Musculoskeletal Injury (MSI) Risk Assessment Worksheet

Instructions

1. Review the **Guide to Musculoskeletal Injury (MSI) Risk Assessment** for information on how to conduct an MSI risk assessment. The guide also describes the physical demands risk factors and contributing risk factors that you need to consider as part of a risk assessment.
2. In the "Description" section of this worksheet:
   - Note the date of the assessment and who is conducting the assessment.
   - Name and describe the job or task being assessed.
   - Note which worker representatives are participating.
3. This worksheet has five sections that address different risk factors. The first part of each section covers physical demands risk factors. The second part of each section covers contributing risk factors.
4. For the physical demands risk factors component of each section, consider the low-, moderate-, and high-risk criteria for each risk factor. Check the boxes for the **highest level of risk** that is present.
5. For the contributing risk factors component of each section, determine if any contributing risk factors are present. The presence of one or more contributing risk factors may increase the overall risk of injury.
6. For each of the five sections, write notes to describe any specific observations you may have.
7. On the last page, record the results on the "Summary of risk" table. The results will help you decide which risk factors pose a greater risk to workers so you can focus on controlling those risk factors first.

Description

Date: Completed by:

Job or task being assessed:

Representative sample of workers, including workers with MSI signs and symptoms:

Joint health and safety committee (or worker health and safety representative) reviewed?

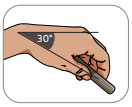
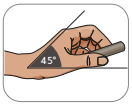
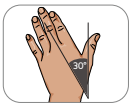
☐ Yes ☐ No

1. Force required

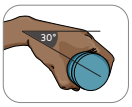
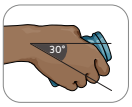
Physical demands risk factors

Determine if any of the following MSI risk factors are present. Check the boxes for the highest level of risk.

Pinch gripping

Low risk	Moderate risk	High risk
☐ Pinch gripping unsupported objects less than 2 hours total per day.	☐ Pinch gripping unsupported objects that weigh 1 kg (2 lb.) or more per hand for more than 2 hours total per day.  ☐ Pinch gripping with a force of 2 kg (4 lb.) or more per hand for more than 2 hours total per day. This is equivalent to pinch gripping half a stack of photocopy paper (250 sheets).	Pinch gripping unsupported objects that weigh 1 kg (2 lb.) or pinch gripping with a force of 2 kg (4 lb.) in any of the following situations: ☐ Pinch gripping for more than 4 hours total per day. ☐ Pinch gripping for more than 3 hours total per day with repetitive motions every few seconds. ☐ Pinch gripping for more than 3 hours total per day with wrists bent in any of the following positions: ☐ ≥ 30° flexion  ☐ ≥ 45° extension  ☐ ≥ 30° ulnar deviation 

Power gripping

Low risk	Moderate risk	High risk
☐ Power gripping unsupported objects less than 2 hours total per day.	☐ Power gripping unsupported objects that weigh 4.5 kg (10 lb.) or more per hand for more than 2 hours total per day.  ☐ Power gripping with a force of 4.5 kg (10 lb.) or more per hand for more than 2 hours total per day. This is equivalent to clamping light-duty automotive jumper cables onto a battery.	Power gripping unsupported objects that weigh 4.5 kg (10 lb.) or power gripping with a force of 4.5 kg or more per hand in any of the following situations: ☐ Power gripping for more than 4 hours total per day. ☐ Power gripping with a repetitive motion every few seconds for more than 3 hours total per day. ☐ Power gripping for more than 3 hours total per day with wrists bent in any of the following positions: ☐ ≥ 30° flexion  ☐ ≥ 45° extension  ☐ ≥ 30° ulnar deviation 

Pushing, pulling, or carrying

Force is needed to push or pull an object, either on wheels or by sliding. Force is also needed to carry an object.

Note any pushing, pulling, or carrying tasks, especially tasks that are repeated and/or long duration, or involve long distances, awkward postures, or work above the shoulder level or below knee height. See **MSI prevention guidance: Pushing and pulling** for more information on assessing these risks.

Determine if any of the following MSI risk factors are present. Check the boxes for the highest level of risk. If there is a moderate risk, do a lift/lower risk assessment to determine if there is a high risk (see page 5).

Lifting or lowering

Low risk	Moderate risk	High risk
☐ Any lifting or lowering that is less than moderate risk. 	Lifting or lowering objects: ☐ Above shoulder height, below the knees, or at arm's length. ☐ Twice or more per minute for more than 1 hour per shift. ☐ That weigh 2.3 kg (5 lb.) or more, twice or more per minute. ☐ That weigh more than 8.2 kg (18 lb.), once per shift. **Note:** If any box above is selected, proceed to high-risk column.	If you find any lifting or lowering that presents a moderate risk, do a lift/lower risk assessment for high risk (see page 5).

Contributing risk factors

☐ Aspects of workplace layout (working reaches, working heights, seating, floor surfaces)

Describe: _____

☐ Characteristics of objects handled (size and shape, load condition and weight distribution, handles)

Describe: _____

☐ Environmental conditions (cold temperatures)

Describe: _____

☐ Organization of work (work-recovery cycles, task variability, work rate)

Describe: _____

Notes and observations:

Lift/lower risk assessment (to determine if high risk)

Use this section to assess forceful exertion from lifting and lowering. You can also use the WorkSafeBC online **Lift/Lower Calculator** to assess lifting and lowering forces. If a job or task involves a number of lifts with various weights or postures, assess the following scenarios:

1. The worst-case scenario — the heaviest weight and the most awkward posture.
2. The most commonly performed lift. When determining the frequency + duration adjustment in Step 3, consider all the lifting done in a typical workday.

Step 1: Determine the actual weight of the lifted object

What is the lifted object?

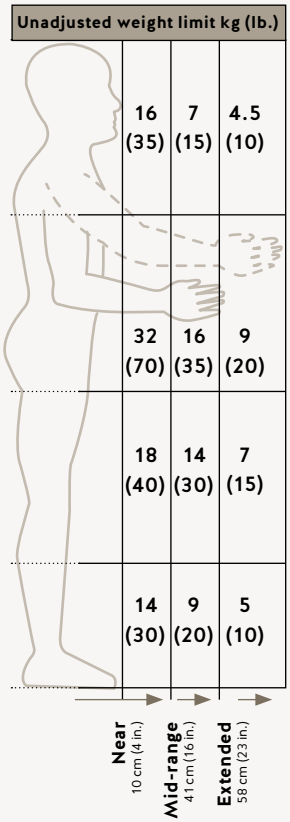
☐ 1. Heaviest/most awkward

☐ 2. Most common

Actual weight = _____

Step 2: Determine the unadjusted weight limit

Look for the most extreme hand position during the lift/lower task. Mark it on the following diagram.



Unadjusted weight limit = _____

Step 3: Determine the frequency + duration adjustment

Find out how many times the worker lifts per minute and how many total hours per day the worker spends lifting. Look up the frequency + duration adjustment in the following table.

How many lifts per minute?	How many hours per day?		
	Less than 1 h	1 h to 2 h	more than 2 h
1 lift every 2–5 min	1.00	1.00	0.85
1 lift every min	0.95	0.95	0.70
2–3 lifts every min	0.90	0.85	0.60
4-5 lifts every min	0.85	0.70	0.50
6-7 lifts every min	0.60	0.50	0.35
8-9 lifts every min	0.40	0.30	0.15
10+ lifts every min	0.20	0.10	0.05

Note: For lifting done less than once every five minutes, use 1.0.

Frequency + duration adjustment = _____

Step 4: Determine the twisting adjustment

If the worker twists more than 45° while lifting, the twisting adjustment is 0.85. Otherwise, use 1.0.

Twisting adjustment = _____

Step 5: Calculate the weight limit

To get the weight limit, multiply the unadjusted weight limit (Step 2) by the frequency + duration adjustment (Step 3) and the twisting adjustment (Step 4).

	X		X		=	
Step 2		**Step 3**		**Step 4**		**Weight limit**

Actual weight = _____ **Weight limit =** _____

Step 6: Analyze the results

If the actual weight (Step 1) is greater than the weight limit (Step 5), you must implement risk controls.

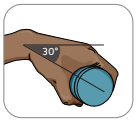
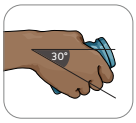
Notes and observations:

2. Repetition

Physical demands risk factors

Determine if any of the following MSI risk factors are present. Check the boxes for the highest level of risk for each body part.

Neck, shoulders, elbows, wrists, and hands		
Low risk	**Moderate risk**	**High risk**
Some repetition, but less than 2 hours total per day: ☐ Neck ☐ Shoulders ☐ Elbows ☐ Wrists ☐ Hands	Repeating the same motion every few seconds with little or no variation for 2–6 hours total per day: ☐ Neck ☐ Shoulders ☐ Elbows ☐ Wrists ☐ Hands	Repeating the same motion every few seconds with little or no variation for more than 6 hours total per day: ☐ Neck ☐ Shoulders ☐ Elbows ☐ Wrists ☐ Hands

Wrists and hands (excludes typing)		
Low risk	**Moderate risk**	**High risk**
☐ Some repetition but less than 2 hours total per day.	☐ Repeating the same motion every few seconds with little or no variation for more than 2 hours total per day.	☐ Repeating a high, forceful hand motion every few seconds with little or no variation for more than 2 hours total per day, with wrists bent in any of the following positions: ☐ ≥ 30° flexion  ☐ ≥ 45° extension  ☐ ≥ 30° ulnar deviation 

Wrists, hands, and fingers (typing)		
Low risk	**Moderate risk**	**High risk**
☐ Intensive typing for less than 4 hours total per day.	☐ Intensive typing for 4–7 hours total per day.	☐ Intensive typing for more than 7 hours total per day. ☐ Intensive typing for more than 4 hours total per day with wrist bent in any of the following positions: ☐ ≥ 30° flexion ☐ ≥ 45° extension ☐ ≥ 30° ulnar deviation Refer to the high-risk illustrations on the previous page under "Wrists and hands."

Contributing risk factors

☐ Aspects of workplace layout (working reaches, working heights, seating, floor surfaces)

Describe: _____

☐ Characteristics of objects handled (size and shape, load condition and weight distribution, handles)

Describe: _____

☐ Environmental conditions (cold temperatures)

Describe: _____

☐ Organization of work (work-recovery cycles, task variability, work rate)

Describe: _____

Notes and observations:

3. Awkward posture

Physical demands risk factors

Determine if any of the following MSI risk factors are present. Check the boxes for the highest level of risk.

Knees

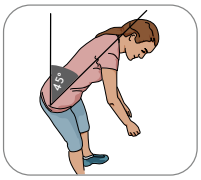
Low risk	Moderate risk	High risk
☐ Squatting or kneeling for less than 2 hours total per day.	☐ Squatting for 2–4 hours total per day.  ☐ Kneeling for 2–4 hours total per day. 	☐ Squatting or kneeling for more than 4 hours total per day.

Shoulders

Low risk	Moderate risk	High risk
☐ Working with elevated arms less than 2 hours total per day.	☐ Working with hands above the head for 2–4 hours total per day. ☐ Working with elbows above shoulder level for 2–4 hours total per day.	☐ Working with hands above the head for more than 4 hours total per day. ☐ Working with elbows above shoulder level for more than 4 hours total per day. 

Neck

Low risk	Moderate risk	High risk
☐ Working with the neck bent in any direction less than 2 hours total per day.	☐ Working with the neck bent more than 30° in any direction for 2–4 hours total per day. ☐ Side ☐ Backward ☐ Forward 	☐ Working with the neck bent more than 45° for more than 4 hours total per day, without support or the ability to vary posture.

Back		
Low risk	**Moderate risk**	**High risk**
☐ Working with the back bent in any direction less than 2 hours total per day.	☐ Working with the back bent more than 30° in any direction for 2–4 hours total per day. 	Working with the back bent forward without support or the ability to vary posture for: ☐ More than 30° for more than 4 hours total per day.  ☐ More than 45° for more than 2 hours total per day. 

Contributing risk factors

☐ Aspects of workplace layout (working reaches, working heights, seating, floor surfaces)

Describe: _____

☐ Characteristics of objects handled (size and shape, load condition and weight distribution, handles)

Describe: _____

☐ Environmental conditions (cold temperatures)

Describe: _____

☐ Organization of work (work-recovery cycles, task variability, work rate)

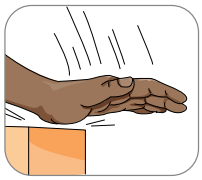
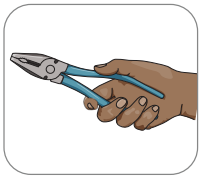
Describe: _____

Notes and observations:

4. Contact stress

Physical demands risk factors

Determine if any of the following MSI risk factors are present. Check the boxes for the highest level of risk.

Hands		
Low risk	**Moderate risk**	**High risk**
☐ Using a hand as a hammer less than 10 times per hour for less than 2 hours total per day.	☐ Using a hand as a hammer more than 10 times per hour for more than 2 hours total per day. 	☐ Using a hand as a hammer more than once per minute for more than 2 hours total per day.
Knees		
Low risk	**Moderate risk**	**High risk**
☐ Using a knee as a hammer less than 10 times per hour for less than 2 hours total per day.	☐ Using a knee as a hammer more than 10 times per hour for more than 2 hours total per day. 	☐ Using a knee as a hammer more than once per minute for more than 2 hours total per day.
Local pressure		
Local contact stress occurs when a hard or sharp object comes in contact with the skin (e.g., holding hand tools, handling objects with grooved or uneven edges, using power tool triggers with sharp edges). See **MSI prevention guidance: Contact stress** for more information on assessing this risk. 		

Contributing risk factors

☐ Aspects of workplace layout (working reaches, working heights, seating, floor surfaces)

Describe: _____

☐ Characteristics of objects handled (size and shape, load condition and weight distribution, handles)

Describe: _____

☐ Environmental conditions (cold temperatures)

Describe: _____

☐ Organization of work (work-recovery cycles, task variability, work rate)

Describe: _____

Notes and observations:

5. Hand-arm vibration

Physical demands risk factors

Moderate risk	High risk
Check the appropriate box if any of the following MSI risk factors are present.	Does hand-arm vibration exceed regulatory limits? Exposure beyond these limits poses a high risk of hand-arm vibration disorders.
☐ Using high-vibration tools for more than 30 minutes total per day (e.g., impact wrenches, chainsaws, jackhammers, or riveting hammers).	**Step 1** There are three ways to find the vibration value for a tool: A. Ask the manufacturer for the vibration value. B. Look it up in a vibration database. C. Measure the vibration yourself. Follow ISO Standard 5349-1:2001 and ISO Standard 5349-2:2001.
☐ Using moderate-vibration hand tools for more than 2 hours total per day (e.g., grinders, sanders, or jigsaws).	**Step 2** Determine how many hours per day the worker uses the tool (i.e., the amount of time that the tool is actually vibrating in the worker's hands). This is the total exposure time. **Step 3** The left column shows total exposure time. The right column shows the maximum vibration value considered safe for nearly all workers for a given daily exposure time.

Total daily exposure time (hours)	Maximum vibration value considered safe for nearly all workers (m/s^2)
8	5
6	5.8
4	7.1
2	10
1	14.1
0.5	20

Note: This table is adapted from OHS Guideline G7.11-1. The values in the table refer to the 2015 American Conference of Governmental Industrial Hygienists (ACGIH) limits.

Contributing risk factors

☐ Aspects of workplace layout (working reaches, working heights, seating, floor surfaces)

Describe: _____

☐ Characteristics of objects handled (size and shape, load condition and weight distribution, handles)

Describe: _____

☐ Environmental conditions (cold temperatures) See **MSI prevention guidance: Cold temperature** for more information on assessing this risk.

Describe: _____

☐ Organization of work (work-recovery cycles, task variability, work rate)

Describe: _____

Notes and observations:

Next steps

Complete and review the "Summary of risk" table to identify the level of risk associated with the various risk factors. Include contributing risk factors for each.

1. Minimize the risk of MSI to the lowest reasonable level. Prioritize as follows:
   - High-risk tasks first
   - Low- and moderate-risk tasks with a history of worker injuries and signs and symptoms of MSI
   - Tasks with multiple risk factors
2. Develop risk controls to eliminate or minimize the risk of MSI.

For more information on developing controls, see ***Preventing Musculoskeletal Injury (MSI): A Guide for Employers and Joint Committees***.

Summary of risk

	Low risk	Moderate risk	High risk	Contributing risk factors
Gripping force	☐	☐	☐	
Lift/lower force	☐	☐	☐	
Repetition	☐	☐	☐	
Awkward posture	☐	☐	☐	
Contact stress	☐	☐	☐	
Hand-arm vibration	☐	☐	☐	

Notes and observations on controls: