Standing stationary or inadequate foot support while seated	☐ Yes ☐ No	0	0	1		
	24. Foot action (pedal), standing stationary with inadequate foot support, balancing	☐ Yes ☐ No	0	1	2		
	25. Kneeling/ squatting	☐ Yes ☐ No	1	2	3		
	26. Hip abduction (repetitive/ prolonged)	☐ Yes ☐ No	0	1	2		
	27. Repetitive ankle extension/flexion	☐ Yes ☐ No	0	1	2		

Risk factor category	Risk factors	Exposure Is the risk factor present within the job or task?	Time				Score
			0 per cent to 25 per cent of total time	25 per cent to 50 per cent of total time	50 per cent to 100 per cent of total time	If total time for job is more than 8 hours, add 0.5 points per hour	
Contact stress	28. Hard/sharp objects press into skin	☐ Yes ☐ No	0	1	2		
	29. Using the knee as a hammer or kicker	☐ Yes ☐ No	1	2	3		
Vibration 	30. Whole-body vibration (without anti-vibration PPE)	☐ Yes ☐ No	0	1	2		
Push/pull	31. Moderate load	☐ Yes ☐ No	0	1	2		
	32. Heavy load	☐ Yes ☐ No	1	2	3		
Control over work pace	33. Zero control factors present = 3 One control factor present = 1 Two or more control factors present = 2	☐ Yes ☐ No	**Above column headers do not apply**				
Total back and lower extremity score							

Manual material handling risk factor checklist

34(a) Step 1: Determine if the lift is near, middle, or far (body to hands). • Use an average horizontal distance if a lift is made every 10 minutes or less. • Use the largest horizontal distance if more than 10 minutes pass between lifts.	Near lift	Middle lift	Far lift	Score
				

34(b) Step 2: Estimate the weight lifted in kg (pounds). • Use an average weight if a lift is made every 10 minutes or less. • Use the heaviest weight if more than 10 minutes pass between lifts. • Enter zero in the total score if the weight is 4.54kg (10lb) or less.	Near lift		Middle lift		Far lift		Score
	Danger zone	More than 23.13 kg (51 lb) **5 points**	Danger zone	More than 15.88 kg (35 lb) **6 points**	Danger zone	More than 12.7 kg (28 lb) **6 points**	
	Caution zone	7.71 to 23.13 kg (17 to 51 lb) **3 points**	Caution zone	5.44 to 15.88 kg (12 to 35 lb) **3 points**	Caution zone	4.54 to 12.7 kg (10 to 28 lb) **3 points**	
	Safe zone	Less than 7.71 kg (17 lb) **0 points**	Safe zone	Less than 5.44 kg (12 lb) **0 points**	Safe zone	Less than 4.54 kg (10 lb) **0 points**	

Total manual material handling score	
Combine total back and lower extremity score with total uppoer extremity and manual handling score. Prioritize tasks that need to be fixed based on the highest scores.	

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