Musculoskeletal Injuries Prevention Guide

MISSION: ZERO

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Acknowledgement:

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Introduction

In Saskatchewan, musculoskeletal injuries (MSIs) account for one third of work-related injuries. Often these injuries result in time away from work. A musculoskeletal injury is an injury or disorder of the muscles, tendons, ligaments, nerves, joints, bones, or supporting vasculature (blood vessels). This type of injury may be caused or aggravated by repetitive motions, forceful exertions, vibration, mechanical compression, sustained or awkward postures, limitations on motion or action, or any other ergonomic stressors.

Work-related MSIs 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 MSI or minimize the discomfort of an existing MSI, employers should make modifications or changes to workers' workstations, equipment, tools, work practices, work rate and body movements. Employers should also provide worker training.

Examples of MSIs include:

- muscle or tendon strains;
- ligament sprains;
- herniated intervertebral discs (slipped disc);
- adaptive changes to soft tissues from physiological, psychological, and other environmental stresses, such as chemical exposure, medications and previous injury history.
- pressure on nerves (numbness or tingling);
- tendonitis;
- bursitis; and
- epicondylitis (e.g., tennis elbow).

Occupational Health and Safety Requirements

Regulation 6-18 of *The Occupational Health and Safety Regulations, 2020* (the regulations) explains an employer's or contractor's responsibilities related to MSIs.

An employer or contractor must regularly, and in consultation with the occupational health committee (OHC), review work activities that may cause or aggravate an MSI. If the review identifies a risk, the employer or contractor must inform workers of the risks as well as signs and symptoms of MSIs. They must also provide effective protections for each worker who may be at risk. Effective protections may include:

- providing equipment that is designed, constructed, positioned and maintained to reduce the harmful effects of an activity;
- implementing appropriate work practices and procedures to reduce the harmful effects of an activity; and

- 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.

To eliminate or reduce the risk of this type of injury, employers or contractors must also ensure that workers at risk of an MSI are instructed in the safe performance of their work, including the use of appropriate work practices and procedures, equipment and personal protective equipment.

See Appendix A for a full list of regulations related to MSIs.

Reviewing Work Activities and Associated Risks

The employer should review the activities with the help of workers who may be at risk of MSIs, and in consultation with the committee. For example, workers can identify which activities pose a risk, or could result in an MSI. There are many signs and symptoms of MSIs that both employers and workers should be aware of:

- pain;
- loss of joint/muscle function;
- fatigue;
- numbness;
- tingling;
- weakness;
- swelling;
- redness;
- stiffness; and
- white knuckles.

The following behaviours may also suggest an MSI:

- rubbing arms, hands, wrists, shoulders;
- perspiring or breathing heavily;
- switching hands to perform tasks; and
- shaking a wrist, arm, or leg.

When an employer is aware of, or has been told that a work activity poses an MSI 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 (e.g., forceful exertion);
- areas of the body at risk of MSI (e.g., lower back); and
- source of risks (e.g., lifting boxes).

Risk Factors (Physical Demands)

Below is a list of the most common MSI 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.

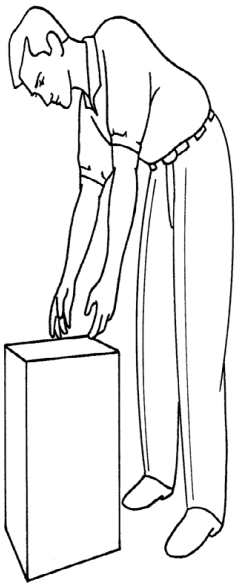
Awkward or sustained postures:

These occur when workers must adopt non-neutral postures to perform their duties. **Neutral posture** is a relaxed body standing upright with the arms hanging comfortably at the side.

Examples of non-neutral work postures include:

- stoop-lift (bending forward at the waist);
- twisting the trunk (especially while lifting);
- elbows away from the body (side, front, or behind); and
- wrist bent up, down, or to the side.

Non-neutral postures increase the load on the musculoskeletal system. Non-neutral postures reduce blood flow to working muscles and increase muscle load (e.g., 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 (e.g.,a herniated or slipped disc), or the micro scale (e.g., microscopic tears in the muscles, tendons or ligaments), which may develop into an MSI over time.

Some forceful exertions used during work, include:

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

Repetitive motions

These occur when workers are required to 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 significant 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:

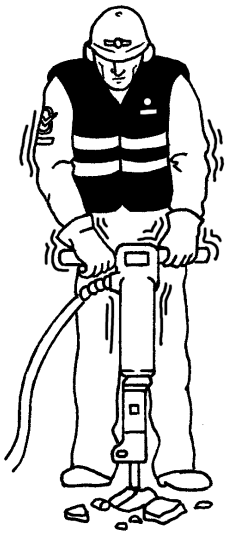
- rapid, or frequently repeated, movement of the fingers, hands, wrists, and/or arms;
- operating controls (depending on the frequency);
- sitting or standing for an extended period of time;
- repeatedly working in an awkward or sustained position;
- typing; and
- working on a production line.

Vibration

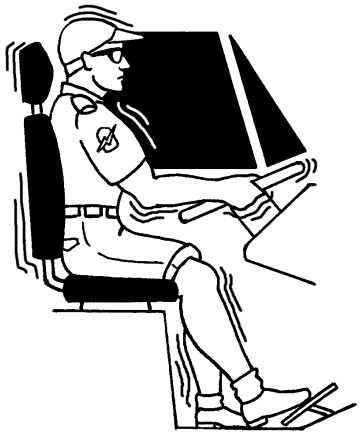
This is the transfer of vibration to the body from an external source, such as a vehicle, machine or tool. Vibration can cause the muscles to tighten, a decrease in the body's circulation, and damage to the blood vessels and nerves.

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

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



Hand-arm vibration



Whole body vibration

Mechanical compression

This occurs when there is external pressure on the soft tissues, either at high forces and/or for prolonged periods of time (e.g., leaning on a barrier, resting hands 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.

Review Methods

An MSI survey is an important first step. A survey should be completed by all workers and then summarized. Summarized survey results will reveal which jobs and tasks to prioritize for review. Note that an MSI survey is not a complete review of all the activities in the workplace that could cause or aggravate an MSI.

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

After corrections are made to equipment, tools, job procedures, etc., it is important to do a 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 MSI surveys be redone approximately once a year in order to monitor MSI 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 MSI survey form.

If using this approach does not resolve the problem, a more in-depth review method will need to be used. More in-depth review methods aim to identify the risk factor(s) which may cause an injury. Consider using one or more of the following assessment methods and the associated tools to assist with the in-depth review.

1. Job Risk Analysis

What: This process describes the sequence of steps for completing a job and identifies the potential risks associated with each step. This is similar to standard job safety analyses or JSAs, except that it focuses only on MSI risks.

Who: The job risk analysis should be conducted by someone who has a complete understanding of the task they are analyzing. Usually, this can be done by a supervisor. If more than one analysis is needed, they should all be done by the same individual for consistency.

Why: Analyzing a task step-by-step allows easier identification of risks which may be difficult to see or describe when the task is observed as a whole.

When: Use this tool before developing safe work procedures, or standard operating procedures for a task, especially one that has not been reviewed for risks.

See Appendix B for more information and a sample job risk analysis form.

2. Physical Demands Description

What: A physical demands description (PDD) 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: PDDs are primarily used by someone who can analyze human movement, such as a kinesiologist, physiotherapist, or occupational therapist. Although these types of resources are present in some workplaces (e.g., in 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 required. For example, if a worker has been injured and is going to be returning to work, having a PDD completed and sent to their healthcare professional will help ensure that the worker can safely perform the required tasks. This tool may also help an injured worker give an effective description of their job to a healthcare provider, who may then offer effective treatment.

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

3. Ergonomic Risk Factor Checklist

What: An ergonomic risk factor checklist is designed to identify specific risks for MSI 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 MSI.

Who: This tool should be used by someone trained in the field of ergonomics. 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 MSIs 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 can be used 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 an MSI. 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

'Control measures,' when applied to MSIs, refer to deliberate changes to a task to reduce the workers' risk of suffering an MSI.

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. Changes may be made to the:

- physical design of the workspace and equipment;
- procedures and body movements used to perform the work;
- pace at which the work is performed; or
- 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 can be used. They are **engineering controls** and **administrative controls**. PPE such as respirators, gloves and protective clothing are less appropriate for controlling MSI risks.

Engineering Controls

Engineering controls refer to the design of the equipment, process, and/or environment where a worker works. Since MSIs occur when the physical capabilities of the worker are exceeded, 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 (e.g., boxes, tools, etc.) 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 are required to reach, bend, lift; and
- postures used during work (e.g., stoop-lift, squat-lift, non-neutral shoulder and wrist position and joint angles)

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

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

Administrative controls include work schedules and rest breaks. The risk of MSI increases when workers are over-tired or do not have enough time to take a short break. Schedules can be modified to reduce the severity, frequency or duration of activities that can lead to an MSI.

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.

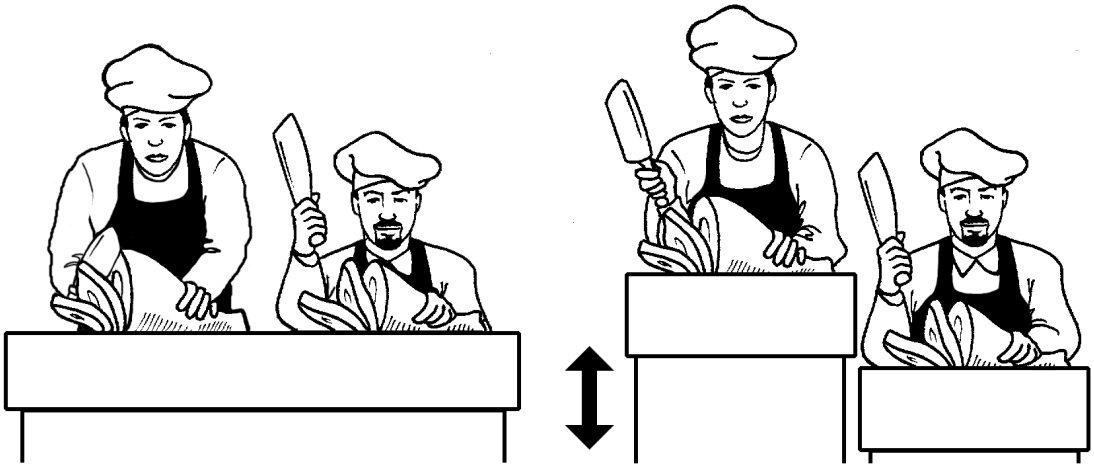
The risk of MSI increases when workers do not have enough variability in their movements. Wherever practical, have workers on a job rotation schedule. Job rotation involves switching tasks with other workers during the shift. This is usually done after a break. Job rotation may be effective in reducing the risk of MSI 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.

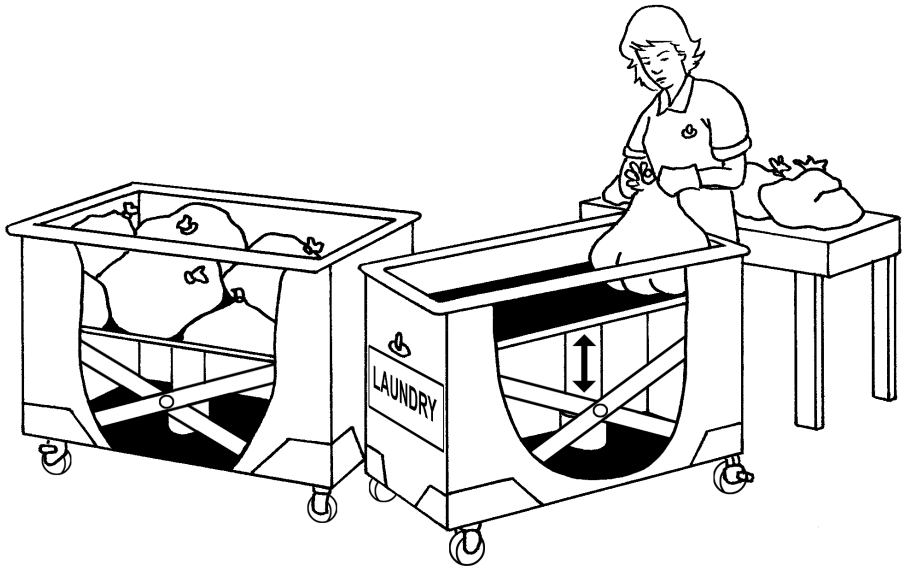
Examples of Engineering and Administrative Controls

Control Measures for Awkward Postures

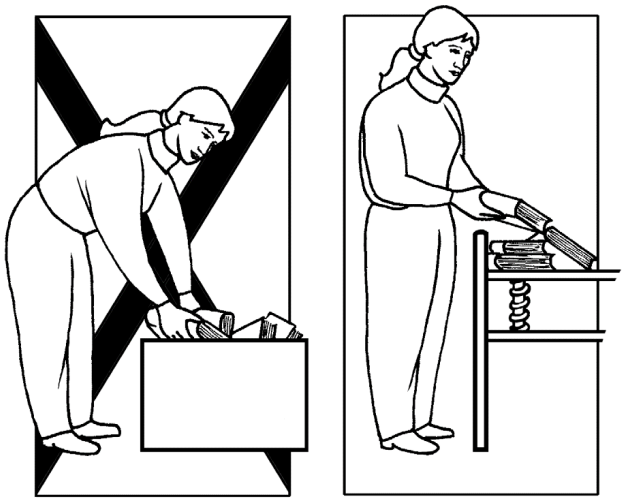
Often the most effective solution to an awkward posture is to adjust the work environment for the worker performing the task. This means arranging the work area so that the worker can work with their hands at or near elbow height and at or near the centerline of the body.



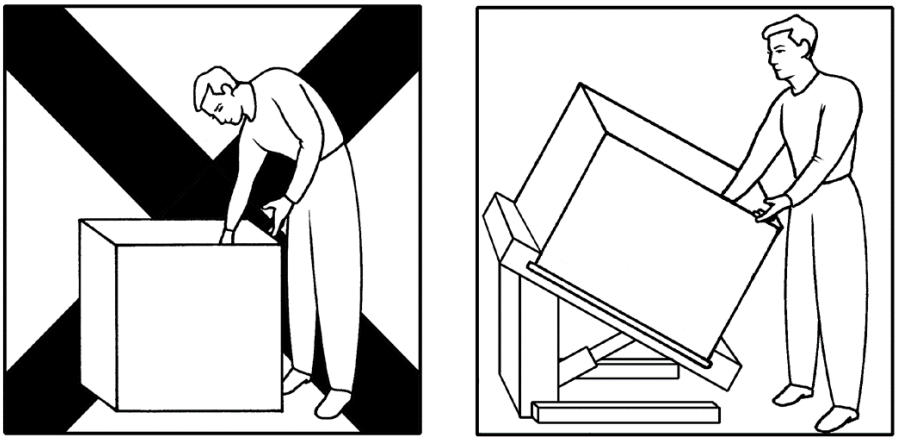
Workers of a different stature will often need to work at two different heights to reduce awkward postures. Using height-adjustable work surfaces can minimize the need for bending and other awkward postures.



Using spring loaded carts can minimize bending when lifting.



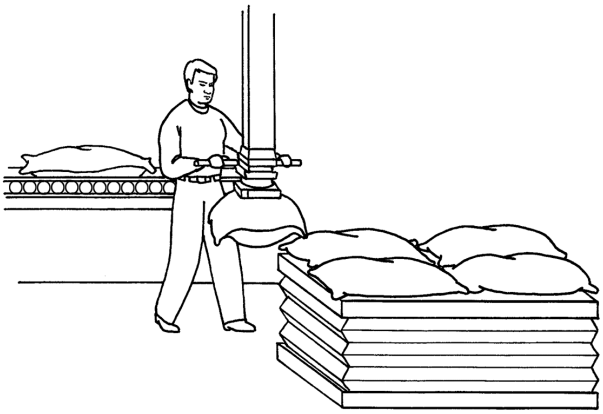
Using spring loaded tables can minimize bending when lifting.

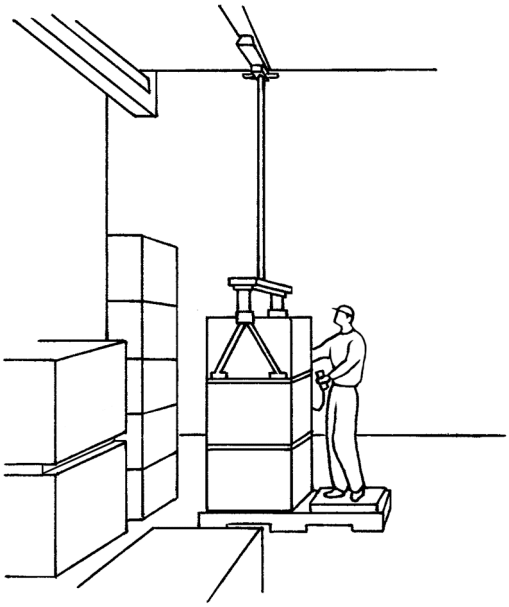


Bending at the waist is an awkward posture which can often be eliminated with equipment, or a process change.

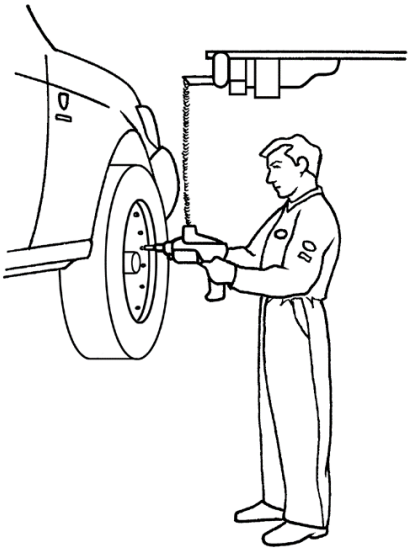
Control Measures for Forceful Exertions

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. This can be done 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.

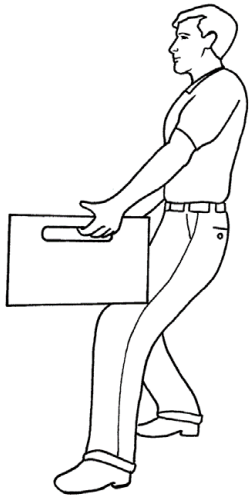




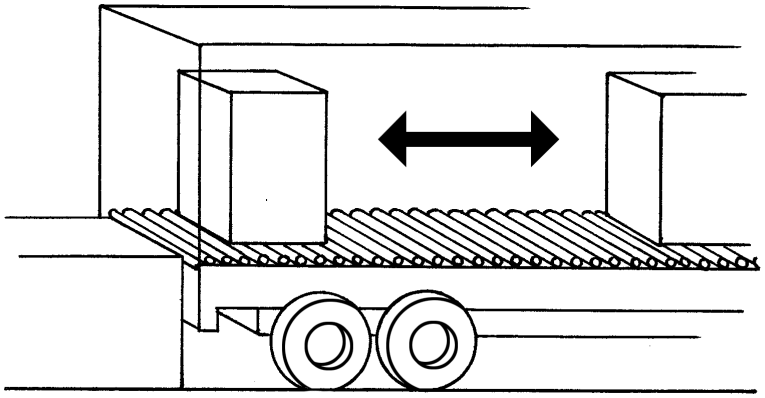
Manual material handling often involves a large amount of force, which can be reduced with the implementation of mechanical assistance.



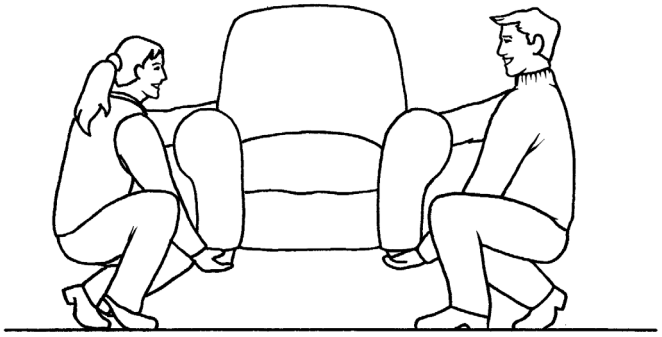
Using tool balancers can minimize the force required to hold tools while working.



Installing handles on boxes/crates being lifted decreases the risk of injury when lifting.



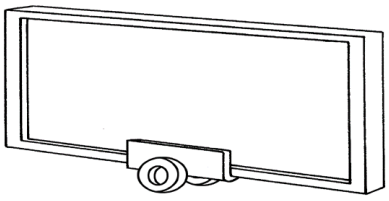
The implementation of rollers and conveyors can minimize the handling of objects.

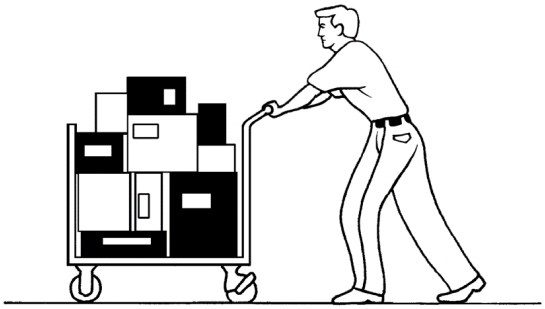


Lifting large objects in teams will minimize the forces associated with lifting.

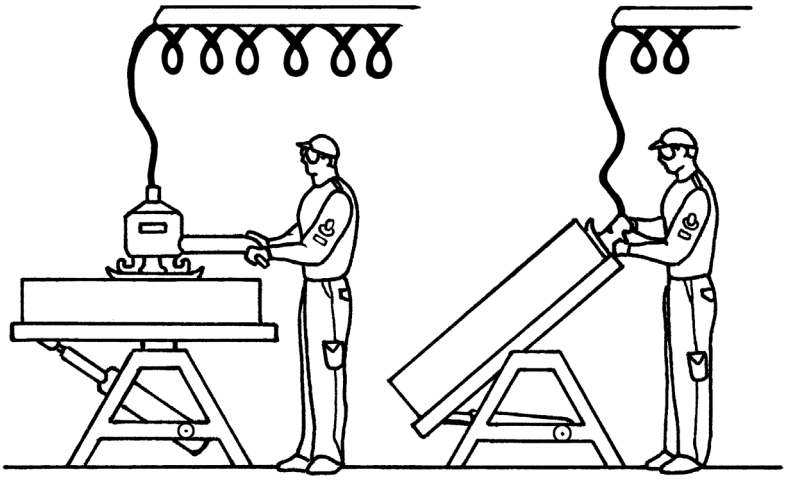
Control Measures for Repetitive Motions

The more frequently 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.





Carts or rollers can be used 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 using tools with less vibration, wrapping tools with anti-vibration wrap, and ensuring machinery is well-serviced to reduce vibration. When workers are exposed to whole body vibration, consider improving the quality of their seat and minimizing the length of exposure.

Control Measures for Compression

If workers are exposed to mechanical compression, consider removing or modifying 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 MSIs. However, there are a few examples:

1. Anti-vibration gloves can be used to reduce exposure of the hand and arm to vibration.
2. Knee pads can be used to reduce tissue compression when kneeling.

When considering PPE to reduce the risk of MSI, 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 required to perform the work.

Training and Education

Workers

Workers and supervisors must be trained and 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.

Relevant findings from the employer's review of work activities that could cause MSIs should be included in worker training and education (see regulation 6-18 for more information).

Good sources of information for reviews are:

- previous injury reports;
- job risk analyses for risks of MSI; and
- employee surveys about current or past pain or discomfort.

Note that most, but not all, MSIs develop gradually. MSIs can be effectively prevented both before signs and symptoms develop, and when workers are still in the early stages of developing signs and symptoms.

This means training needs to address how to:

I. Prevent, reduce and eliminate MSI risks before signs and symptoms develop.

One of the most effective ways of preventing serious MSIs is to train workers in the signs and symptoms of MSIs, and any risks of MSIs associated with their work. If an MSI risk has been identified, the signs and symptoms of it must be included in the training.

II. Reduce, eliminate and prevent existing MSIs from developing further if they are known to occur, or are suspected.

Workers should know what to do if they suspect they are developing an MSI, 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 of the regulations;
- 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 MSIs that workers may experience (workers who know the early warning signs of an MSI can get medical help sooner); and

- 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; and
    - use and maintenance of required PPE.

III. Training Records

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

Supervisors

Employers must identify risks and the MSIs workers could develop from performing their regular duties. Supervisors should be trained 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 the following procedures when training workers and supervisors about control measures for risk of MSI:

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.

Appendix A — Occupational Health and Safety Regulations

Occupational Health and Safety Regulations, 2020

Lifting and handling loads

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

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

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

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 practise 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.

Appendix B — MSI Survey 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 (forceful, awkward or repetitive, etc.) tasks that you do at work.

_____

_____

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?

None 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, etc. that you think may have caused (or contributed to) your symptoms. Also include any suggestions that you have regarding how your work area or work tasks, etc. could be changed in order to prevent or alleviate any problems you have identified.

_____

_____

_____

_____

Appendix C — Job Risk Analysis

Conducting a Job Risk Analysis

There are three steps to conducting this type of analysis:

1. Break the job down into its basic steps.
2. Identify the hazards present in each step and assess the risks.
3. Develop controls/corrective action for all risks you have identified.

Step 1: Breaking the job into steps

Every task can be broken down into steps. These steps should become the basis of the safe work procedure.

It is essential to identify every step of the task. Write down everything. After each step is identified, review the notes and combine points, or eliminate unnecessary detail.

To give a clear understanding of the task, the steps must include every key step required to do it correctly. Do not include excess details that will make analyzing the process a burden.

Limit the number of steps you record. If there are too many steps in the job, divide it into two jobs. Generally, there should be no more than 15 steps in a job.

Step 2: Identifying the risks present at each step

Each step of the job must now be assessed for risk. Take each step of the job one at a time and identify all of the MSI hazards that could be associated with it. For example, the step could be 'picking up an object off of the ground'. The hazard associated with this step would be 'lifting from ground height'.

Step 3: Developing controls for all the risks you have identified

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. These ideas can be put forward as solutions to eliminate the hazards and reduce the potential risks of MSIs.

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: _____

Job Risk Analysis Form

Job Name:	Facility:	Conducted By:

Job Steps	Risks	Corrective Action

Appendix D — Physical Demands Description (PDD)

What is a Physical Demands Description?

A PDD is a document used to describe all of the physical demands associated with a task. There are no standard PDD requirements. A PDD's purpose is to help a reader visualize all of 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 (e.g., employee 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 portion of the PDD, the better the reader will be able to recreate the actual task(s) in his/her mind. When completed, a PDD should provide the reader with an accurate description of what a worker must do (with regards to force, repetition and posture) to complete the described task(s).

A PDD 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 PDD with an accurate description of what lifting requirements are for a worker performing this task. The PDD may also include pictures and/or video of the task being done and the equipment being used.

Note: You may choose to use the sample PDD provided on the next page, create your own PDD, or adapt a PDD that you like.

PHYSICAL DEMANDS			Not a component	* FREQUENCY				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									

*** FREQUENCY**

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

PHYSICAL DEMANDS			Not a component	* FREQUENCY				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							

*** FREQUENCY**

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

Appendix E — Ergonomic Risk Factor (ERF) Checklist

Guide to Completing the Ergonomic Risk Factor Checklist

Introduction

The ERF 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 PDD (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, pains, etc., 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 or not 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 of 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 the following 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°.

The 60 second cycle represents the entire day (e.g., 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% of his day, or six hours, with his wrist deviated. Therefore, according to the time column on the ERF Checklist (see the next page), 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°. 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.

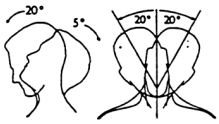
STEP 5: Opportunities for improvement

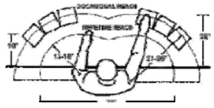
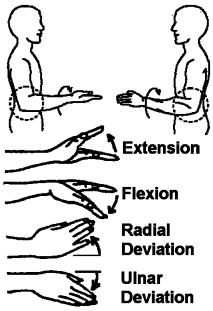
The final step is to record any actions that could improve the job. Note any recommendations after observing the worker do the job, while talking with the worker, and after completing the checklist analysis. It may be useful to recommend that the job be looked at in more detail before any decisions are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

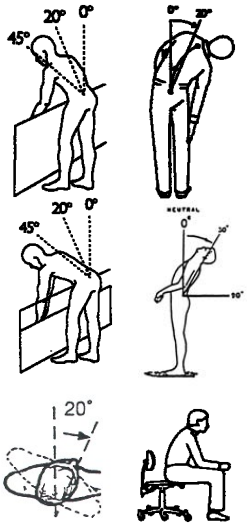
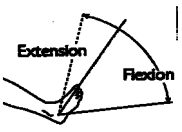
ERGONOMIC RISK FACTOR CHECKLIST FORM (Adapted from *The Prevention of Musculoskeletal Injuries for Manitoba*.)

UPPER EXTREMITY RISK FACTOR CHECKLIST

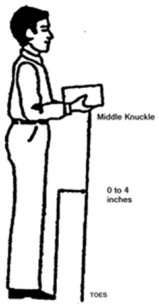
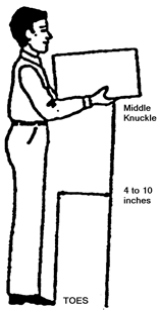
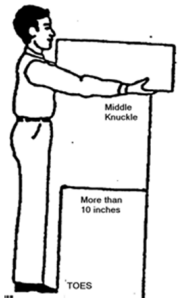
Date:_____Analyst:_____Job:_____Location: _____

RISK FACTOR CATEGORY	RISK FACTORS	EXPOSURE Is the risk factor present within the job or task?	TIME				SCORE
			0% to 25% of total time	25% to 50% of total time	50% to 100%of total time	If total time for job is more than 8 hrs., 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 Postures  	**7.** Neck: twist/bend (twisting neck >20°, bending neck forward >20° or back < 5°)	☐ 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% to 25% of total time	25% to 50% of total time	50% to 100% of total time	If job time is more than 8 hrs., 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	0	1	2		
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% to 25% of time	25% to 50% of time	50% to 100% of time	If job time is more than 8 hrs., add 0.5 points per hour	
Awkward Postures  	**18.** Mild forward or side bending of torso more than 20°; less than 45°	☐ Yes ☐ No	0	1	2		
	19. Severe forward bending of torso more than 45°	☐ 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% to 25% of total time	25% to 50% of total time	50% to 100% of total time	If job time is more than 8 hrs., 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 I: **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 II: **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 0 in the total score if the weight is 4.54 kg (10 lb.) or less.	**NEAR LIFT**		**MIDDLE LIFT**		**FAR LIFT**		
	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 UPPER EXTREMITY AND MANUAL HANDLING SCORE PRIORITIZE TASKS THAT NEED TO BE FIXED BASED ON THE HIGHEST SCORES	

Find more resources and stay informed by subscribing to the WorkSafe YouTube channel: youtube.com/@worksafesask

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