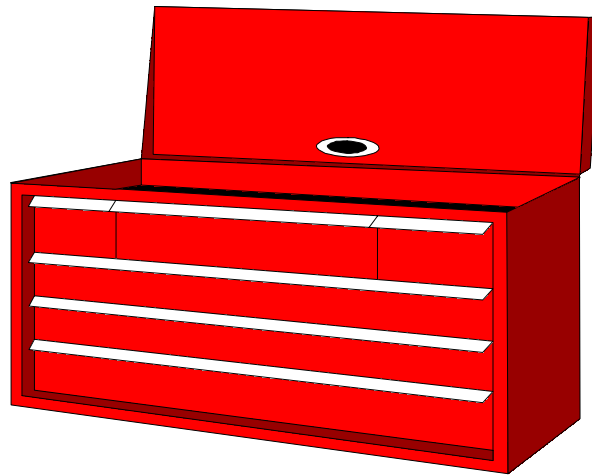


INDUSTRIAL MUSCULOSKELETAL INJURY REDUCTION PROGRAM

Common Industry Jobs (CIJs) Janitor Tool Kit



IMIRP program coordinated by:



Council of
Forest
Industries



Industrial
Wood & Allied
Workers of
Canada



Advanced
Ergonomics
Inc.

In cooperation with the Workers' Compensation Board of British Columbia

JANITOR TOOL KIT

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Overview

Janitor

Job Summary

A Janitor is responsible for maintaining sanitary conditions in mill common areas, such as lunchrooms, washrooms, meeting rooms, and offices. A Janitor will clean floors, clean surfaces, remove garbage, carry equipment, and perform general maintenance. Janitors may also stock supplies and operate vehicles. Refer to the Physical Demands Analysis for more detail.

Physical Demands

The physical demands of the Janitor may include:

- a) Forceful use of the neck/shoulder, elbow/wrist, and low back
- b) Repetitive motions of the neck/shoulder, elbow/wrist, low back, knee, and foot
- c) Awkward postures of the neck, neck/shoulder, elbow/wrist, low back, and knee
- d) Static postures of the low back and knee
- e) Contact stress in the knee
- f) Vibration transmitted through the feet
- g) Kneeling to clean low surfaces
- h) Pushing and pulling on hand tools
- i) Lifting, carrying, and lowering supplies

Mental Demands

A Janitor may be responsible for many cognitive tasks, including ordering and stocking cleaning supplies, along with vending supplies and health and safety equipment. Janitors may also be responsible for maintaining MSDS and other posted notices, and distributing and accounting for worker safety equipment.

Major Variations

With different mills, the following major variations may be found:

- 1) Janitors may be responsible for:
 - a) Clearing snow, and other outdoor duties
 - b) Indoor cleaning exclusively
- 2) Janitors may:
 - a) Participate in structured job rotation, where they regularly perform other job tasks every shift
 - b) Participate in informal job rotation, where they provide relief or occasional help as required
 - c) Perform Janitor tasks all shift
- 3) Due to mill layout and delivery access, Janitors may:
 - a) Frequently perform heavy manual handling of materials, including between floors and buildings
 - b) Rarely perform heavy manual handling of materials

Minor Variations

With different mills, the following minor variations may be found:

- 1) Janitors may work:
 - a) Independently
 - b) With a partner
- 2) Janitors may:
 - a) Occasionally perform office tasks, such as ordering supplies and printing notices
 - b) Rarely or never perform office tasks

Physical Demands Analysis Janitor

PDA General Instructions: Janitor

The purpose of this PDA is to familiarise healthcare professionals with the physical demands of a Janitor. This PDA can be used to gather information about an individual's job and to assist in developing a rehabilitation and return-to-work plan. It is not intended for use in claims adjudication.

Where applicable, common industry job data (e.g., hand tools, tasks) have been included in the tables of this document. The information reported was collected from a sample of Janitors in the BC Sawmill Industry. However, the PDA requires completion by the healthcare professional, with input from the injured worker to highlight tasks that aggravate the injury or prevent the worker from returning to their job. The worker's supervisor may be contacted for further information or verification of tasks.

A PDA should be filled out for each individual worker following an injury. Subsequent changes in the work process may reduce the accuracy of any pre-existing physical demands assessments. The IMIRP Society accepts no responsibility for the use or misuse of this Physical Demands Analysis, or for the accuracy of the PDA as it applies to any specific workplace.

Disclaimer

*The IMIRP Society accepts no responsibility for the use or misuse of the PDA,
or the accuracy of the PDA as it applies to any specific workplace.*

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Physical Demands Analysis Janitor

Task List

For each of the tasks listed below, please indicate whether it occurs at your mill.

Maintain common areas

Janitors are responsible for maintaining clean conditions in mill common areas.
Physical tasks include:

Clean floors

Janitors sweep and/or mop lunchroom, washroom, meeting room, and office floors.

Handscrubbing may be required to remove some marks and stains.

Periodically, floor buffing and waxing is performed with a power buffer.

In carpeted areas, Janitors use a vacuum to clean the floor.

Does this task occur at your mill?

Yes No



Clean surfaces

Janitors are also responsible for cleaning all surfaces in washrooms, lunchrooms, meeting rooms, and offices.

This task can include washing windows, tables, toilets, sinks, desks, counters, refrigerators, and microwaves.

Cleaning lower surfaces can require kneeling.

Does this task occur at your mill?

Yes No



Remove garbage

Janitors are responsible for removing trash from mill common areas.

Does this task occur at your mill?

- Yes No



Carry equipment

Janitors carry equipment and supplies to areas throughout the mill. This equipment can be for janitor use, such as mop buckets and boxes of paper towel, or for general employee use, like water cooler bottles.

Does this task occur at your mill?

- Yes No



General maintenance

Janitors can be responsible for various general maintenance duties. This work can include fixing or replacing broken equipment, such as furniture, windows, and light bulbs, and other light repair work. Posting and removing notices can also be included in this task.

Does this task occur at your mill?

Yes No

Stock supplies

Janitors can be responsible for stocking general mill supplies. This task can include ordering, storing, and delivering materials.

Does this task occur at your mill?

Yes No



Operate vehicles

Janitors may use a mill vehicle to travel between buildings, or to deliver supplies and remove garbage.

Does this task occur at your mill?

Yes No

Job Profile

Date: _____

Company Name: _____

Division: _____

Employee Name: _____

Supervisor: _____

Phone: _____

Fax: _____

Is a Return-to-Work (RTW) strategy in place? Yes No

If yes, check all that apply: Modified Job Modified Worksite Graduated RTW

Describe:

Length of shift _____ hours

Formal breaks

- Two 10 minute breaks
- One 30 minute lunch break
- Other: _____

Informal breaks

- Yes, length of break varies
- Yes, _____ minutes/shift

Work pace control

- Self – paced
- Time pressure (e.g. completing a task during the 30 minute lunch break)
- Other: _____

Job rotation

Describe:

Yes No

Work Organisation

Task Description

The table below contains a list of tasks performed by a Janitor. Use the left column to check off tasks that are present at your mill. Estimate the *Percent of Shift* each task is performed and place a check mark in the appropriate column. The *Comments* section may be used to include information related to duration, frequency, and cycle times. Further tasks can also be included under *Other*.

Task	Percent of Shift				Comments
	Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Clean floors</i>					<ul style="list-style-type: none"> • <i>Performed daily in most/all common areas</i> • <i>Can include sweeping, mopping, handscrubbing, and vacuuming</i> • <i>Typically interspersed with other Janitor tasks</i> • <i>Cycle time = 2 hours to 4 hours</i>
<i>Clean surfaces</i>					<ul style="list-style-type: none"> • <i>Performed daily in most/all common areas</i> • <i>Can include spraying, wiping, and scrubbing</i> • <i>Cleaning lower areas can require kneeling</i> • <i>Interspersed with other tasks</i> • <i>cycle time = 0.5 hours to 2 hours</i>
<i>Remove garbage</i>					<ul style="list-style-type: none"> • <i>Cycle time = <0.5 hours</i>
<i>Carry equipment</i>					<ul style="list-style-type: none"> • <i>Interspersed with other tasks</i> • <i>Cycle time = 0.5 hours to 1 hour</i>
<i>General maintenance</i>					<ul style="list-style-type: none"> • <i>Cycle time = <0.5 hours</i>
<i>Stock supplies</i>					<ul style="list-style-type: none"> • <i>Typically follows regular schedule</i> • <i>Cycle time = 0.5 hours to 2 hours</i>
<i>Operate vehicle</i>					<ul style="list-style-type: none"> • <i>Generally short trips on-site</i> • <i>Cycle time = <0.5 hours</i>
<i>Other:</i>					

Workstation Characteristics

Dimensions & Layout

Sketch workstation(s) and indicate relevant measurements, such as working heights and reaches.

Flooring, Displays and Seating

The table below lists several components of a workstation. For *Flooring* and *Displays* there are several options provided. Please indicate all of the options that apply to the workstation. For the *Seating* section, describe and identify the features of the seat, if applicable. The *Comments* section may be used to include additional information, especially any workstation characteristics of concern.

Workstation Characteristics	Comments
<p>Flooring (<i>Check all that apply</i>)</p> <p><input type="checkbox"/> Cement</p> <p><input type="checkbox"/> Wood</p> <p><input type="checkbox"/> Rubber matting</p> <p><input type="checkbox"/> Metal</p> <p><input type="checkbox"/> Other _____</p>	
<p>Displays (<i>Check all that apply</i>)</p> <p><input type="checkbox"/> Lights on console</p> <p><input type="checkbox"/> Mirrors</p> <p><input type="checkbox"/> Video monitors</p> <p><input type="checkbox"/> Computer monitors</p> <p><input type="checkbox"/> Scrolling display</p> <p><input type="checkbox"/> Signal lights</p> <p><input type="checkbox"/> Other _____</p>	
<p>Seating (<i>Check all that apply</i>)</p> <p><input type="checkbox"/> Armrests</p> <p><input type="checkbox"/> Backrest</p> <p><input type="checkbox"/> Swivel seat</p> <p><input type="checkbox"/> Slide track</p> <p><input type="checkbox"/> Lumbar support</p> <p><input type="checkbox"/> Foot rest</p> <p><input type="checkbox"/> Casters # _____</p> <p><i>Indicate if adjustable:</i></p> <p><input type="checkbox"/> Height</p> <p><input type="checkbox"/> Armrests</p> <p><input type="checkbox"/> Backrest</p> <p><input type="checkbox"/> Forward tilt</p>	<p>Height of seat: _____ cm</p> <p>Depth of seat: _____ cm</p> <p>Width of seat: _____ cm</p> <p>Covering type: _____</p>

Equipment & Machinery Controls

The table below contains a list of the types of controls used by a Janitor. Use the left column to check off controls that are present at the work site. Highlight controls that may aggravate the injury, or which the worker finds difficult to use. The *Comments* section may be used to include any additional information. Further controls can be included under *Other*.

Type of Control	Function	Comments	
	<i>Toggle switch</i>	<ul style="list-style-type: none"> • <i>Operate vacuum</i> • <i>Operate floor buffer</i> 	<ul style="list-style-type: none"> • <i>Control not frequently used</i>
	<i>Other:</i>		
	<i>Other:</i>		

Physical Demands

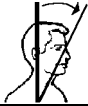

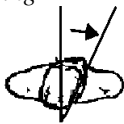

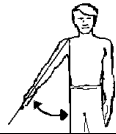

Whole Body Physical Demands

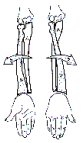

Identify each of the physical demands required by a Janitor and list the corresponding tasks in the second column. Check off (✓) the estimated *Percent of Shift*, and use the *Comments* section to include information related to duration, frequency, and cycle times.

Physical Demands	Tasks or Activity	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Kneeling</i>	<ul style="list-style-type: none"> Clean surfaces 			✓		<ul style="list-style-type: none"> Observed when cleaning lower surfaces Can be for extended duration
<i>Walking</i>						
<i>Sitting</i>						
<i>Standing</i>						
<i>Climbing</i>						
<i>Balancing</i>						
<i>Kneeling/ Crouching</i>						
<i>Other:</i>						





Body Postures





The table below outlines the body postures that may be adopted throughout the shift by a Janitor, related to tasks. Check off (✓) the estimated *Percent of Shift*, and use the *Comments* section to include information describing posture duration, frequency, cycle times, and hand used.

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Shoulder Flexion</i>	• <i>Clean floors</i>		✓			• <i>Repetitive shoulder flexion (both arms) while sweeping and mopping</i>
Neck						
<i>Flexion</i> 						
<i>Extension</i> 						
<i>Twisting</i> 						
Shoulder						
<i>Flexion</i> 						
<i>Abduction/adduction</i> 						
<i>Extension</i> 						

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Forearm						
<i>Rotation</i> 						
Wrist						
<i>Wrist Movements</i> 						
Hand/Fingers						
<i>*Handling</i>						
<i>*Fingering</i>						
<i>*Gripping</i>						

Legend for Hand/Fingers

<i>Handling</i>	<i>grasping, turning, holding, etc.</i>			
<i>Fingering</i>	<i>picking, pinching, etc.</i>			
<i>Gripping</i>	<i>Power</i> 	<i>Pinch</i> 	<i>Hook</i> 	<i>Precision</i> 

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back						
<i>Flexion</i> 						
<i>Lateral Flexion</i> 						
<i>Twisting</i> 						
<i>Extension</i> 						

Manual Material Handling

The table below contains a list of general manual material handling activities performed by a Janitor. Indicate tasks that require one or more of these activities, and fill in the weight of the objects, or the force required, for each action. Check off (✓) the estimated *Percent of Shift*, and use the *Comments* section to include information related to duration, frequency, cycle times, and characteristics of objects handled.

Activity	Task Description	Weight (kg)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Pushing</i>							
<i>Pulling</i>							
<i>Lifting</i>							
<i>Lowering</i>							
<i>Carrying</i>							

Hand Tools

Indicate the hand tools used by a Janitor by placing a check mark (✓) in the far left column. Determine the weight of the hand tool and enter it in the appropriate column. Check off (✓) the estimated *Percent of Shift*, and use the *Comments* section to include information related to duration, frequency, cycle times, and characteristics of objects handled.

Type of Tool	Task(s)	Weight (kg)	Percent of Task				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Broom	<ul style="list-style-type: none"> Clean floors 	1.0 to 2.0					<ul style="list-style-type: none"> Frequently used Often carried between workstations
Mop	<ul style="list-style-type: none"> Clean floors 	1.0 to 4.0					<ul style="list-style-type: none"> Frequently used
Dust pan	<ul style="list-style-type: none"> Clean floors 	<1.0					<ul style="list-style-type: none"> Used for sweeping/cleaning
Shovel	<ul style="list-style-type: none"> Clean floors 	1.0 to 3.0					<ul style="list-style-type: none"> Used in some sweeping/cleaning tasks
Other:							
Other:							
Other:							

Environmental Conditions

Work Environment

The table below contains a list of environmental conditions that may be of concern. If any of these factors aggravate the injury, describe in the *Comments* section.

Factor	Comments
Vibration (<i>Indicate source</i>) <input type="checkbox"/> Seat <input type="checkbox"/> Floor <input type="checkbox"/> Tool <input type="checkbox"/> Other: _____	
Noise level	
Lighting level	
Other:	

Location of Workstation

The table below contains a list of potential work environments. Indicate with a check mark (✓) in the left column which of the work environments apply to the specific workstation. For example, the workstation may be inside a building with both a local fan and heater, exposed to the outside by a doorway that is always open. In this situation, 'Inside exposed', 'Heater present', and 'Fan present' would all be checked.

Work Environment	
	Outside uncovered
	Outside covered
	Inside enclosed
	Inside exposed
	Heater present
	Fan present

Temperature

The table below contains a list of the geographical regions of British Columbia. Indicate the appropriate region with a check mark (✓) in the left column. Refer to the regional map in Appendix A of the PDA.

Region	Avg. Max July/Aug	Avg. Min Dec/Jan	Extreme Max.	Extreme Min.
Vancouver Island	22.5 °C	-0.6 °C	36.1 °C	-18.8 °C
Southwestern BC	22.9 °C	0.4 °C	35.6 °C	-18.3 °C
Cariboo Chilcotin Coast	22.2 °C	-11.6 °C	36.4 °C	-42.5 °C
High Country	26.3 °C	-9.9 °C	39.6 °C	-39.7 °C
Okanagan Similkameen	26.5 °C	-8.4 °C	36.0 °C	-36.3 °C
Kootenay Country	26.2 °C	-6.7 °C	38.5 °C	-32.0 °C
British Columbia Rockies	24.7 °C	-12.3 °C	37.5 °C	-42.2 °C
North by Northwest	19.5 °C	-11.7 °C	32.9 °C	-38.1 °C
Peace River Alaska Highway	20.0 °C	-20.2 °C	34.6 °C	-47.7 °C

Personal Protective Equipment

The table below contains a list of the personal protective equipment (PPE). For the Janitor job at your mill, indicate with a check mark (✓) which of the PPE items are required.

Gloves Type:	Hard Hat	Leather Apron
Glove Liners	Steel-toed Boots	Dust Mask
Eye Protection	Hearing Protection	Seat Belt
Face Shield/Helmet	Life Jacket	Harness
Knee Pads	Other:	Other:

Appendix A – Regional Map



- | | |
|-----------------------------|--------------------------------|
| A - Vancouver Island | F - Kootenay Country |
| B - High Country | G - British Columbia Rockies |
| C - Southwestern BC | H - North by Northwest |
| D - Cariboo Chilcotin Coast | I - Peace River Alaska Highway |
| E - Okanagan Similkameen | |

Risk Factor Identification Checklist

Janitor

Purpose

The Risk Factor Identification Checklist for a Janitor is used to **identify** potential ergonomic risk factors. Keep in mind that the purpose of this checklist is only to **identify** potential ergonomic risk factors, **not** to assess them.

The checklist can be used as part of your ergonomic intervention process, when workers express concerns about their work environment, during regular workplace inspections and observations, or when conducting an accident or injury investigation. Ideally, management and worker representatives who have completed the IMIRP Occupational Health & Safety Committee and Supervisor Ergonomic Training Session should complete this checklist. Try to view different workers in the same occupation when completing the checklist. Some specific examples are given to help answer the questions.

Instructions

General

Except for the first two questions, all remaining questions will require an answer with an implied frequency. For appropriate questions indicate with a check mark whether the answer to the question is 'No' or 'Yes'. This way you will have a record indicating that all risk factors have been considered in the identification process.

If you indicate 'No', please continue to the next question. If the question refers to a situation which does not exist (e.g., there is no seating available), please indicate 'No' in the appropriate box and continue to the next question.

If your answer is 'Yes', please check the appropriate box and then circle the frequency ('S' for 'Sometimes' or 'O' for 'Often'). If you answer 'Yes – Sometimes', then this risk factor **may be** a potential area of concern. If you answer 'Yes – Often' then there is an increased likelihood that this risk factor **is** an issue. Each mill will be responsible for defining what 'Sometimes' and 'Often' will mean to them. It is important that all people who complete the checklist are consistent in how they determine if a risk factor occurs 'Sometimes' or 'Often'. Use the 'Comments' section to indicate specific tasks, or to make other notes about the direct risk factors.

Since ergonomic risk factors frequently occur in combinations, you may find similar questions in different sections. Answering all questions will ensure that the situations that involve combinations of ergonomic risk factors are identified. It is very important to recognise all risk factors that occur in the work area.

Please note that for some of the questions it will be beneficial to ask the worker for their input. Please take the opportunity to include the operator in the risk factor identification process as much as possible. Videotaping the job of interest and reviewing the checklist in a quiet area with the worker may allow for more discussion.

Summary Tables

At the end of each body part section, summarise your findings in the table provided. If any of the direct risk factor sections contain a 'Yes', indicate 'Yes' in the appropriate section of the summary table. Answer the questions referring to injury statistics and discomfort survey findings. If there are only 'No' answers in a direct risk factor section, indicate 'No' in the summary table for that section. Use the summary information to determine how you will use the Work Manual.

Risk Factor Identification Checklist – Janitor

Management Representative _____

Worker Representative _____

Date _____

Risk Identification completed:

<input type="checkbox"/> Before implementation of solutions
<input type="checkbox"/> After implementation of solutions

Job History		No	Yes	Comments
1	Are there records of musculoskeletal injuries or accidents to indicate a risk of musculoskeletal injury? (refer to Worksheet 1 in Implementation Guide)			
2	Are there worker comments to indicate a risk of musculoskeletal injuries? (refer to Worksheet 2 in Implementation Guide)			

Definitions

Force: Force is the amount of physical effort required by the person to do a task and/or maintain control of tools and equipment. The effort depends on the type of grip, object weight and dimensions, body posture, type of activity, surface of the object, temperature, vibration, duration of the task, and number of repetitions.

Repetition: Repetition is defined as similar or the same motions performed repeatedly. The severity of risk depends on the frequency of repetition, speed of the movement or action, the number of muscle groups involved, and the required force. Repetition is influenced by machine or line pacing, incentive programs, piecework, and deadlines.

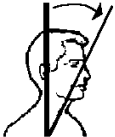
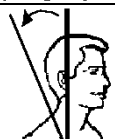
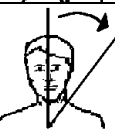

Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

Contact Stress: Contact stress is the contact of the body with a hard surface or edge. Contact stress can also result when using a part of the body as a hammer or striking instrument.

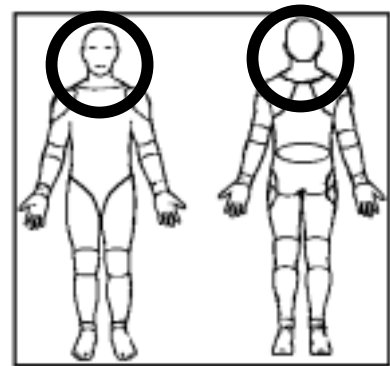
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

Vibration: Vibration is oscillation of a tool or surface. Vibration can be transmitted through the arm or through the whole body.

NECK

Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., looking up or down frequently)			S	
			O	
Ask the worker: Do you spend a large percentage of the day performing one action or task?			S	
			O	
Static Posture				
Ask the worker: Do tasks require your neck or shoulders to be maintained in a fixed or static posture? (e.g., looking down at floors for a long period of time while cleaning)			S	
			O	
Awkward Posture				
Flexion			S	
			O	
Extension			S	
			O	
Lateral Bending			S	
			O	
Rotation			S	
			O	



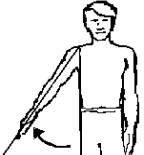
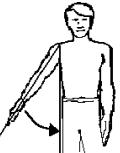
Please indicate whether the following direct risk factors were identified at the NECK .		
Direct Risk Factors	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Neck or Head/Eye or Upper Back? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Neck or Head/Eye or Upper Back? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No



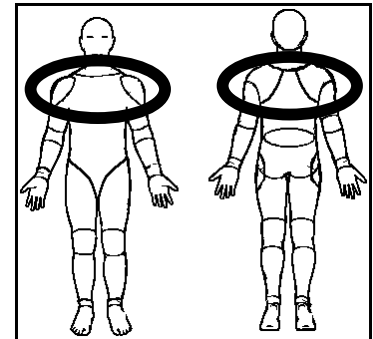
Body parts within the circled area will be classified as NECK issues.

SHOULDER

Force	N	Y	Comments:
Is forceful physical handling performed? Such as: Lifting		S O	
Lowering		S O	
Pushing		S O	
Pulling		S O	
Carrying		S O	
Repetition			
Are identical or similar motions performed over and over again? (e.g., shovelling, wiping)		S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., mopping floors)		S O	
Static Posture			
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., carrying water jugs)		S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., using a mop)		S O	




Awkward Posture		N	Y	Comments:
Flexion				S O
Extension				S O
Abduction				S O
Adduction				S O

Please indicate whether the following direct risk factors were identified at the SHOULDER .		
Direct Risk Factors	Force	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Shoulder or Neck or Upper Back? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Shoulder or Neck or Upper Back? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No



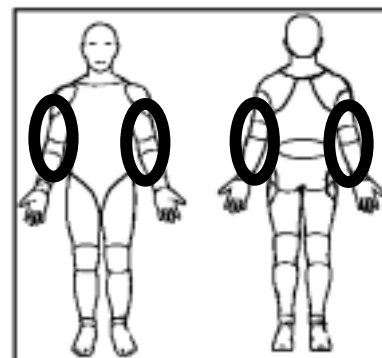
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

Force		N	Y	Comments:
Is forceful physical handling performed? Such as:			S	
Lifting			O	
Lowering			S	
			O	
Pushing			S	
			O	
Pulling			S	
			O	
Carrying			S	
			O	
Turning materials			S	
			O	
Are objects handled in a power grip? (e.g., mop, broom)			S	
			O	
Are objects handled in a pinch grip? (e.g., cloths, sponges)			S	
			O	
Are objects handled in a hook grip? (e.g., mop buckets)			S	
			O	
Ask the worker: Do you wear gloves while performing your job? If the answer is No , check the No box and go to next section.			*	S
				O
*If the answer to the above question is Yes , ask the worker: Are the gloves too large/small?				S
				O
Does the thickness of the gloves cause problems with gripping?				S
				O
Repetition				
Are identical or similar motions performed over and over again? (e.g., scrubbing, mopping)				S
				O
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., sweeping)				S
				O




Static Posture		N	Y	Comments:
Ask the worker: Do tasks require your hand and arm to be maintained in a fixed or static posture?			S O	
Ask the worker: Do you apply constant pressure on controls/objects with your hand?			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., waxing floors with power waxer)			S O	
Contact Stress				
Ask the worker: Do any objects, tools or parts of the workstation put pressure on any parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm, elbow? (e.g., hand tools that dig into the palm of the hand, metal edges of consoles or workstation digging into elbow)			S O	
Vibration				
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment? (e.g., power waxer)			S O	





Please indicate whether the following direct risk factors were identified at the ELBOW .	
Direct Risk Factors	Force <input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition <input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture <input type="checkbox"/> Yes <input type="checkbox"/> No
	Contact Stress <input type="checkbox"/> Yes <input type="checkbox"/> No
	Vibration <input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Elbow or Forearm? (see Worksheet 1 in the Implementation Guide)	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Elbow or Forearm? (see Worksheet 2 in the Implementation Guide)	<input type="checkbox"/> Yes <input type="checkbox"/> No



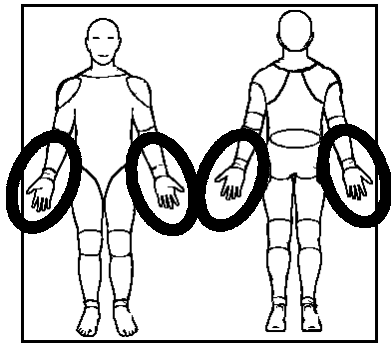
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

Force		N	Y	Comments:
Is forceful physical handling performed? Such as:			S	
Lifting			O	
Lowering			S	
			O	
Pushing			S	
			O	
Pulling			S	
			O	
Carrying			S	
			O	
Turning materials			S	
			O	
Are objects handled in a power grip? (e.g., mop, broom)			S	
			O	
Are objects handled in a pinch grip? (e.g., cleaning cloths, sponges)			S	
			O	
Are objects handled in a hook grip? (e.g., mop buckets)			S	
			O	
Ask the worker: Do you wear gloves while performing your job? If the answer is No , check the No box and go to next section.			*	S
				O
*If the answer to the above question is Yes , ask the worker: Are the gloves too large/small?				S
				O
Does the thickness of the gloves cause problems with gripping?				S
				O
Repetition				
Are identical or similar motions performed over and over again? (e.g., wiping windows clean)				S
				O
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., mopping)				S
				O

Static Posture		N	Y	Comments:
Ask the worker: Do tasks require any part of your arm or hand to be maintained in a fixed or static posture? (e.g., vacuuming, buffing floors)			S O	
Ask the worker: Do you apply constant pressure on controls/objects with your hand?			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods?			S O	
Contact Stress				
Ask the worker: Do any objects, tools or parts of the workstation put pressure on any parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm? (e.g., hand tools that dig into the palm of the hand)			S O	
Ask the worker: Do you use your hand like a hammer for striking? (e.g., prying open buckets)			S O	
Awkward Posture				
Flexion			S O	
Extension			S O	
Ulnar Deviation			S O	
Radial Deviation			S O	
Vibration				
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment? (e.g., pneumatic drill)			S O	





Please indicate whether the following direct risk factors were identified at the WRIST/HAND .		
Direct Risk Factors	Force	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Contact Stress	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Vibration	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Wrist or Hand/Finger or Forearm? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Wrist or Hand/Finger or Forearm? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No



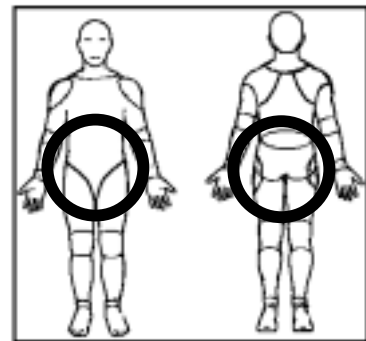
Body parts within the circled area will be classified as WRIST issues.

LOW BACK OR HIP/THIGH

Force	N	Y	Comments:
Is forceful physical handling performed? Such as: Lifting		S	
		O	
Lowering		S	
		O	
Pushing		S	
		O	
Pulling		S	
		O	
Carrying		S	
		O	
Repetition			
Are identical or similar motions performed over and over again? (e.g., mopping)		S	
		O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., bending to sweep)		S	
		O	
Static Posture			
Ask the worker: Do tasks require your trunk and upper body to be maintained in a fixed or static posture?		S	
		O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift?		S	
		O	
Contact Stress			
Ask the worker: Do any objects, tools or parts of the workstation put pressure on any parts of your hip/thigh? (e.g., obstructions that dig into the hip or thigh)		S	
		O	


Awkward Posture		N	Y	Comments:
Flexion			S O	
Extension			S O	
Lateral Bending			S O	
Twisting			S O	
Vibration				
Ask the worker: Is your whole body exposed to vibration for significant portions of the work shift? (e.g., standing on catwalks and machinery)			S O	

Please indicate whether the following direct risk factors were identified at the LOW BACK or HIP/THIGH .		
Direct Risk Factors	Force	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Contact Stress	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Vibration	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Low Back or Hip/Thigh? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Low Back or Hip/Thigh? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No

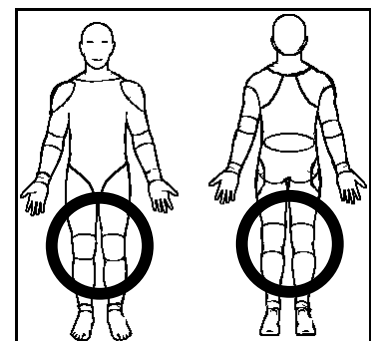


Body parts within the circled area will be classified as LOW BACK issues.

KNEE



Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., climbing stairs, crouching)			S O	
Static Posture				
Ask the worker: Do tasks require you to maintain your knee(s) in a fixed or static posture? (e.g., crouching to clean under tables)			S O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift?			S O	
Do workers kneel (with one or both knees)? (e.g., cleaning low areas)			S O	
Contact Stress				
Ask the worker: Do any objects or parts of the workstation put pressure on your knee(s)? (e.g., kneeling on hard surfaces)			S O	
Awkward Posture				
Extreme Flexion			S O	

Please indicate whether the following direct risk factors were identified at the KNEE .		
Direct Risk Factors	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Contact Stress	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Knee or Hip/Thigh? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Knee or Hip/Thigh? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No

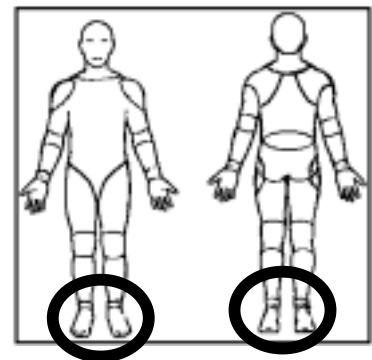


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., walking on uneven surfaces)			S O	
Static Posture				
Are workers required to stand in a stationary position for long periods of time during the shift?			S O	
Awkward Posture				
Flexion			S O	
Extension			S O	
Vibration				
Ask the worker: Is your whole body exposed to vibration for significant portions of the work shift? (e.g., standing on catwalks)			S O	

Please indicate whether the following direct risk factors were identified at the ANKLE/FOOT .		
Direct Risk Factors	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Vibration	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports for the Ankle or Foot? (see Worksheet 1 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Discomfort Survey investigation, were there reports of discomfort for the Ankle or Foot? (see Worksheet 2 in the Implementation Guide)		<input type="checkbox"/> Yes <input type="checkbox"/> No



Body parts within the circled area will be classified as ANKLE/FOOT issues.

CHARACTERISTICS OF OBJECTS BEING HANDLED

	N	Y	Comments:
Are there problems handling a load due to its size or shape? (e.g., water jugs, supply boxes)		S O	
Are there problems handling a load due to its fragile, unbalanced, or non-rigid conditions? (e.g., garbage bags)		S O	
Ask the worker: Do you experience situations where mechanical aids or equipment are not readily available to assist with manipulating an object? (e.g., carrying mop buckets up stairs)		S O	
Are handles for tools and equipment inappropriate in terms of size or shape? (e.g., mop buckets)		S O	
Ask the worker: Do any objects that you work with (other than tools or equipment) have handles? If the answer is No , check the No box and go to the next section.		S O	
If the answer to the above question is Yes , ask the worker: Are the handles an inappropriate size or shape for the characteristics of the object?		S O	

ENVIRONMENTAL CONDITIONS

Temperature			
Ask the worker: Are your hands or arms exposed to cold from exhaust air, cold liquids or solids? (e.g., cleaning walks in winter, filling buckets)		S O	
Ask the worker: Are you exposed directly to temperature extremes that may cause you to use more force or cause you to fatigue quicker than normal? (e.g., hot or cold, either by equipment or natural environment)		S O	
Lighting			
Ask the worker: Do you assume awkward postures to overcome problems associated with glare, inadequate lighting, or poor visibility?		S O	

ENVIRONMENTAL CONDITIONS [CONTINUED]

Noise	N	Y	Comments:
Have there been complaints on the level of noise in the work area?		S O	
Ask the worker: Are there any distracting or annoying noises at the workstation? (e.g., air hoses)		S O	

WORK ORGANISATION

	N	Y	Comments:
Is the work externally-paced or controlled by a machine or the process?		S O	
Do peak workloads or sudden increases in pace occur with the tasks? (e.g., cleaning spills, delivering supplies)		S O	
Ask the worker: Are there indications of excessive fatigue or pain, or symptoms of adverse health effects, due to extended work days or overtime? (e.g., extended weekend cleaning)		S O	
Ask the worker: Are there indications of excessive fatigue or adverse health effects due to shiftwork?		S O	
Ask the worker: Are rest periods or task variety insufficient to prevent the build-up of fatigue or the risk of adverse health effects?		S O	
Ask the worker: Are tasks in a job rotation program similar to one another, and therefore not providing a variation in movements?		S O	

Work Manual

**Industrial
Musculoskeletal
Injury
Reduction
Program**



Janitor

This Work Manual contains information about the body parts found to be at risk of musculoskeletal injury (MSI) for the Janitor (Injury Education), and how to reduce the risk of MSIs using various control measures (Injury Prevention). Each Work Manual is intended to help Occupational Health and Safety Committee members establish effective solutions to reduce MSIs, and as a resource for workers to understand the MSI risks that they may encounter on the job.

The Body Manual, referenced throughout the Work Manual, is a separate document that contains information on how to prevent common MSIs through exercise. Please note exercises described in the Body Manual should only be used after consulting a healthcare practitioner.

The General Risk Factor Solutions Manual, referenced throughout the Work Manual, is a separate document that contains general, preventative information on Environmental Conditions and Work Organisation issues.

Work Manual

Janitor

Disclaimer

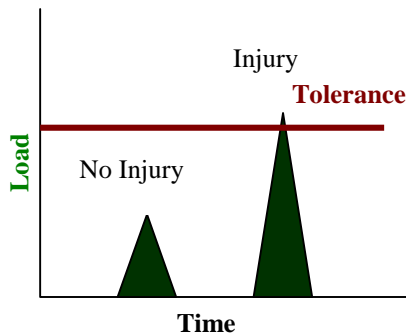
The BC sawmill IMIRP documents were developed by Advanced Ergonomics Inc. (AEI) based on analyses conducted in a number of voluntary, participating sawmills in British Columbia and should be considered applicable only to the BC sawmill industry. Modification to these documents may reduce their usefulness and/or lead to hazardous situations. Individuals or committees wishing to make Physical Demands Analyses (PDAs) site-specific, or wishing to implement options from the Work Manuals, are advised to first complete the two-day OHSC and Supervisors Ergonomics Training Session. Modifications to a PDA must be within the scope of competence of those individuals making the changes and must be reported to any rehabilitation professional using the PDA. Neither AEI nor the IMIRP Society accepts any responsibility for the use or misuse of these documents.

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Injury Education

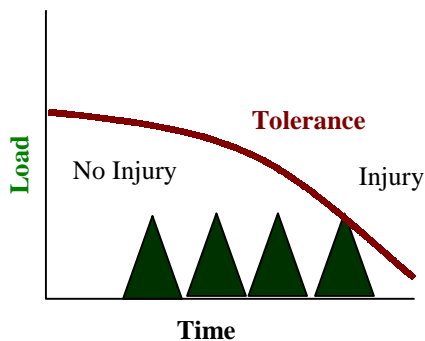
*Injuries occur when ...
Loads exceed tissue tolerances*



Excessive Force

This type of injury occurs from a single event, where the loads or forces are so great they exceed tissue tolerances and cause an immediate injury. This type of injury is more common with trips and falls.

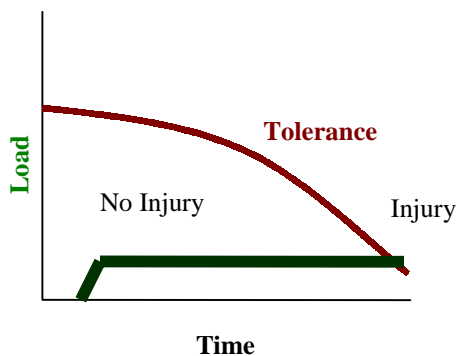
Example – a worker going over on their ankle and spraining it.



Excessive Repetition

This type of injury occurs from repeated loading weakening tissue to the point of failure. It progresses slowly to the point where a subfailure load can cause an injury. This type of injury is more common with repetitive tasks.

Example – a worker pulling lumber off a chain developing a herniated disc.



Excessive Duration

This type of injury occurs from constant loading weakening tissue to the point of failure. This type of injury is more common with tasks that require workers to adopt static or awkward postures for extended periods.

Example – a Grader developing neck tension.

Body Parts at Risk

The previous page on injury education explains how injuries can occur. The Injury Education section of this Work Manual expands on these principles, relating them to the specific body parts at risk of being injured.

After all of the appropriate information is collected during the investigation of the Janitor job (i.e., injury statistics, discomfort surveys, results from the Identification Checklist), the next steps are to:

1. Match the body parts of concern from your investigation to those described in this section of the Work Manual.
2. Note the direct risk factors associated with each body part of concern.
3. Read the information on the page and try to understand why a body part, in combination with each of the direct risk factors, is of concern.
4. Discover which indirect risk factors are associated with a particular body part problem and the headings under which they are found in the Injury Prevention section of the Work Manual.
5. Note the consequences of the direct risk factor relative to a body part.
6. Note where the potential solutions can be found within the Injury Prevention section of the Work Manual. In addition, for many of the body parts, a reference may be provided to refer to specific sections of the Body Manual.

At the end of the Body Parts at Risk Section, there is a summary page of all the body parts of concern for the Janitor. In addition, a reference table, with a summary of the direct and indirect risk factors by body part, is provided.

In the last section on Injury Prevention, the Work Manual discusses specific solution options for each of the body parts at risk.

Major Risk Identification

IMIRP ergonomists have assessed the Janitor position and found that the Low Back, Neck/Shoulder, and Elbow/Wrist are the body parts of primary concern. Focussing on solutions that target these body areas will likely reduce the greatest risks associated with this job.

Low Back: Major risks include awkward postures and forceful exertions while lifting loads, and repetitive awkward postures while using hand tools or working in confined areas. Static back postures also occur while cleaning

The following solutions are targeted at reducing the risk of injury to the low back:

1. Trunk support (page 73)
2. Foot scrubbing (page 75)
3. Floor drains (page 75)
4. Tap hoses (page 75)

Neck/Shoulder: Major risks include repetitive awkward motions of the unsupported arms, often with force, while cleaning various surfaces.

The following solutions are targeted at reducing the risk of injury to the neck and shoulder:

1. Slide-out drawers (page 72)
2. Carts and dollies (page 78)
3. Alternate arm use (page 79)

Elbow/Wrist: Major risks include forceful exertions while carrying loads, as well as repetitive awkward postures, with grip force, when using hand tools.

The following solutions are targeted at reducing the risk of injury to the Elbow/Wrist:

1. Transverse tool handles (page 79)
2. Tool handle grips (page 80)
3. Gloves (page 80)

For additional stretching and strengthening exercises that would benefit a Janitor refer to the Low Back, Neck/Shoulder, and Elbow/Wrist sections of the Body Manual.

NECK

Direct Risk Factors:
Awkward Posture
Static Posture



A Janitor may hold the head forward or to the side in order to inspect worksurfaces and storage locations.

Working on tasks with obstructed views, such as cleaning inside microwave ovens, or underneath tables, can lead to increased levels and duration of awkward neck posture.

BACKGROUND INFORMATION

- A number of smaller muscles around the neck produce the forces necessary to support and move the head. These muscles remain relatively relaxed when the head is balanced over the spine (neutral posture). The neutral posture occurs when the head is upright, and the ears and shoulders are aligned.

DIRECT RISK FACTORS

Awkward Posture

- Neck muscles must support the weight of the head while in a forward or side bent position. The more the neck is bent, the greater the load on the muscles and tendons.

Static Posture

- When the neck is held in a forward or side bent position, the muscles of the neck must remain tense to support the weight of the head. With no time allowed for recovery, the constant state of tension in the neck muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, the tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the soft tissues of the neck, especially the muscles, is increased because the head is held in a forward or side bent position while inspecting low worksurfaces, such as floors and shelves.

Environmental Conditions

Lighting

- Loading on the muscles and soft tissues of the neck is increased because the head is held in awkward postures for extended duration while inspecting worksurfaces in poorly-lit locations, such as under tables and inside cabinets.

CONSEQUENCES

- When the head is held in a forward or side bent posture, muscles and soft tissues of the neck may fatigue. Fatigue leads to an accumulation of waste products and/or a decrease in the ability to tolerate additional stress.
- Signs and symptoms include pain, tenderness, muscle spasm in the neck area, and headaches.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Neck, please see the column labelled “Neck” in the Summary of Solutions on pages 82 to 84.
- For exercises that can help to prevent *neck* injuries, see the *Neck section of the Body Manual*.

NECK/SHOULDER

Direct Risk Factors:

Force
Awkward Posture
Repetition



A Janitor frequently works with the arms away from the body in order to clean floors and surfaces, carry equipment, and stock supplies.

Activities that require higher forces such as wet mopping or floor buffing, are the main tasks of concern.

BACKGROUND INFORMATION

- The neck and shoulder regions work together to produce certain movements, or to hold certain postures. The larger muscles of the neck and upper back (e.g., trapezius) elevate the shoulders, and the larger muscles of the shoulders (e.g., deltoids) raise the arms. Deeper muscles stabilise the shoulder joint, as well as produce movement. These deeper muscles and their tendons are referred to as the rotator cuff.

DIRECT RISK FACTORS

Force

- The rotator cuff stabilises the shoulder joint when objects are pushed and pulled. The heavier the object, or the larger the force required, the greater the load on the rotator cuff.
- If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur.

Awkward Posture

- Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on the muscles and tendons.

Repetition

- When the arms are repeatedly lifted, the muscles of the neck and shoulder are subjected to repeated stress with little or no time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the tissues of the shoulder and upper back is increased when working with the arm raised to heights above the shoulder, such as when cleaning upper shelves or light fixtures.

Working Reaches

- Loading on the tissues of the shoulder and upper back is increased when working with the arm raised and extended in the forward direction, such as when cleaning windows or walls.

CONSEQUENCES

- When working with the arms away from the body, muscles and soft tissues of the neck and shoulder may fatigue. Fatigue leads to an accumulation of waste products and/or a decrease in the ability to tolerate additional stress.
- Signs and symptoms include pain, tenderness, muscle spasm in the neck and shoulder area, and headaches.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Neck/Shoulder, please see the column labelled “Neck/Shoulder” in the Summary of Solutions on pages 82 to 84.
- For exercises that can help to prevent *neck* and *shoulder* injuries, see the *Neck* and *Shoulder sections of the Body Manual*.

ELBOW/WRIST

Direct Risk Factors:

Force
Awkward Posture
Repetition



A Janitor may grip many different objects and hand tools when carrying and stocking supplies, and when performing clean-up duties.

The risk of injury increases when handling heavy objects, possibly with poor or nonexistent handles, leads to overgripping and larger loads on the tissues of the forearm and elbow.

BACKGROUND INFORMATION

- Muscles used for gripping are found in the forearm. The tendons of these muscles cross over the elbow and the wrist joints before connecting to bones. The elbow area may be affected by tension generated in the forearm muscles.

DIRECT RISK FACTORS

Force

- Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection.

Awkward Posture

- The width of an object affects how much muscle tension needs to be generated. There is an optimal grip width where the forearm muscles work efficiently. Outside this width, muscles have to work harder to generate equivalent tension. Consequently, objects that are too large (e.g., large cuts of wood) or too small (e.g., narrow tool handles) could increase the tension generated by muscles, and lead to tissue fatigue at the tendon/bone connection.

- The position of the wrist also affects how much muscle tension needs to be generated. There is an optimal wrist position where the forearm muscles work efficiently. This occurs when the wrist is in its natural relaxed (neutral) position. Bending the wrist forward or backward deviates from this position, and the forearm muscles have to work harder to maintain the grip. Consequently, gripping objects with the wrist bent increases the tension generated by muscles, and could lead to tissue fatigue at the tendon/bone connection.

Repetition

- Repeated stress to the elbow without adequate rest could slowly fatigue tissues to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Loading on the tissues of the elbow and forearm is increased when Janitors are required to overgrip large, awkward containers to maintain control of the load.
- Increased loads are placed on the tissues of the back when heavy objects can only be carried on one side of the body, due to the object design. For Janitors, this includes carrying mop buckets and shop vacuums.

Container, Tool, and Equipment Handles

- Tool handles that are too wide or too narrow can result in grip spans that are outside the preferred range. Working with these overly small or large grip spans requires excess force, which can lead to muscle fatigue and injury.
- The design of tool handles can result in awkward wrist postures for the Janitor.

CONSEQUENCES

- Repeated forceful gripping may lead to fatigue at the tendon/bone connection near the elbow, as well as in the muscles of the forearm.
- Signs and symptoms include pain in the elbow area and decreased grip strength.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Elbow/Wrist, please see the column labelled “Elbow/Wrist” in the Summary of Solutions on pages 82 to 84.
- For exercises that can help to prevent *elbow* injuries, see the *Elbow section of the Body Manual*.

LOW BACK

Direct Risk Factors:

Force
Awkward Posture



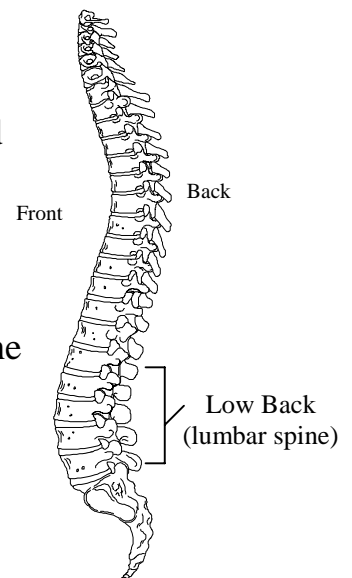
A Janitor may lift, lower, and carry loads.

Handling large, awkward loads, such as a full mop bucket, is the main injury risk. Lifting and lowering loads to extreme heights and/or reaches increases this risk.

BACKGROUND INFORMATION

- The spine is made up of 33 bones called vertebrae. Each of these vertebrae is specially designed to protect the spinal cord and provide support for the back. Between each of the vertebrae are discs. Discs have tough elastic walls that are filled with a watery gel-like substance. These discs are like jelly donuts; when they are pressed down on one side, the other side bulges and puts increased pressure on the wall of the disc. To maintain an even distribution of pressure across the discs, the spine has to be kept in the neutral posture.

Neutral Spine



DIRECT RISK FACTORS

Force

- Lifting increases the loading on the spine. Weight held in the hands is transmitted to the low back. The greater the weight, the greater the loading on the structures of the low back.

Awkward Posture

- Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Increased loading is placed on the tissues of the back when lifting and lowering heavy loads at heights that require bent postures of the trunk. For Janitors, this work can include handling supplies and removing garbage.

Working Reaches

- Increased loads are placed on the soft tissues of the back when handling heavy loads at distances that require bent postures of the trunk. These tasks can include handling supplies and removing garbage for Janitors.

Characteristics of Objects Being Handled

Size and Shape

- Loading on the tissues of the back is increased when Janitors are required to handle large, awkward containers that cannot be carried close to the body.
- Increased loads are placed on the tissues of the back when heavy objects can only be carried on one side of the body, due to the object design. For Janitors, this includes carrying mop buckets and shop vacuums.

Load Condition and Weight Distribution

- Loading on the tissues of the back is increased when Janitors are required to generate excess force to maintain trunk posture and control non-rigid loads, such as full mop buckets and full garbage bags.

CONSEQUENCES

- Bending forward or to the side may lead to damage in the disc walls, as well as fatigue in the other soft tissues of the back. Heavy loading increases the rate of this fatigue, and subsequently the potential for injury.
- Signs and symptoms may include muscle spasm and sharp or radiating pain in the back and/or lower extremities.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Back, please see the column labelled “Back” in the Summary of Solutions on pages 82 to 84.
- For exercises that can help to prevent *back* injuries, see the *Back section of the Body Manual*.

LOW BACK

Direct Risk Factors:
Awkward Posture
Static Posture
Repetition



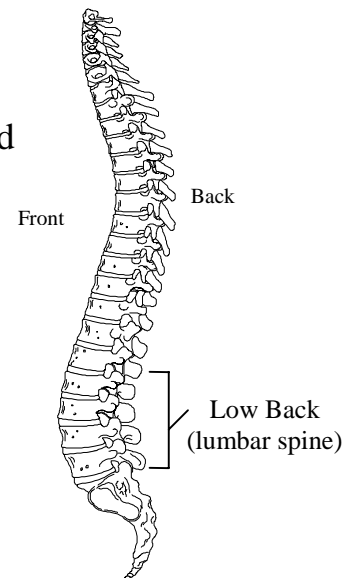
A Janitor frequently bends down and/or to the side to clean floors and surfaces.

Static back posture is also maintained for many tasks, increasing the risk of injury.

BACKGROUND INFORMATION

- The spine is made up of 33 bones called vertebrae. Each of these vertebrae is specially designed to protect the spinal cord and provide support for the back. Between each of the vertebrae are discs. Discs have tough elastic walls that are filled with a watery gel-like substance. These discs are like jelly donuts; when they are pressed down on one side, the other side bulges and puts increased pressure on the wall of the disc. To maintain an even distribution of pressure across the discs, the spine has to be kept in the neutral posture.

Neutral Spine



DIRECT RISK FACTORS

Awkward Posture

- Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs.

Static Posture

- Holding a forward or side bending posture can gradually fatigue the structures of the low back. If the duration of the static posture is excessive, and recovery is not adequate, the muscles of the lumbar spine will fatigue, possibly leading to injury.

Repetition

- Repeated forward and/or side bending can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, the disc walls may fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the soft tissues of the back is increased because the torso is held in a forward or side bent position while cleaning and inspecting low worksurfaces, such as floors and shelves.

Working Reaches

- Loading on the soft tissues of the back is increased because the torso is held in a forward or side bent position while cleaning and inspecting under horizontal surfaces, such as tables and cabinets.

Environmental Conditions

Lighting

- Loading on the soft tissues of the back is increased because the torso is held in a forward or side bent position for extended periods while cleaning and inspecting worksurfaces in poorly-lit areas, such as under tables and in cabinets.

CONSEQUENCES

- Repeatedly bending forward/to the side may lead to damage in the disc walls, as well as fatigue and possible injury in other soft tissues of the back.
- Signs and symptoms may include muscle spasm and sharp or radiating pain in the back and/or lower extremities.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Back, please see the column labelled “Back” in the Summary of Solutions on pages 82 to 84.
- For exercises that could help to prevent **back** injuries, see the ***Back section of the Body Manual.***

KNEE



Direct Risk Factors:

Awkward Posture
Static Posture
Contact Stress
Repetition

A Janitor frequently squats and/or kneels in order to clean low surfaces, or to scrub marks and stains off floors by hand.

BACKGROUND INFORMATION

- At the knee joint, the kneecap (patella) is held in place over the thighbone (femur) by connective tissue. When the leg is straight, there is little or no contact between these two bones. However, as the knee bends, the kneecap can come into contact with the thighbone.

DIRECT RISK FACTORS

Awkward & Static Posture

- Bending the knee increases the contact stress between the kneecap and the thighbone. Contact stress increases significantly when the knee is bent over 90 degrees.

Contact Stress

- Kneeling on a hard surface increases the contact stress between the kneecap and the thighbone.

Repetition

- Repeated squatting and kneeling may gradually irritate the knee. Irritation of the knee may lead to muscle wasting, which in turn leads to poor tracking of the knee cap on the thigh bone and increased contact stress between these bones.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Squatting and kneeling occurs because workers have to clean and inspect surfaces at low heights.

Floor Surfaces

- Workers typically kneel on hard floor surfaces like wood or metal, which increases contact stress on the knee.

CONSEQUENCES

- Repeated squatting and kneeling could cause inflammation under the kneecap, which may cause pain and may change the mechanics of kneecap tracking. Changes in kneecap tracking may lead to premature wear of the kneecap and/or the thighbone.
- Signs and symptoms include muscle wasting around the inner knee, creaking in the knee, and chronic pain if left unchecked.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Knee, please see the column labelled “Knee” in the Summary of Solutions on pages 82 to 84.
- For exercises that could help to prevent *knee* injuries, see the *Knee section of the Body Manual*.

FOOT

Direct Risk Factors:
Repetition
Vibration



A Janitor may walk on a hard, vibrating surface in order to move through different areas of the mill.

Frequent stairclimbing can also place increased loading on the tissues of the feet.

BACKGROUND INFORMATION

- There are a number of small muscles in the base of the foot, as well as a tough band that attaches to the heel bone and runs down towards the toes. This band is called the plantar fascia, and it contributes to the arch in our feet.

DIRECT RISK FACTORS

Repetition

- During walking, impact between the ground and the feet loads the plantar fascia. If the duration of walking is excessive, and recovery is not adequate, the fascia may fatigue to the point of injury.

Vibration (whole body)

- Vibrating floors can increase the loading on the foot. Factors like vibration level and vibration frequency increase the amount of loading on the foot, and could lead to irritation. The longer the Janitor is exposed to vibration, the greater the risk of injury.

INDIRECT RISK FACTORS

Workstation Design

Floor Surfaces

- Loading on the feet can be increased when walking or standing on uneven floor surfaces.

CONSEQUENCES

- Continual walking may cause damage to the plantar fascia.
- Signs and symptoms include pain and stiffness at the base of the heel, initially in the morning. As the problem progresses the pain may become chronic.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Foot, please see the column labelled “Foot” in the Summary of Solutions on pages 82 to 84.
- For exercises that can help to prevent *foot* injuries, see the *Foot section of the Body Manual*.

Summary of Body Parts at Risk

NECK

- A Janitor may hold the head forward or to the side in order to inspect worksurfaces and storage locations.
- Working on tasks with obstructed views, such as cleaning inside microwave ovens or underneath tables, can lead to increased levels and duration of awkward neck posture.



NECK/SHOULDER

- A Janitor frequently works with the arms away from the body in order to clean floors and surfaces, carry equipment, and stock supplies.
- Activities that require higher forces, such as wet mopping or floor buffing, are the main tasks of concern.



ELBOW/WRIST

- A Janitor may grip many different objects and hand tools when carrying and stocking supplies, and when performing clean-up duties.
- The risk of injury increases when handling heavy objects, possibly with poor or nonexistent handles, leads to overgripping and larger loads on the tissues of the forearm and elbow.



LOW BACK

- A Janitor may lift, lower, and carry loads.
- Handling large, awkward loads, such as a full mop bucket, is the main injury risk. Lifting and lowering loads to extreme heights and/or reaches increases this risk.



LOW BACK

- A Janitor may lift, lower, and carry loads.
- Handling large, awkward loads, such as a full mop bucket, is the main injury risk. Lifting and lowering loads to extreme heights and/or reaches increases this risk.



KNEE

- A Janitor frequently squats and/or kneels in order to clean low surfaces, or to scrub marks and stains off floors by hand.



FOOT

- A Janitor frequently squats and/or kneels in order to clean low surfaces, or to scrub marks and stains off floors by hand.



Risk Factors by Body Part

Direct Risk Factors	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle/ Foot	Foot
Force		✓		✓			✓				
Repetition		✓		✓			✓		✓		✓
Awkward Postures	✓	✓		✓			✓		✓		
Static Postures	✓						✓		✓		
Contact Stress									✓		
Vibration – Whole body*											✓
Vibration - Hand Transmitted*											

Indirect Risk Factors		Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle/ Foot	Foot
Duration*	Duration	✓	✓		✓			✓	✓			✓
Workstation Design	Working Reaches		✓					✓				
	Working Heights	✓	✓					✓	✓			
	Seating											
	Floor Surfaces								✓			✓
Characteristics of Objects Being Handled	Size and Shape				✓			✓				
	Load Condition and Weight Distribution							✓				
	Container, Tool and Equipment Handles				✓							
Environmental Conditions	Heat Exposure	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Cold Exposure	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Lighting	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Noise	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Vibration**	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Work Organisation	Work-Recovery Cycles	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Task Variability	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Work Rate	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

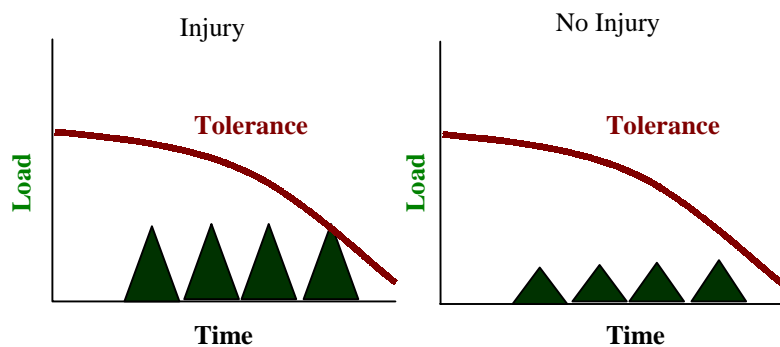
* Extended exposure to any risk factor can increase the likelihood of injury. For solutions designed to decrease the duration of exposure to any risk factor please refer to the Work Organisation section of the General Risk Factor Solutions Manual

** Vibration is categorised under both direct and indirect risk factors. Vibration can directly increase the likelihood of injury to the back and wrist as well as indirectly (environmental conditions) promote injuries in other parts of the body.

- = Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.
- ◆ = Indicates that the risk factor assessed is commonly found in sawmills, and may need to be addressed at your mill. See the appropriate section of the General Risk Factor Solutions Manual for more information.
- ✓ = Indicates that the risk factor was assessed as a contributor to the body part problem. Please see the Summary of Solutions Table on pages 82 to 84 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

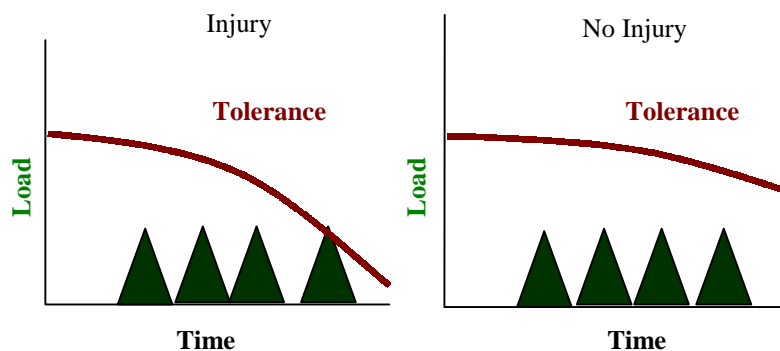
Injury Prevention

*Injuries are prevented by ...
Decreasing loads and increasing tissue tolerances*



Injuries may be avoided by decreasing the size of the loads on the tissue.

Example – using a torque multiplier wrench to loosen bolts.



Injuries may be avoided by increasing tissue tolerances, and allowing the body to endure more loading.

Example – using maintenance exercises to strengthen tissues.

Suggested Solutions

The previous page explains how injuries may be prevented by decreasing the load on a tissue or by increasing the tissue tolerances. The Injury Prevention section of the Work Manual provides possible solutions that can be implemented to decrease the size of the loads on the tissues.

Each of the solutions described in the Work Manual has a risk control icon. The Risk Control Key provides guidelines on how to distinguish between different types of risk controls. Generally, engineering, administrative, and work practice controls are considered more effective than the use of personal protective equipment to decrease the risk of musculoskeletal injuries.

The focus of the Injury Prevention section is on solutions developed following the ergonomic investigation of the Janitor job. The solutions are presented under the headings of Workstation Design, Characteristics of Objects Being Handled, Environmental Conditions, and Work Organisation.

The Summary of Solutions table provides a quick reference guide to solutions for specific body part problems.

Please note that the information provided in the Body Manual addresses the issue of injury prevention in terms of increasing tissue tolerances through exercise. This information is not provided in the Work Manual.

Risk Control Key

Risk control measures (solutions) are commonly grouped into four categories:

E

ENGINEERING CONTROLS

These include physical changes to workstations, equipment, materials, production facilities, or any other relevant aspect of the work environment, that reduce or prevent exposure to risk factors.

A

ADMINISTRATIVE CONTROLS

These include any change in procedure that significantly limits daily exposure to risk factors, by control or manipulation of the work schedule or manner in which work is performed. Administrative controls include, but are not limited to, job rotation, rest breaks, alternative tasks, job enlargement, redesign of work methods, and adjustment of work pace or output. Some models of risk control include work practice controls within this category.

WP

WORK PRACTICE CONTROLS

These include techniques used to perform the tasks of a job, such as reaching, gripping, using tools and equipment, or discarding objects, etc. Education and training are an integral part of work practice controls.

PPE

PERSONAL PROTECTIVE EQUIPMENT

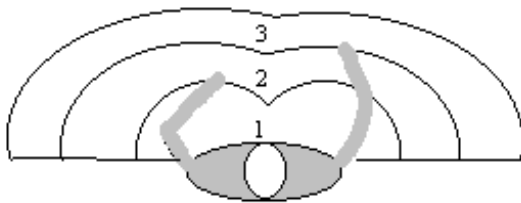
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

On the following pages, the icons next to the solution options indicate the type of risk control.

Workstation Design

WORKING REACHES

A working reach that is too far for the worker will require stressful shoulder, elbow, wrist, and back postures. Reaching to the side, behind, or too far in front of the body can put stress on the smaller muscles. Ideally, working reaches should be within a normal reach envelope, as laid out below, with the controls and materials that are handled most often closest to the body. It is also ideal to have controls that perform similar or combined functions grouped together to decrease awkward postures that may otherwise occur.



1 = Controls/items most frequently used
2 = Controls/items less frequently used
3 = Controls/items least frequently used

Generally, the most frequently used items should be placed within a forearm's reach, with less frequently used items placed within a comfortable arm's reach, and infrequently used items placed within a fully extended arm's reach. For more specific recommendations on working reaches, please consult anthropometric tables or an ergonomist.

Slide-out drawers

E
WP In order to reduce awkward postures of the trunk and arms, store cleaning supplies and other items on slide-out drawers in cabinets. Keeping these drawers at waist level can also reduce the loading during lifting.

Trunk support

WP

In order to reduce forces generated in the low back while maintaining awkward static trunk postures, use a free hand to support the upper body. Using one arm to brace yourself while in a forward flexed position (e.g., wiping lunchroom tables) can minimise the load on the back.

At right, a picture of a Janitor using his free arm to help support his trunk while reaching to wipe tables. The bracing from the free arm reduces the magnitude of back muscle force necessary to maintain balance, reducing the potential for back injury.



Modified tool handles

E
WP

In order to reduce awkward postures of the arms, trunk, and knees, handtools can be outfitted with lightweight extended handles. For more information on this risk control, see the following section on **Container, Tools, and Equipment Handles**.

WORKING HEIGHTS

A working height that is too high for the worker will require stressful shoulder and arm postures, while a height that is too low will require stressful bending of the neck and trunk. The height of a work surface should allow room to change position and move the legs and feet (WCB Draft Ergonomic Regulations, 1994).

The ideal workstation is height adjustable, allowing a large percentage of the population to adjust the work surface height to suit their dimensions.

To determine the appropriate work height specific for the Janitor, identify the body part of most concern. If the main concern is the:

Neck - minimise forward bending of the neck by increasing working height.

Shoulders - minimise elevation of the arms by lowering working height.

Low Back - minimise forward bending of the back by increasing working height.

For more specific guidelines on matching the working heights with the tasks performed please consult anthropometric tables or an ergonomist.

Manual handling heights

E WP	In order to reduce awkward postures and forceful movements of the trunk and arms, try to keep heavy manual handling at approximately waist level. Providing storage at this height can help prevent back injuries.
---------	--



An example of a working height that is too low. Handling loads with this bent trunk posture can lead to back injury.



An example of a good working height for heavy handling. Neutral arm and trunk postures can be maintained, and the load starts and stays close to the body, when working at waist height.



Handling at a height that is too high. Awkward postures of the arms and back, as well as lifting a load far from the body, lead to increased risk of injury.

Power lifts

E
WP

In order to reduce awkward postures and forceful movements of the trunk, use power lifts where available. For example, hoists that are typically used for moving saw change carts between floors can also be used to carry heavy loads, such as full water cooler bottles and mop buckets, when the hoist is free to use. Make sure carts or dollies are available on both floors to transport heavy loads in horizontal directions.

Foot scrubbing

WP

In order to reduce awkward and static postures of the back and knees, use a scrub pad underneath the foot to remove marks from the floor. Make sure to alternate feet to distribute the load.

In the picture at right, the Janitor has a floor-scrubbing pad underneath her foot. The Janitor uses this pad to apply force to remove marks, reducing awkward trunk and arm postures.



Floor drains

E

In order to minimise awkward postures and forces in the back and arms, floor drains should be installed on each floor to allow for dumping dirty mop buckets and other cleaning pails. Lifting these full containers to a waist high sink level, or transporting the containers between floors, increases the load on the soft tissues in the shoulders and back. Floor drains allow buckets to be emptied without any lifting.

Tap hoses

E

In order to minimise awkward postures and forces in the back and arms, hoses should be installed on each floor to allow for filling mop buckets and cleaning pails. Lifting these full containers from a waist high sink level, or transporting the containers between floors, increases the load on the soft tissues in the shoulders and back. Hoses allow buckets to be filled on the floor, eliminating lifting.

FLOOR SURFACES

Anti-fatigue insoles

PPE

In order to minimise fatigue in the lower extremities, anti-fatigue matting can be worn inside protective footwear. The use of anti-fatigue insoles will help to increase comfort and reduce muscle fatigue. The cushioned surface encourages continuous micro-movements of the feet, which minimises blood pooling in the feet and legs and the associated discomfort.

Kneepads

PPE

In order to minimise contact stress in the knee, workers can wear kneepads to provide cushioning in this area. External kneepads can be worn when required, while coveralls with kneepad inserts provide permanent protection.

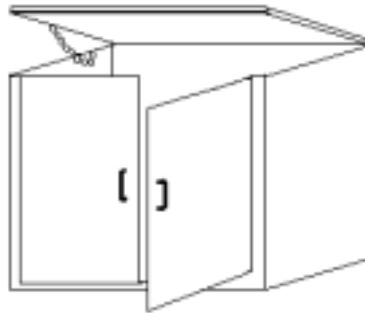
ADDITIONAL WORKSTATION DESIGN OPTIONS

Lift-top cabinet

E

In order to reduce the awkward postures of the trunk and arms, and to minimise the need for crouching or kneeling, storage cabinets that open from the top as well as from the front can be used to store cleaning and other supplies. The open top eliminates the need to stoop to reach under horizontal surfaces. These cabinets are most useful with storage at or below waist height.

At right, a drawing of a lift-top storage cabinet. Cabinets should be fit with a solid mechanism for holding the lid in the raised position.



Bicycle transportation

A
WP

In order to reduce repetitive loading of the feet, Janitors can use a bicycle to move between buildings. This suggestion is most useful for Janitors who work in several buildings each day. The bicycle should be outfitted with a large, balanced basket to carry cleaning supplies and other items. The bike should also have all safety features, including front and rear lights and reflectors.

In the picture at right, a bicycle with a large basket. Janitors use this bicycle to move between buildings, reducing some of the repetitive loading on the feet from walking.



Characteristics of Objects Being Handled

SIZE AND SHAPE

Carts and dollies

A
WP In order to reduce forceful use of the arms and back, as well as awkward postures of the arms, use a cart or dolly to safely handle large or awkward loads. Large pneumatic wheels and an extended load tongue can make dollies more versatile in terms of handling large objects and manoeuvring up and down stairs.

Subdivide large loads

A
WP In order to reduce forceful use of the arms and back, as well as awkward postures of the arms, subdivide loads which cannot be safely handled. For example, four cases of soft drink cans for the vending machine should be carried in two trips of two cases each. This method allows for smaller, more stable loads, reducing the potential for injury.

LOAD CONDITION AND WEIGHT DISTRIBUTION

Balanced loads

WP In order to reduce forceful use of the trunk, try to distribute loads across both arms when possible. Carrying loads in this balanced posture will reduce compression and required muscle force in the low back.

In the picture at right, a Janitor with an equally distributed load. This balanced load reduces the back muscle force required to maintain trunk balance, and also reduces the back compression and risk of injury.



Alternate arm use

WP In order to reduce forceful use of the trunk and arms, as well as awkward static arm postures, alternate arms when carrying loads in one hand, such as mop buckets. Alternating arms will distribute the load evenly between both sides.

Multiple workstations

**E
WP** In order to reduce forceful use of the trunk and arms, as well as awkward static arm postures, equip each floor or work area with any large equipment frequently used there. For example, having local access to a mop, bucket, water supply, and waste drain will eliminate the need to carry full mop buckets between floors, or buildings.

CONTAINER, TOOL AND EQUIPMENT HANDLES

Transverse tool handles

E In order to reduce awkward postures of the arms, trunk, and wrists, transverse handles can be installed on tool handles. These transverse handles allow for more neutral wrist postures, and for more direct application of force, while helping to maintain more upright back postures.



At left, an attachable transverse handle for long-handled tools.

At right, an operator using a broom with transverse handle and forearm bracket.



Extended tool handles

**E
WP** In order to reduce awkward postures of the arms, trunk, and knees, handtools can be outfitted with lightweight extended handles. These handles are most useful on tools such as toilet brushes and dusters, which are typically used in locations that require awkward postures. Extended wringer handles on mop buckets can also reduce awkward trunk postures.

Tool handle grips

E

In order to reduce the force required to grip hand tools, increase the friction between the tool handles and the operator's glove. Due to the smooth, slippery surface of metal or wooden tool handles (e.g., broom, shovel, mop) a Janitor must use a higher grip force in order to maintain control of the tool. This can put the elbow, and possibly the wrist and hand, at risk of injury. Wrapping the tool handles with foam, rubber, medical/athletic tape, or modifying the surface using other friction increasing material (e.g., gritty paint if plastic substances are not allowed) would increase the friction between the handle and the Janitors glove, and thus decrease the grip forces required.

Gloves

PPE

In order to reduce grip forces required by the Janitor, the operator should wear thin, close fitting gloves with a "sticky" palm surface to increase the friction between the gloves and the tool handles.

Enlarge bucket handles

E

In order to reduce contact stress in the hand and grip forces required by the Janitor, handles on frequently carried buckets and pails should be enlarged. A securely fastened piece of hose or foam, split to pass around the existing handle, will help to spread out the carrying load across the Janitor's fingers.

In photo at right, the thin handle of the bucket localises the entire carrying load across a narrow band of the Janitor's fingers. This localised contact stress can lead to nerve damage and blood flow interruption.



Environmental Conditions

LIGHTING

Portable lighting

WP In order to reduce awkward postures of the head and trunk, Janitors should use portable lighting to clean and inspect poorly-lit areas. A small plug-in lamp or shop safety light at floor level can help illuminate under tables and chairs in lunchrooms and offices, while a flashlight can provide enough light for working in cabinets and other confined spaces.

Work Organisation

TASK VARIABILITY

Change postures

A To reduce the length of exposure to stresses on the neck, back, and knees, break-up work into areas with varied layouts and working heights. Frequent changes in posture from working at varied heights will help avoid excess fatigue.

Please refer to the General Risk Factor Solutions Manual for solutions regarding work organisation risk factors.

Summary of Solutions

Refer to the table below to help determine which solution alternatives will aid in addressing risk factors in the particular body parts of concern.

		Injury Prevention Potential										
SOLUTIONS	Page	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Slide-out drawers	72		A					A				
Trunk support	73							F				
Modified tool handles	73		A					A		A		
Manual handling heights	74		F A					F A				
Power lifts	75							F A				
Foot scrubbing	75							A S		A S		
Floor drains	75		F A					F A				
Tap hoses	75		F A					F A				

Direct Risk Factors

F = Force

S = Static Posture

R = Repetition

C = Contact Stress

A = Awkward Posture

V = Vibration

Summary of Solutions

Refer to the table below to help determine which solution alternatives will aid in addressing risk factors in the particular body parts of concern.

		Injury Prevention Potential										
SOLUTIONS	Page	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Anti-fatigue insoles	76									S		R V
Kneepads	76									C		
Lift-top cabinet	77		A					A				
Bicycle transportation	77											R
Carts and dollies	78		F A					F				
Subdivide large loads	78		F A					F				
Balanced loads	78							F				
Alternate arm use	79		F A					F				
Multiple workstations	79		F A					F				

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Summary of Solutions

Refer to the table below to help determine which solution alternatives will aid in addressing risk factors in the particular body parts of concern.

		Injury Prevention Potential										
SOLUTIONS	Page	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Transverse tool handles	79		A		A			A				
Extended tool handles	79		A					A		A		
Tool handle grips	80				F							
Gloves	80				F							
Enlarge bucket handles	80						C					
Portable lighting	81	A						A				
Change postures	81	A						A		A		
Heat Exposure	♦	indirectly reduces risk of injury to the body										
Cold Exposure	♦	indirectly reduces risk of injury to the body										
Lighting	♦	indirectly reduces risk of injury to the body										
Noise	♦	indirectly reduces risk of injury to the body										
Vibration	♦	directly reduces risk of injury to the back and wrist										
Rest breaks	♦	indirectly reduces risk of injury to the body										
Job Rotation	♦	indirectly reduces risk of injury to the body										
Task Rotation	♦	indirectly reduces risk of injury to the body										
Work Pace	♦	indirectly reduces risk of injury to the body										
Scheduling	♦	indirectly reduces risk of injury to the body										

Direct Risk Factors

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♦ = See General Risk Factor Solutions Manual

JANITOR MSI SAFETY GUIDE

OBJECTIVE: To identify ergonomic risks involved in Janitor tasks, and to reduce the potential for musculoskeletal injuries.
 More detailed information about risk reducing recommendations can be found in the Work Manual for the Janitor.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Neck</p> <p>A Janitor may hold the head forward or to the side in order to inspect work surfaces and storage locations.</p> <p>Working on tasks with obstructed views, such as cleaning inside microwave ovens or underneath tables, can lead to increased levels and duration of awkward neck posture.</p>	<p>Awkward Posture</p> <p>Static Posture</p>	<ul style="list-style-type: none"> • Neck muscles must support the weight of the head while in a forward or side bent position. The more the neck is bent, the greater the load on the muscles and tendons. • When the head is held in a forward or side bent position, the muscles of the neck must remain tense to support the weight of the head. With no time allowed for recovery, the constant state of tension in the neck muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, the tissues may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Use a small portable light to help illuminate dark areas. • Break up work into areas, and clean from top to bottom. Frequent changes in postures, from working at various heights, will help avoid excess neck fatigue. • For exercises that can help prevent <i>neck</i> injuries, <i>see the Neck section of the Body Manual</i>.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Neck/Shoulder</p> <p>A Janitor frequently works with the arms away from the body in order to clean floors and surfaces, carry equipment, and stock supplies.</p> <p>Activities that require higher forces, such as wet mopping or floor buffing, are the main tasks of concern.</p>	<p>Force</p> <p>Awkward Posture</p> <p>Repetition</p>	<ul style="list-style-type: none"> • The rotator cuff stabilises the shoulder joint when objects are pushed and pulled. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. • If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur. • Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on the muscles and tendons. • When the arms are repeatedly lifted, the muscles of the neck and shoulder are subjected to repeated stress with little or no time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Use power lifts when available. • Alternate sides, even within the same trip, for objects that have to be carried in a single hand, like a mop bucket. • For exercises that can help prevent <i>shoulder</i> injuries, see the <i>Shoulder section of the Body Manual</i>.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Elbow/Wrist</p> <p>A Janitor may grip many different objects and handtools when carrying and stocking supplies, and when performing clean-up duties.</p> <p>The risk of injury increases when handling heavy objects, possibly with poor or non-existent handles, leads to overgripping and larger loads on the tissues of the forearm and elbow.</p>	<p>Force</p> <p>Awkward Posture</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection. • As the wrist is bent, the tendon sheaths will rub up against the walls of the carpal tunnel. The further the wrist is bent, the more friction experienced in the tendon sheaths. • Repeated bending of the wrist and gripping causes stress to the tendon sheaths. If the repetitive stress is excessive, and recovery is not adequate, the tendon sheaths may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Modify the grip of smooth wooden tool handles. Textured surfaces increase the friction between hands/gloves and the tool handle, reducing the force required to grip the handle. • Use only necessary gripping force when handling objects or tools. Be aware that cold temperatures and tool vibration can lead to decreased sensitivity and increased grip forces. • Maintain a straight wrist position when gripping or manoeuvring tools and objects. • Whenever possible, use both hands for forceful movements. Using both hands distributes the required force. • For exercises that can increase tissue tolerances and prevent <i>elbow</i> and <i>wrist</i> injuries, <i>see the Elbow and Wrist sections of the Body Manual.</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Low Back</p> <p>A Janitor may lift, lower, and carry loads.</p> <p>Handling large, awkward loads, such as a full mop bucket, is the main injury risk. Lifting and lowering loads to extreme heights and/or reaches increases this risk.</p>	<p>Force</p> <p>Awkward Posture</p>	<ul style="list-style-type: none"> • Lifting increases the loading on the spine. Weight held in the hands is transmitted to the low back. The greater the weight, the greater the loading on the structures of the low back. • Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. 	<ul style="list-style-type: none"> • Lift and lower loads with a neutral spine. Keep your arms close to the body, with the elbows bent and the wrists straight. • Try to distribute loads evenly on both sides of the body. • Use a free arm to support some of the mass of the trunk when in a forward flexed posture. • Lift and lower loads with both feet planted on the floor. This stance increases stability and recruits larger muscle groups to assist with the physical demands. • Use carts or dollies when available. • For exercises that can help prevent Low Back injuries, <i>see the Low Back section of the Body Manual.</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Low Back</p> <p>A Janitor frequently bends down and/or to the side to clean floors and surfaces.</p> <p>Static back posture is also maintained for many tasks, increasing the risk of injury.</p>	<p>Awkward Posture</p> <p>Static Posture</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. • Holding a forward or side bent posture can gradually fatigue the structures of the low back. If the duration of the static posture is excessive, and recovery is not adequate, the muscles of the lumbar spine will fatigue, possibly leading to injury. • Repeated forward and/or side bending can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, the disc walls may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Keep the back in a neutral posture while mopping and sweeping floors. Bend the knees and use the arms to move the mop head in a small figure eight pattern. • Use a free arm on tables or counters to help support the weight of the upper torso when in bent trunk postures. • To reduce the length of exposure to stress on the back, break up work into areas, and clean from top to bottom. Frequent changes in postures, from working at various heights, will help avoid excess fatigue. • For exercises that can help prevent Low Back injuries, <i>see the Low Back section of the Body Manual.</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Knee</p> <p>A Janitor frequently squats and/or kneels in order to clean low surfaces, or to scrub marks and stains off floors by hand.</p>	<p>Awkward Posture</p> <p>Static Posture</p> <p>Contact Stress</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Bending the knee increases the contact stress between the kneecap and the thighbone. Contact stress increases significantly when the knee is bent over 90 degrees. • Kneeling on a hard surface increases the contact stress between the kneecap and the thigh bone. • Repeated squatting and kneeling may gradually irritate the knee. Irritation of the knee may lead to muscle wasting, which in turn leads to poor tracking of the knee cap on the thigh bone and increased contact stress between these bones. 	<ul style="list-style-type: none"> • When working at low levels for prolonged periods, try to sit instead of crouching or kneeling. • Wear kneepads or foam inserts in coveralls to prevent contact stress when kneeling and crawling. • For exercises that can help prevent <i>knee</i> injuries, refer to the <i>Knee section of the Body Manual</i>.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Foot</p> <p>A Janitor may walk on a hard, vibrating surface in order to move through different areas of the mill.</p> <p>Frequent stair climbing can also place increased loading on the tissues of the feet.</p>	<p>Repetition</p> <p>Vibration</p>	<ul style="list-style-type: none"> • During walking, impact between the ground and the feet loads the plantar fascia. If the duration of walking is excessive, and recovery is not adequate, the fascia may fatigue to the point of injury. • Vibrating floors can increase the loading on the foot. Factors like vibration level and vibration frequency increase the amount of loading on the foot, and could lead to irritation. 	<ul style="list-style-type: none"> • Buy appropriate supportive footwear to decrease foot discomfort. • Place anti-fatigue inserts into shoes to provide extra cushioning. • For exercises that can increase tissue tolerances and prevent <i>foot</i> injuries, <i>see the Foot section of the Body Manual.</i>