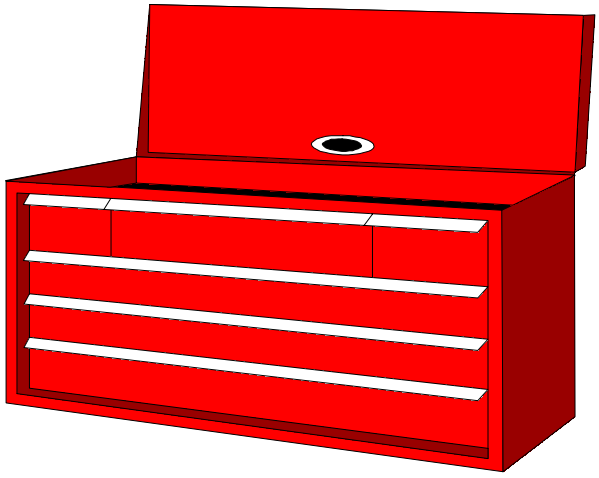
Industrial Musculoskeletal Injury Reduction Program

Common Industry Jobs (CIJs)

Grade/Quality Control Inspector 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

GRADE/QUALITY CONTROL INSPECTOR TOOL KIT
Table of Contents

Overview

Grade/Quality Control Inspector

Job Summary

A Grade/Quality Control Inspector ensures that the lumber being produced by the sawmill and/or planer meets certain standards (appearance, size, quality). A Grade/Quality Control Inspector will monitor machines and visually check lumber being produced, pull boards from conveyors to measure, inspect finished loads, perform office work duties, check kiln-dried lumber, perform log surveys, tally inventory, and perform other duties as assigned. Refer to the Physical Demands Analysis for more detail.

NOTE: Some Grade/Quality Control Inspectors perform similar physical job duties as a **Tallyman** rather than the tasks listed above. Please refer to the Tallyman Tool Kit if this is the case at your mill.

Physical Demands

The physical demands of the Grade/Quality Control Inspector may include:

a) Forceful exertions and awkward postures of the shoulder
b) Awkward and static postures of the wrist
c) Forceful exertions, awkward postures, and repetitive movements of the low back
d) Awkward and static postures of the knee, with contact stress while kneeling
e) Frequent standing, walking, and stair climbing
f) Occasional lifting, lowering, pushing, and pulling lumber of various sizes and weights

Mental Demands

A Grade/Quality Control Inspector must have good knowledge of the (lumber) standards as specified by the mill. An Inspector must have good knowledge of sawmill processes, as troubleshooting may be required to re-program machines and adjust saws. Computer skills and a valid grading ticket are often required at some mills.

Major Variations

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

1) A Grade/Quality Control Inspector is often assigned to other duties in the mill. These other duties can make up almost 50% percent of shift, and therefore may change or add to the risk of MSI for a particular worker. Examples of these other duties include:
   a) Assisting other workers with jam-ups
   b) Changing chemicals to be sprayed onto lumber
   c) Performing other jobs (e.g., Grader, Trimmer Puller) as part of a job rotation, or to fill in for other workers during breaks.

2) Work technique varies, because work is performed in various locations throughout the mill. The following examples illustrate some of the variations in work technique observed:
   a) Measuring lumber can be done on a transfer deck/conveyor belt, the floor after the boards have been pulled off the line, saw horses after the boards have been pulled off the line, and pull-off stations beside a transfer deck.
   b) Inspecting finished loads can be done with one person transferring boards (with or without the aid of a leverage bar), or with two people lifting the boards.

3) The types of quality checks may vary from mill to mill, requiring different hand tools, measuring devices, etc. The frequency of each test performed (e.g., moisture metre checks, grade checks) also varies depending on the mill.

Minor Variations

No minor variations were noted.

Physical Demands Analysis
Grade/Quality Control Inspector

PDA General Instructions: Grade/Quality Control Inspector

The purpose of this PDA is to familiarise healthcare professionals with the physical demands of a Grade/Quality Control Inspector. 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 Grade/Quality Control Inspector(s) 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.

Table of Contents

Physical Demands Analysis

Grade/Quality Control Inspector

Task List

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

Monitor machines and visually check lumber being produced

A Grade/Quality Control Inspector walks around the mill to check the wood being processed/cut by various machines (e.g., canters, edgers, trim saws).

Does this task occur at your mill?

☐ Yes ☐ No

Pull boards from conveyors to measure

A Grade/Quality Control Inspector pulls boards off conveyors and transfer decks at different points in the sawmill process to make sure proper sizes are being cut. Boards can also be measured on the conveyer (e.g., during breaks).

Does this task occur at your mill?

☐ Yes ☐ No

Inspect finished loads

A Grade/Quality Control Inspector inspects random finished loads to ensure that they have been graded properly.

Does this task occur at your mill?

☐ Yes ☐ No

Office work duties

A Grade/Quality Control Inspector is responsible for some paperwork and/or computer work, including tasks such as recording lengths of boards measured, and changing programs for various saws.

Does this task occur at your mill?

☐ Yes ☐ No

Check kiln-dried lumber

A Grade/Quality Control Inspector ensures that the moisture content of kiln-dried wood is within appropriate levels.

Does this task occur at your mill?

☐ Yes ☐ No

Log survey

A Grade/Quality Control Inspector checks logs for excessive bark, and measures logs to determine the amount of wood that can be produced from a certain size of log.

Does this task occur at your mill?

☐ Yes ☐ No

Tally inventory

A Grade/Quality Control Inspector may tally loads in the yard.

Does this task occur at your mill?

☐ Yes ☐ No

Other duties as assigned

A Grade/Quality Control Inspector are often assigned other duties in the mill. These duties may include assisting other workers to clear jam-ups, providing relief for other workers during breaks and participating in a job rotation schedule for a portion of the shift.

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

☐ Yes ☐ No

Describe:

_____

_____

_____

_____

Work Organisation

Task Description

The table below contains a list of tasks performed by a Grade/Quality Control Inspector. Use the left column to check off (✓) tasks that are present. 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. Additional 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%	
	Monitor machines and visually check lumber being produced					• *Machines monitored may include canters, edgers, trim saws, planer, etc.* • *Check for species, proper sizes and cuts, chemical spraying, etc.* • *May be assigned to sawmill, planer, or both*
	Pull boards from conveyors to measure					• *Boards are generally pulled off conveyors and transfer decks at specific locations* • *Pieces are measured using a measuring tape, callipers, micrometer, etc.* • *Number of boards handled per day varies from mill to mill*
	Inspect finished loads					• *Finished loads are checked for proper grading* • *Each board is inspected and then manually re-stacked* • *Approximately one hour per shift is spent doing this task*
	Office work (computer/paper work)					• *Subtasks include: recording when programs are changed, and changing settings/programs for saws* • *Generally, time spent in the office is intermittent*
	Check kiln-dried lumber					• *A moisture meter is generally used for this task*

Task	Percent of Shift				Comments
	Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Log survey					• *Performed once a week on average* • *Check for bark on logs* • *Measure diameter, and length to determine cubic metres of wood that will be produced*
Tally inventory					• *Range of 2 to 3 hours per month* • *Range of 2 to 3 times per week*

Other duties as assigned					• *Other duties may include:*
					  • *Assist with jam-ups*
					  • *Relief for other workers during breaks*
					  • *Changing chemicals to be sprayed*
					  • *Rotate to other jobs (e.g. Grader, Trimmer Puller, etc.*

Other:					

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**
Flooring *(Check all that apply)* ☐ Cement ☐ Wood ☐ Rubber matting ☐ Metal ☐ Other: _____	
Displays *(Check all that apply)* ☐ Lights on console ☐ Mirrors ☐ Video monitors ☐ Computer monitors ☐ Scrolling display ☐ Signal lights ☐ Other: _____	
Seating *(Check all that apply)* ☐ Armrests ☐ Backrest ☐ Swivel seat ☐ Slide track ☐ Lumbar support ☐ Foot rest ☐ Casters #: _____ *Indicate if adjustable:* ☐ Height ☐ Armrests ☐ Backrest ☐ Forward tilt	Height of seat: _____ cm Depth of seat: _____ cm Width of seat: _____ cm Covering type: _____

Equipment & Machinery Controls

The table below contains a list of the types of controls used by a Grade/Quality Control Inspector. 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. Additional controls can be included under *Other*.

	Type of Control	**Function**	**Comments**
	Push buttons	• *Start/stop belts, transfer chains, etc.*	• *Controls are used on an as-needed basis*
	Foot pedals	• *Start/stop belts, transfer chains, etc.*	• *Controls are used on an as-needed basis*
	Moisture meter push button	• *Activates moisture meter*	• *Some moisture meters result in awkward hand/wrist postures when used*
	Other:		

Physical Demands

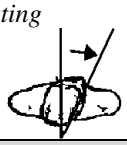
Whole Body Physical Demands

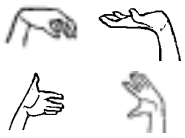
Identify each of the physical demands required by a Grade/Quality Control Inspector and list the corresponding tasks in the second column. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information related to duration, frequency, and cycle times.

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%	
Example: Walking	• *Monitor machines and visually check lumber being produced* • *Log survey* • *Tally inventory* • *Other duties*			✓		• *Walking throughout the mill includes up and down stairs* • *Frequency of walking may vary for Grade/Quality Control Inspectors at different mills*
Walking						
Sitting						
Standing						
Climbing						
Balancing						
Kneeling/ Crouching						
Other:						

Body Postures

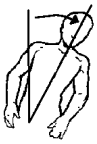
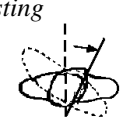
The table below outlines the body postures that may be adopted throughout the shift by a Grade/Quality Control Inspector, related to tasks. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information describing posture duration, frequency, cycle times, and hand 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%	
Example: Back Flexion	• *Monitor machines and visually check lumber being produced* • *Pull boards from conveyors to measure* • *Inspect finished loads* • *Tally inventory*		✓			• *Repetitive and/or static back flexion was observed when inspecting finished loads due to lifting boards from one load and transferring them to another load*
Neck						
Flexion 						
Extension 						
Twisting 						
Shoulder						
Flexion 						
Abduction/ adduction 						
Extension 						

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						
Rotation 						
Wrist						
Wrist Movements 						
Hand/Fingers						
**Handling*						
**Fingering*						
**Gripping*						

Legend for Hand/Fingers

Handling	*Grasping, turning, holding, etc.*			
Fingering	*Picking, pinching, etc.*			
Gripping	*Power* 	*Pinch* 	*Hook* 	*Precision* 

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						
Flexion 						
Lateral Flexion 						
Twisting 						
Extension 						

Manual Material Handling

The table below contains a list of general manual material handling activities performed by a Grade/Quality Control Inspector. 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. If necessary, please refer to Appendix A to calculate the weight of the wood being 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%	
Pushing							
Pulling							
Lifting							
Lowering							
Carrying							

Hand Tools

Indicate the hand tools used by a Grade/Quality Control Inspector 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 Shift				Comments
				Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Calipers	• *Pull boards from conveyer to measure*	*0.4*					
	Measuring tape	• *Pull boards from conveyer to measure* • *Log survey*	*negligible*					
	Hand-held computer	• *Pull boards from conveyer to measure*	*0.5*					
	Moisture meter	• *Check kiln-dried lumber*	*0.2*					
	Digital micrometer	• *Pull boards from conveyer to measure*	*0.2*					
	Chalk line	• *Pull boards from conveyer to measure*	*negligible*					
	Electric drill	• *Pull boards from conveyer to measure*	*1.5*					
	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 *(Indicate source)* ☐ Seat ☐ Floor ☐ Tool ☐ 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 B 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 Grade/Quality Control Inspector 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 – Weight of Wood Equation

1. Type of Wood Handled

The table below contains a list of the types of wood processed in British Columbia. The weight per board foot wet and dry is given for each species. This information will be used in the table in *Section 4* to calculate the weight of the wood handled. Please indicate all of the types of wood processed.

Wood Handled	Wet lb./ Board Foot	Dry lb./ Board Foot	Wood Handled	Wet lb./ Board Foot	Dry lb./ Board Foot
Douglas Fir	3.60	2.83	Larch	3.48	N/A
Hemlock	3.42	2.49	Spruce/Pine/Fir*	2.95	2.18
Red Cedar	2.42	2.00	Alpine Fir	2.67	2.00
Yellow Cedar	3.01	2.49	Lodge Pole Pine	3.26	2.41
Sitka Spruce	2.76	2.23	White Spruce	2.93	2.15

*The Spruce/Pine/Fir values are an average of White Spruce, Lodge Pole Pine, and Alpine Fir.

2. Size of Wood*

The table below contains a list of different sizes or dimensions of wood. The percentage next to the size of the wood is the multiple used to compare the size of the board to a board foot (1" by 12" by 12"). This multiple will be used in the table in *Section 4* to calculate the weight of wood handled. Please indicate all of the applicable sizes of wood handled at the workstation. Add any other sizes to the bottom of the table if your particular size of wood is not listed.

1" Sizes	Multiple	2" Sizes	Multiple	4" Sizes	Multiple	6" Sizes	Multiple	8" Sizes	Multiple
1 by 4	0.33	2 by 4	0.67	4 by 4	1.33	6 by 6	3.00	8 by 8	5.33
1 by 6	0.50	2 by 6	1.00	4 by 6	2.00	6 by 8	4.00	8 by 10	6.67
1 by 8	0.67	2 by 8	1.33	4 by 8	2.67	6 by 10	5.00	8 by 12	8.00
1 by 10	0.83	2 by 10	1.67	4 by 10	3.33	6 by 12	6.00		
1 by 12	1.00	2 by 12	2.00	4 by 12	4.00				

* Conservative estimates of actual wood dimensions

If the size of the board is different from those in this table, use this equation to find out the multiple value.

[(Dimensions of wood) x 12] / 144 = Multiple
For example: For a 5 by 5 piece of wood [(5x5) x 12]/144 = 2.08

3. Length of Wood

The table below contains a list of the common lengths of wood. Please indicate which of these lengths are being handled at this particular workstation. Add additional lengths to the table if necessary. This information will be used in the table in *Section 4*.

Length of Wood							
6 foot		12 foot		18 foot		22 foot	
8 foot		14 foot		20 foot		24 foot	
10 foot		16 foot		Other:		Other:	

4. Weight of Wood Equation*

The table below is used to calculate the weight of the boards being handled. The weight is calculated by multiplying the species weight/board foot (*Section 1 value*) by the size of wood multiple (*Section 2 value*) and by the length of wood (*Section 3 value*).

Example: For a run of wet Spruce/Pine/Fir, 2" x 4", 16 feet long

2.95 *(wet lb./ board foot)* x **0.67** *(size of wood multiple for 2" x 4")* x **16** *(length of board in feet)* = **32 lbs**.

For the heaviest species handled, enter the lb./board foot value, the multiple for the largest size of this wood, and the largest length of this wood. Multiply these values together to determine the weight of the board in pounds.

For the most common species handled, enter the lb./board foot value, the multiple for the most common size of wood, and the most common length of this wood. Multiply these values together to determine the weight of the board in pounds.

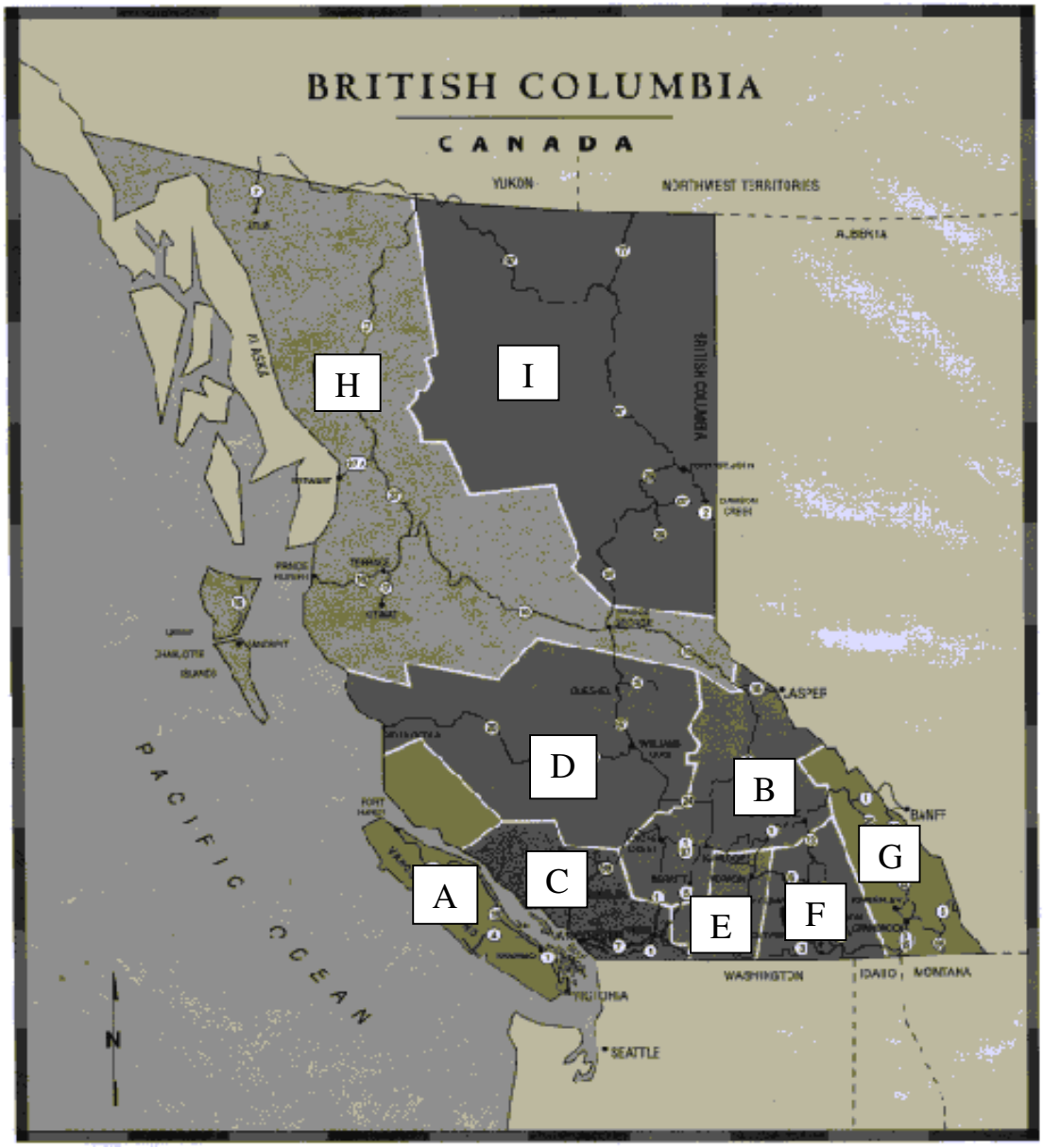
For the lightest species handled, enter the lb./board foot value, the multiple for the smallest size of wood, and the shortest length of this wood. Multiply these values together to determine the weight of the board in pounds.

If required, divide the pound value by 2.2 to obtain the weight of the board in kilograms.

Type of Wood Handled (lb./ board foot) *From Section 1*		**x**	**Multiple (size of wood)** *From Section 2*	**x**	**Length of Wood** *From Section 3*	**=**	**Weight of the Board in pounds**	**Divide by 2.2 to calculate value in kilograms**
Heaviest Species Handled		x		x		=		
Most Common Species Handled		x		x		=		
Lightest Species Handled		x		x		=		

* Weight may vary from the above calculation depending on the cell moisture content of the wood, actual wood dimensions, and wood density.

Appendix B – 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
Grade/Quality Control Inspector

Purpose

The Risk Factor Identification Checklist for a Grade/Quality Control Inspector 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 – Grade/Quality Control Inspector

Management Representative _____

Worker Representative _____

Date _____

Risk Identification completed:

☐ Before implementation of solutions

☐ 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.

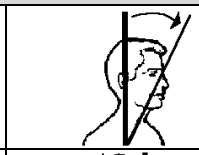
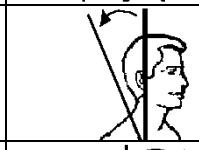
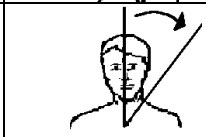
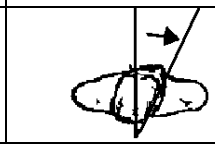
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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.

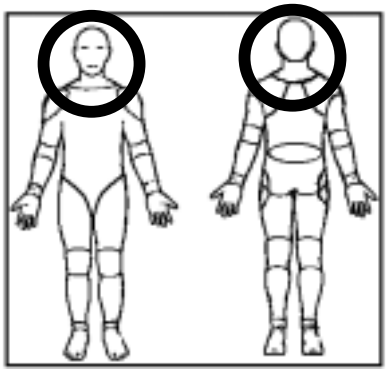
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

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? (e.g., pulling boards off of conveyors to measure)			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 a computer screen for a long period)			S O	
Awkward Posture				
Flexion 			S O	
Extension 			S O	
Lateral Bending 			S O	
Rotation 			S O	

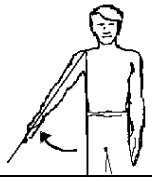
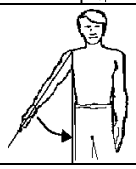
Please indicate whether the following direct risk factors were identified at the **NECK**.		
Direct Risk Factors	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Neck or Head/Eye or Upper Back? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐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)		☐Yes ☐No



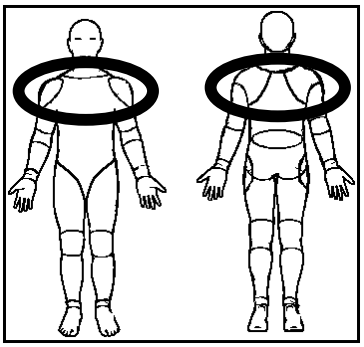
Body parts within the circled area will be classified as NECK issues.

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., lifting and transferring boards)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., measuring boards)			S O	
Static Posture				
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., using a moisture meter with the arm away from the body for several minutes at a time)			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., gripping a hand-held computer for a long period of time)			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	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐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)		☐Yes ☐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)		☐Yes ☐No



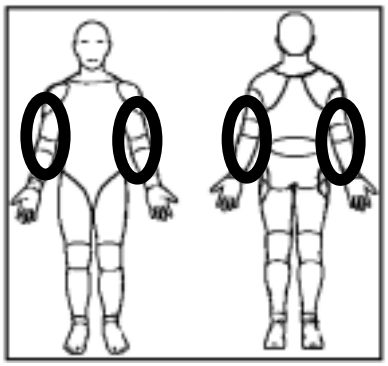
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

Force	N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting			S 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., pneumatic drill) 			S O	
Are objects handled in a pinch grip? (e.g., pieces of lumber) 			S O	
Are objects handled in a hook grip? (e.g., oil cans) 			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., lifting and transferring boards)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., measuring boards)			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? (e.g., using a moisture metre with the arm away from the body for several minutes at a time)			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., gripping a hand-held computer for a long period of time)			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., edge of a desk digging into forearm)			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 **ELBOW**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Elbow or Forearm? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐No
In the **Discomfort Survey** investigation, were there reports of discomfort for the Elbow or Forearm? (see Worksheet 2 in the Implementation Guide)		☐Yes ☐No



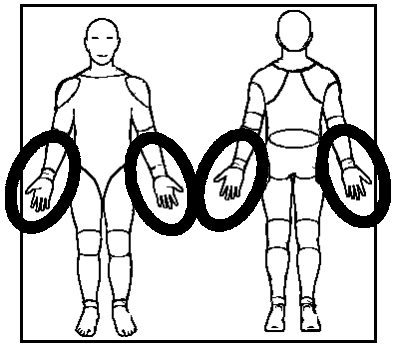
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

Force	N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting			S 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., hammer) 			S O	
Are objects handled in a pinch grip? (e.g., piece of lumber) 			S O	
Are objects handled in a hook grip? (e.g., oil cans) 			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., lifting and transferring boards)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., measuring boards)			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? (e.g., using a moisture meter with the arm away from the body for several minutes at a time)				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., gripping a hand-held computer for a long period of time)				S O	
Contact Stress					
Ask the worker: Do **<u>any</u>** objects, tools or parts of the workstation put pressure on **<u>any</u>** parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm? (e.g., leaning on the wrist while using the computer mouse)				S O	
Ask the worker: Do you use your hand like a hammer for striking? (e.g., when unjamming conveyors)				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	

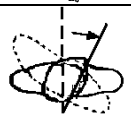
Please indicate whether the following direct risk factors were identified at the **WRIST/HAND**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Wrist or Hand/Finger or Forearm? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐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)		☐Yes ☐No



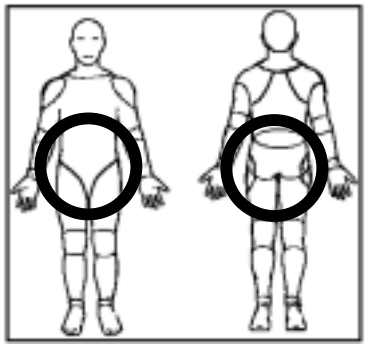
Body parts within the circled area will be classified as WRIST issues.

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?			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., bending to measure boards)			S O	
Static Posture				
Ask the worker: Do tasks require your trunk and upper body to be maintained in a fixed or static posture? (e.g., bending to measure boards)			S O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift? (e.g., Sitting at a desk for prolonged periods)			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., chairs that put pressure on the back of the 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	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Low Back or Hip/Thigh? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐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)		☐Yes ☐No

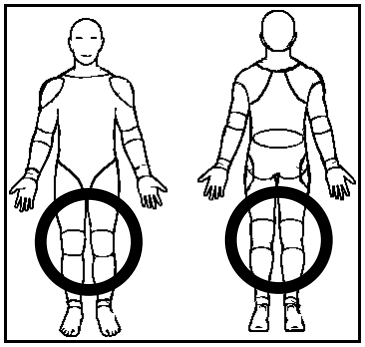


Body parts within the circled area will be classified as LOW BACK issues.

KNEE

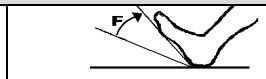
Repetition	N	Y		Comments:
Are identical or similar motions performed over and over again? (e.g., climbing stairs, crouching)			S O	
Static Posture				
Ask the worker: Do tasks require you to maintain your knee(s) in a fixed or static posture? (e.g., prolonged kneeling/crouching when inspecting finished loads)			S O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift? (e.g., sitting at a desk for prolonged periods)			S O	
Do workers kneel (with one or both knees)?			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 a catwalk)			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	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Knee or Hip/Thigh? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐No
In the **Discomfort Survey** investigation, were there reports of discomfort for the Knee or Hip/Thigh? (see Worksheet 2 in the Implementation Guide)		☐Yes ☐No

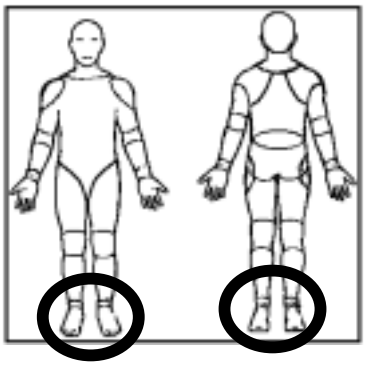


Body parts within the circled area will be classified as KNEE issues.

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 and machinery)			S O	

Please indicate whether the following direct risk factors were identified at the **ANKLE/FOOT**.		
Direct Risk Factors	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Ankle or Foot? (see Worksheet 1 in the Implementation Guide)		☐Yes ☐No
In the **Discomfort Survey** investigation, were there reports of discomfort for the Ankle or Foot? (see Worksheet 2 in the Implementation Guide)		☐Yes ☐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., long, heavy boards)			S O	
Are there problems handling a load due to its fragile, unbalanced, or non-rigid conditions? (e.g., large containers of liquid)			S O	
Ask the worker: Do you experience situations where mechanical aids (e.g., hoists) or equipment are not readily available to assist with manipulating an object?			S O	
Are handles for tools and equipment inappropriate in terms of size or shape? (e.g., pneumatic tools, hand tools)			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?			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? (e.g., inspecting lumber in dark areas)			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? (e.g., programmed lathe)			S O	
Do peak workloads or sudden increases in pace occur with the tasks? (e.g., whistle chasing, having to complete tasks during breaks/lunch)			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?			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

Grade/Quality Control Inspector

This Work Manual contains information about the body parts found to be at risk of musculoskeletal injury (MSI) for the Grade/Quality Control Inspector (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.

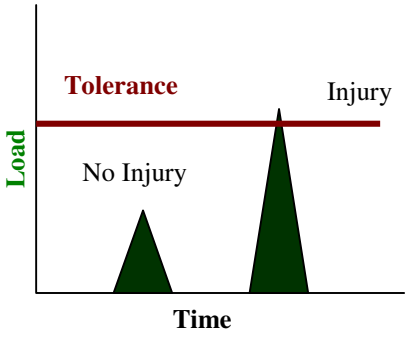
Work Manual

Grade/Quality Control Inspector

Table of Contents

Injury Education

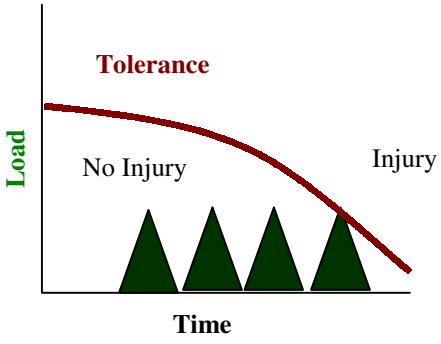
Injuries occur when …
Loads exceed tissue tolerances



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.

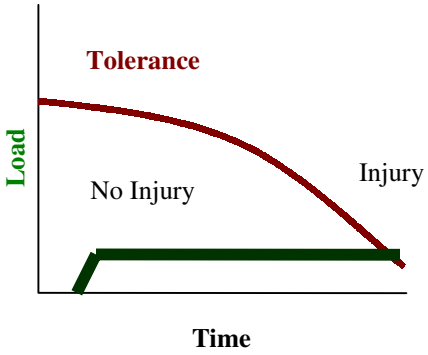
Example – a worker going over on their ankle and spraining it.



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 Grade/Quality Control Inspector 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 Grade/Quality Control Inspector. 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 Grade/Quality Control Inspector position and found that the back is the main body part of concern while performing regular duties. Focussing on solutions that target the back will likely reduce the greatest risks associated with this job.

Back: Major risks include forceful exertion and awkward postures while handling (lifting, pushing, and pulling) boards. Lifting boards after prolonged sitting may also contribute to the risk of discomfort or injury.

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

1. Pull-off stations (page 73)
2. Use leverage when handling boards (page 74)
3. Leverage bars (page 75)
4. Warm up for lifting (page 76)
5. Braced posture (page 76)
6. Manual material handling (page 85)

Computer and office work was found to be a common responsibility for Grade/Quality Control Inspectors. Due to the low frequency of this task, office work was not found to contribute to the risk of musculoskeletal injury. However, Guidelines for Office Work (page 78) were included in this manual for reference, and are important if workers use a computer for more than 50% of the shift.

For additional stretching and strengthening exercises that would benefit a Grade/Quality Control Inspector, refer to the Back section of the Body Manual.

NOTE: It was observed that some Grade/Quality Control Inspectors perform similar physical job duties as a Tallyman, rather than the tasks listed above. Please refer the Tallyman Tool Kit to see if this is the case at your mill.

SHOULDER

Direct Risk Factors:
Force
Awkward Postures

A Grade/Quality Control Inspector may work with arms or shoulders raised when handling (pushing, pulling, and lifting) boards in various parts of the mill to check the board size and quality.

BACKGROUND INFORMATION

- The shoulder joint is designed for mobility. The joint is held together by muscles and soft tissues. The larger muscle groups around the shoulder are responsible for producing movement (e.g., deltoids). The 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, pulled, and manipulated. The heavier the object, the greater the load on the rotator cuff.
- If force placed on the rotator cuff exceeds tissue tolerances, injury may occur.

Awkward Postures

- The rotator cuff stabilises the shoulder joint when the arms are away from the body. The farther away the arms are from the body, the greater the load on the rotator cuff.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the shoulder is increased as the arm is raised. The higher the workstation, the higher the arms are raised when handling lumber.

CONSEQUENCES

- When using the arms to push, pull, and manipulate boards, the rotator cuff may fatigue. Fatigue leads to an accumulation of waste products and/or a decrease in the ability to tolerate additional stress.
- Stressing a fatigued shoulder may lead to degeneration or injury in the rotator cuff muscles of the shoulder joint.
- Signs and symptoms include pain, tenderness, and decreased range of motion and strength in the shoulder joint.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Shoulder, please see the column labelled "Shoulder" in the Summary of Solutions on pages 87 to 89.
- For exercises that can help to prevent ***shoulder*** injuries, see the ***Shoulder section of the Body Manual.***

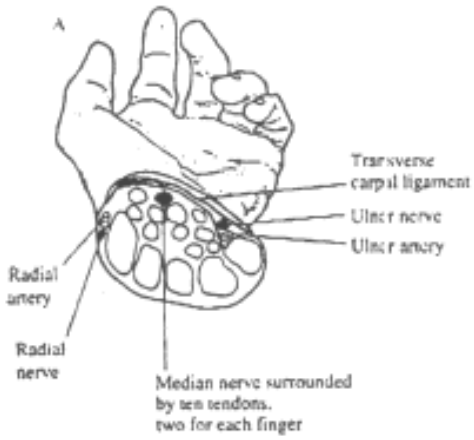
WRIST

Direct Risk Factors:
Awkward Postures
Static Postures

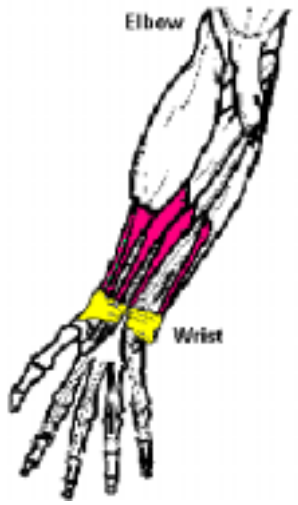
A Grade/Quality Control Inspector may grip measurement tools with awkward wrist postures when testing lumber.

BACKGROUND INFORMATION

- Most of the muscles involved in gripping and manoeuvring the hands are found in the forearms. These muscles attach at the elbow and their tendons (surrounded by a protective sheath) run down the forearm into the hand. At the wrist, the tendons and a nerve run under a thick band (see pictures below), which forms the roof of the carpal tunnel.



The Carpal Tunnel



DIRECT RISK FACTORS

Awkward Postures

- As the wrist is bent, tendon sheaths rub against the walls of the carpal tunnel. The further the wrist is bent, the more friction experienced in tendon sheaths.

Static Postures

- When the wrist is held in a bent position, tendon sheaths are under constant stress. If the duration of constant stress is excessive, and recovery is not adequate, wrist tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Container, Tool, and Equipment Handles

- Loading on the wrist is increased as the wrist is bent away from its neutral position. Using hand tools with awkward handles can cause prolonged bent wrist postures.

CONSEQUENCES

- Holding the wrist in a bent position may lead to irritation and damage in tendon sheaths.
- Signs and symptoms include pain, tenderness, and inflammation in the wrist area.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Wrist, please see the column labelled “Wrist” in the Summary of Solutions on pages 87 to 89.

LOW BACK

Direct Risk Factors:
Force
Repetition
Awkward Postures

A Grade/Quality Control Inspector may bend forward to measure and check the quality of wood.

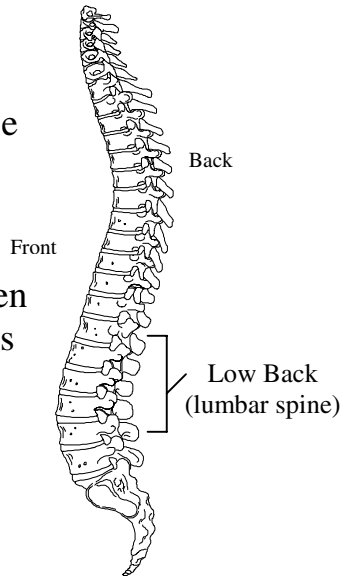
Repetitive bending may occur when inspecting and restacking finished loads for proper grade.

Seated office work also contributes to loading on the low back

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.

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the low back increases when working heights are below a comfortable working level. The greater the forward bending, the greater the loading on soft tissues of the back. Loading on the back also occurs when working in a seated posture. This cumulative load can increase the risk of injury to the back.

CONSEQUENCES

- Repeated forward bending may lead to damage in disc walls and other back tissues.
- 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 87 to 89.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

KNEE

Direct Risk Factors:
Repetition
Awkward Postures
Static Postures
Contact Stress

A Grade/Quality Control Inspector may squat or kneel to inspect finished loads.

Repeated climbing up and down stairs also places stress on structures of the knee

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

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 kneecap on the thighbone and increased contact stress between these bones.

Awkward Postures

Static Postures

- 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.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the knee is increased when the knee is fully bent. This can occur when a Grade/Quality Control Inspector must kneel or crouch to handle/measure boards on the ground.

Floor Surfaces

- Loading on the knee is increased when a Grade/Quality Control Inspector kneels on hard floor surfaces, causing contact stress.
- Loading on the knee is increased when walking up and down stairs.

CONSEQUENCES

- Repeated squatting and kneeling could cause inflammation under the kneecap, which may cause pain and may change the mechanics of kneecap tracking. Frequent stair climbing can add to this inflammation. Changes in kneecap tracking may lead to premature wear of the kneecap and/or 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 87 to 89.
- For exercises that could help to prevent ***knee*** injuries, see the ***Knee section of the Body Manual.***

FOOT

Direct Risk Factors:
Repetition

A Grade/Quality Control Inspector may stand and walk on hard surfaces continuously throughout a shift.

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.

INDIRECT RISK FACTORS

Workstation Design

Floor Surfaces

- The harder the floor surface, the greater the loading on the foot. If the floor surface does not provide any shock absorption, this force is transmitted to the soft tissues of the foot.

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 87 to 89.
- For exercises that can help to prevent ***foot*** injuries, see the ***Foot section of the Body Manual.***

Summary of Body Parts at Risk

SHOULDER

- A Grade/Quality Control Inspector may work with arms or shoulders raised when handling (pushing, pulling, and lifting) boards in various parts of the mill to check the board size and quality.

WRIST

- A Grade/Quality Control Inspector may grip measurement tools with awkward wrist postures when testing lumber.

LOW BACK

- A Grade/Quality Control Inspector may bend forward to measure and check the quality of wood.

- Repetitive bending may occur when inspecting and restacking finished loads for proper grade.

- Seated office work also contributes to loading on the low back

KNEE

- A Grade/Quality Control Inspector may squat or kneel to inspect finished loads.

- Repeated climbing up and down stairs also places stress on structures of the knee

FOOT

- A Grade/Quality Control Inspector may stand and walk on hard surfaces continuously throughout a shift.

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 <u>any</u> 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.*

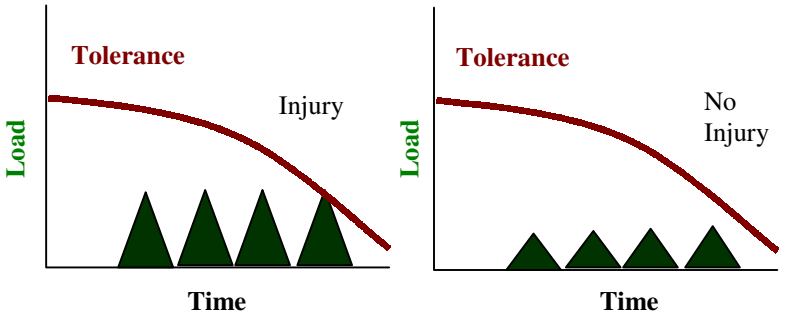
= Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.

♦ = 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 87 to 89 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

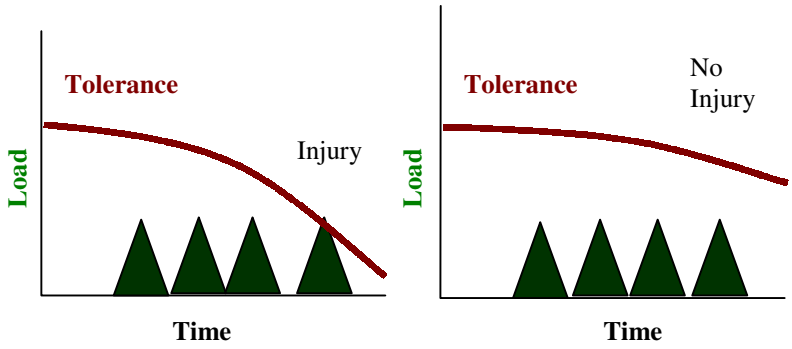
Injury Prevention

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 Grade/Quality Control Inspector 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 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 Grade/Quality Control Inspector, 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.

Pull-off stations

E

To decrease awkward postures of the shoulder and low back, build designated pull-off stations in different areas of the mill that allow the worker to handle and measure wood at approximately waist height. This design allows for safer manual handling of boards, since they can be slid off (or leveraged over the edge of) the transfer deck, measured, and then transferred back onto the transfer deck, all at proper working heights.

In areas with no measuring station, the worker exerts more force to move boards from the transfer deck to the floor or sawhorse.

In an area with a measuring station, the worker can use leverage to move the board off the conveyer to a nearby station, and can measure board dimensions while in safe back postures.

A measuring station with rollers (instead of sawhorses) makes it easier to pull boards off the transfer deck. The board holders are at the same height as the transfer deck, allowing the boards to be transferred with minimal lifting and lowering.

Use leverage when handling boards

E
WP

In order to reduce force on the shoulder and back while handling lumber, use leverage when possible. Leverage points allow a worker to manoeuvre boards using body weight, in addition to some muscular effort.

Leverage can be used when moving boards off of or onto transfer decks.

Leverage can also be used when one person is inspecting finished loads to ensure that they have been properly graded. In the picture below, the leverage bar used is height adjustable, to accommodate workers of different heights

Leverage bars

E

Ideally, bars and sawhorses used for leverage should have certain characteristics:

- A stable base and sufficient weight to prevent excess movement.
- A smooth low-friction top surface makes manoeuvring boards easier
- Height adjustability allows different sized workers to work in good postures

The tool shown above has the characteristics of a good leverage bar. A stop-pin mechanism allows height adjustment for different tasks and workers.

The sawhorse shown above has been given a metal top surface to lower the friction between the sawhorse and the wood.

Braced postures

WP To reduce load on the low back when reaching onto a conveyor or transfer deck to pull boards, a Grade/Quality Control Inspector can use the safety rail or guard to brace the lower body. When bending forward, bracing the lower body against the guard reduces the amount of muscle activity in the low back.

Ideally, the safety rail or guard should be padded to avoid excessive contact stress. The Grade/Quality Control Inspector should try to use a free arm to support the upper body when possible.

Warm up for lifting

WP To reduce the risk of low back strain due to handling lumber a Grade/Quality Control Inspector should be encouraged to build a warm up period into his/her schedule. After prolonged sitting while doing office work, tissues of the low back are not in the ideal condition for lifting - soft tissues are stretched, discs are compressed. Lifting with tissues in this state can significantly increase the risk of injury to the low back.

Workers should try to do lifting and handling tasks only after a period of standing and walking, where the tissues in the back can recover to normal conditions.

FLOOR SURFACES

Anti-fatigue insoles

PPE

If a worker must stand in several different areas for long periods of time, anti-fatigue insoles in work boots will help to minimise fatigue in the lower extremities. The cushioned surface of the insole can absorb repeated impact from walking on concrete floors and metal catwalks, and may aid in damping vibration while standing in one spot.

Appropriate footwear

PPE

A Grade/Quality Control Inspector may spend the majority of the shift walking throughout the mill. In order to ensure healthy foot alignment, purchase appropriate footwear (e.g., good arch and heel support for the individual's foot, cushioned insole, etc. Some additional features to consider include a good tread on the sole to prevent slipping on work surfaces. See the guidelines for footwear in the Foot section of the Body Manual.

Kneepads

PPE

If there are tasks that require working at low levels, and kneeling is preferred by the worker (e.g., inspecting finished loads, tallying loads), having kneepads available in that work area would help to reduce contact stress to the knees.

Guidelines for Office Work

The following office work guidelines are recommended for workers who have office duties in addition to their tasks throughout the sawmill.

WORKSTATION LAYOUT

Computer workstation layout

WP

In order to reduce awkward postures of the neck/shoulder orient the workstation so that the computer can be accessed straight on (below left). This positioning will reduce the need for the worker to twist while working at the computer (below right), which causes awkward postures of the neck and upper body.

Computer in front of worker

Computer off to the side

Keyboard placement

E
WP

Place the keyboard in the appropriate position based on use. If the lettered section is used most frequently, centre the middle of the letter keys in front of the worker, leaving the numeric pad out to the right-hand side. If the number pad is used more frequently, move the keyboard so that the number pad is in line with the right shoulder. This positioning will reduce awkward postures of the neck/shoulder and low back.

Adjustable keyboard and mouse tray

E

An adjustable keyboard and mouse tray may help to decrease awkward postures of the wrists by allowing the operator to adjust the keyboard and/or mouse to the most comfortable height and reach distance. Ideally the keyboard will be at a height where the wrists are straight when the fingers are on the middle row of keys. This is also a good position for "hunt-and-peck" typists.

If the work surface does not adjust up or down, raise or lower the chair to a height where the worker can maintain neutral wrist postures. Keeping the wrists neutral will reduce the risk of wrist discomfort or injury.

Wrist support

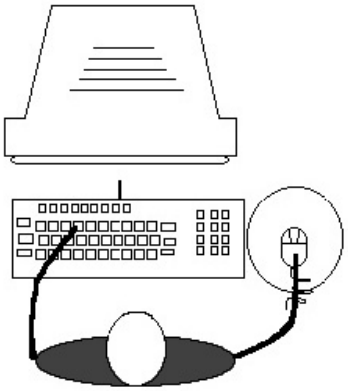
E

In order to minimise awkward postures of the wrists while typing or mousing, use a wrist support to help keep the wrists in a neutral position. A wrist support made of a soft material such as foam or gel will also reduce contact stress of the wrist.

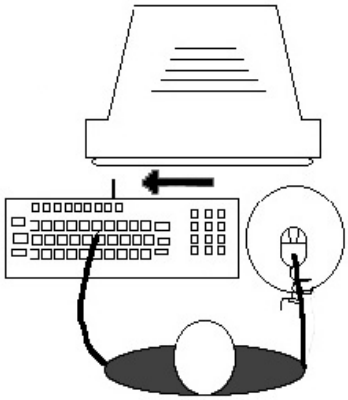
Mouse placement

E
WP

In order to reduce awkward and/or static postures of the shoulder, position the mouse so that it is close to, and at the same height as, the keyboard. If the mouse is used more frequently than the keyboard, position the mouse so that it is on the desk directly in front of the arm that uses the mouse.



Position for mainly keyboard use



Position for mainly mouse use

Monitor positioning

Proper positioning of the monitor can reduce several ergonomic risk factors:

E
WP

To reduce eyestrain and awkward postures of the neck, position the monitor so that it is approximately an arm's length distance from the worker.

Note: Larger monitors may need to be positioned farther away from the worker.

E
WP

In order to reduce awkward postures of the neck, adjust the monitor height so that the top line of text, or the top of the screen, is at eye level.

Note: Bifocal wearers may want to position the screen lower so that it is more easily viewed through the bottom of the lenses.

Suggestions for lowering the monitor:

- Take it off the central processing unit and place it directly on the desk
- Raise the height of the chair

Suggestions for raising the monitor:

- Put a book or other flat object under the screen
- Place the monitor on an adjustable arm

WP To minimise glare on the monitor due to overhead lights, tilt the monitor downward and locate it perpendicular to windows. Minimising glare helps to reduce eyestrain.

Desk workstation layout

E In order to reduce awkward postures of the upper body, organise items on the desk to correspond with the frequency of daily tasks. The most frequently used items (e.g., keyboard and mouse) should be placed within forearm's reach. Less frequently used items (e.g., phone) should be placed within a comfortable arm's reach, and infrequently used items (reference books, papers used once per month) can be placed farther away.

Phone placement

E In order to reduce awkward postures of the upper body, place the phone on the non-dominant side. For example, a right-handed worker should place the phone on the left side of the workstation. This positioning allows the worker to write while on the phone, without the phone cord getting in the way.

Footrest

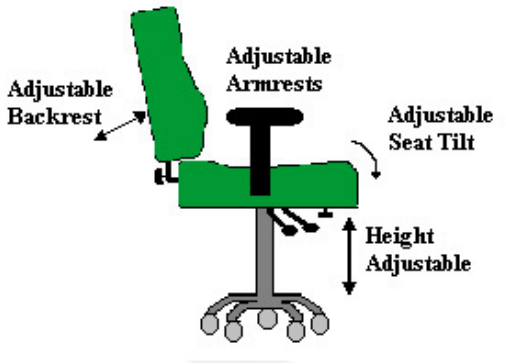
E
WP A footrest may prevent awkward postures of the back, and contact stress on the legs, if the chair and work surface are too high. Supporting the feet on the ground or on a footrest helps a worker to maintain proper postures while seated.

SEATING

Adjustable seating

E
WP

To avoid awkward postures of the body, seating should have several adjustable features (see list below) to allow for continual postural adjustments. Workers should also be trained on how and why to use the adjustable features. Poor chairs can contribute to back stress, circulation problems, fatigue, and discomfort. A good chair should have the following:



- Adjustable height
- Adjustable backrest
- Adjustable backrest height
- Adjustable arm rests
- Adjustable seat tilt
- Waterfall front edge
- Five legs
- Swivel seat
- Durable/breathable fabric

Vary body posture

WP

In order to reduce awkward postures of the back, workers should get up from the seated posture throughout the day. At least once an hour is recommended. This alleviates the load on the spine, allows the discs to equalise, and allows ligaments to regain their stiffness after being stretched out from sitting.

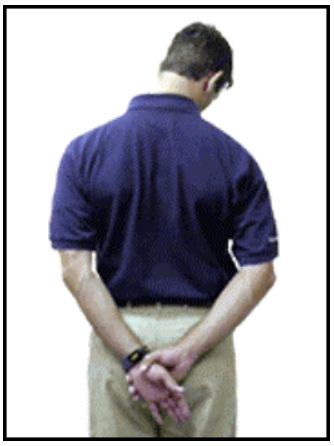
Additional Work Practices

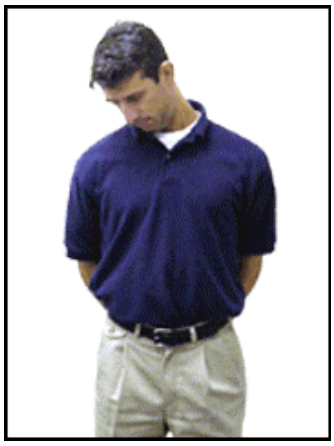
Stretches

WP The following stretches can be done as a warm-up before the shift, as well as before every break. Stretches marked with an asterisk (*) are also beneficial after any prolonged office work.

Neck Stretch

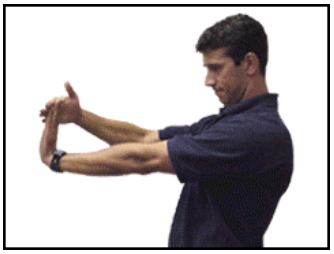
Turn the head slightly to one side and reach for the ground with the ground behind you with the opposite arm. Hold for 10 seconds. Repeat 3 times on each side.

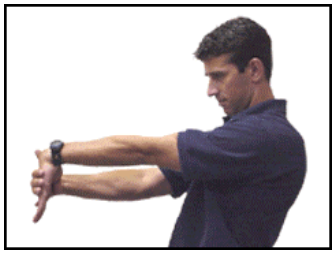




Wrist Flexor and Extensor Stretch

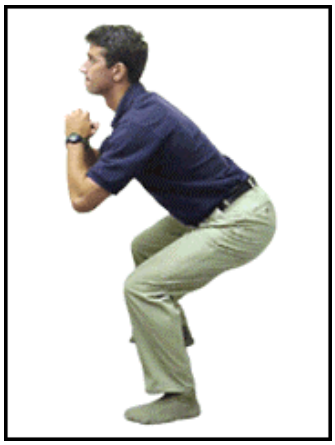
With your arm extended and fingers pointing up, gently pull hand towards your body until you feel a mild stretch in the forearm. (**Note:** do not stretch to the point where you feel pain or tingling). Hold for 15 – 30 seconds. Repeat with fingers pointing down. Repeat with the other arm.





Squat

Place feet shoulder width apart, sit down and then stand back up. Repeat 5 times

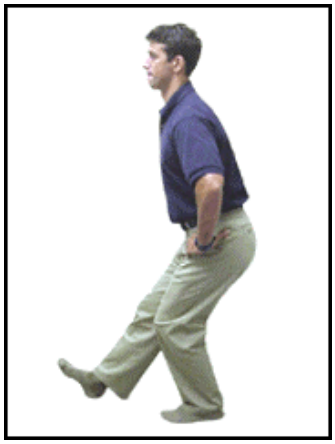


Hip Flexor Stretch

Place one foot in front of the other and lower the body, keeping your pelvis tilted. Hold for 5 seconds. Repeat 3 times with each leg.

Hamstring Stretch

Place one foot in front of the other and squat down. Hold for 5 seconds. Repeat 3 times with each leg.



Characteristics of Objects Being Handled

Manual material handling

WP

The following work practices refer specifically to manual material handling tasks. These tasks include lifting, lowering, pushing, pulling, carrying, and holding objects.

- Use the entire body, especially the large muscle groups of the lower body, to perform a movement.
- To reduce loading on the soft tissues of the back, lift heavy objects with a neutral back posture while maintaining the 3-point curve (the natural "S" shaped curve of the back – see the Injury Education section for more information). Do not use pelvic tilt to position the trunk for lifting.
- Do not twist while holding or moving a load. This places the back in a weaker posture that can lead to injury.
- When lifting, lowering, carrying, or holding objects keep them as close to the body as possible. The farther the load is away from the body, the more stress it puts on the back.

CONTAINER, TOOL AND EQUIPMENT HANDLES

Task variability

A
WP

A Grade/Quality Control Inspector generally has the ability to vary tasks throughout the shift, and rarely uses one tool for excessive duration. However, breaking up difficult tasks throughout the shift may reduce cumulative exposure to awkward postures due to tool design. For example, if repeated use of the moisture metre (testing 90 boards at a time) causes hand or wrist discomfort, break up this task by testing 30 boards at three different times during the day.

Environmental Conditions

Please refer to the General Risk Factor Solutions Manual for solutions regarding environmental conditions.

Work Organisation

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
Pull-off stations	**73**			**A**				**A**				
Use leverage when handling boards	**74**			**F**				**F**				
Leverage bars	**75**			**F A**				**F A**				
Braced postures	**76**							**F**				
Warm up for lifting	**76**							**F**				
Anti-fatigue insoles	**77**											**R**
Appropriate footwear	**77**											**R**
Kneepads	**77**									**C**		
Computer workstation layout	**78**			**A**								
Keyboard placement	**78**			**A**				**A**				
Adjustable keyboard and mouse tray	**79**					**A**						

Direct Risk Factors

F = *Force* **R** = *Repetition* **A** = *Awkward Postures*
S = *Static Postures* **C** = *Contact Stress* **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
Wrist support	**79**					**A**						
Mouse placement	**80**			**A**								
Monitor positioning	**80**			**A**								
Desk workstation layout	**81**			**A**								
Phone placement	**81**			**A**								
Footrest	**81**							**A**				
Adjustable seating	**82**			**A**				**A**				
Vary body posture	**82**							**A**				
Stretches	**83**	indirectly reduces risk of injury to the body										
Manual material handling	**85**							**F** **A**				
Task variability	**85** ◆					**A**						

Direct Risk Factors

F = *Force* **R** = *Repetition* **A** = *Awkward Postures*
S = *Static Postures* **C** = *Contact Stress* **V** = *Vibration*
◆ = *See General Risk Factor Solutions Manual*

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
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										
Work Pace	◆	indirectly reduces risk of injury to the body										
Scheduling	◆	indirectly reduces risk of injury to the body										

Direct Risk Factors

◆ = *See General Risk Factor Solutions Manual*

GRADE/QUALITY CONTROL INSPECTOR MSI SAFETY GUIDE

OBJECTIVE:

To identify ergonomic risks involved in a Grade/Quality Control Inspector job and to reduce the potential for musculoskeletal injuries.
More detailed information about risk reducing recommendations can be found in the Work Manual for the Grade/Quality Control Inspector.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Shoulder A Grade/Quality Control Inspector may work with arms or shoulders raised when handling (pushing, pulling, and lifting) boards in various parts of the mill to check the board size and quality.	**Force** **Awkward Postures**	• The rotator cuff stabilises the shoulder joint when objects are pushed, pulled, and manipulated. The heavier the object, the greater the load on the rotator cuff. • If force placed on the rotator cuff exceeds tissue tolerances, injury may occur. • The rotator cuff stabilises the shoulder joint when the arms are away from the body. The farther away the arms are from the body, the greater the load on the rotator cuff.	• **Leverage:** In order to reduce force on the shoulder and back while handling lumber, use leverage when possible. Examples include using a bar or sawhorse to transfer boards from one load to another, or using a bar or raised conveyor edge to manoeuvre a board on to or off of the conveyor. This allows you to manoeuvre the boards using your body weight in addition to muscular effort. • Refer to the Manual Material Handling Tips in Low Back section – these will also help to reduce force on the shoulder muscles. • For exercises that can help prevent ***Shoulder*** injuries, ***see the Shoulder section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Wrist A Grade/Quality Control Inspector may grip measurement tools with awkward wrist postures when testing lumber.	**Awkward Postures** **Static Postures**	• As the wrist is bent, tendon sheaths rub against the walls of the carpal tunnel. The further the wrist is bent, the more friction experienced in tendon sheaths. • When the wrist is held in a bent position, tendon sheaths are under constant stress. If the duration of constant stress is excessive, and recovery is not adequate, wrist tissues may fatigue to the point of injury.	• Exposure to using any awkward tools may be reduced by breaking up difficult tasks throughout the shift. For example, if repeated use of the moisture meter (testing 90 boards at a time) causes hand or wrist discomfort, break up this task by testing 30 boards at three different times during the day. • For exercises that can help prevent ***Wrist*** injuries, ***see the Wrist section of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Grade/Quality Control Inspector may bend forward to measure and check the quality of wood. Repetitive bending may occur when inspecting and restacking finished loads for proper grade.	**Force** **Repetition** **Awkward Postures**	• 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. • Repeated forward bending and/or lifting can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, disc walls or other tissues may fatigue to the point of injury. • Back muscles must support the weight of the upper body when bending forward. Increased bending of the back increases loading on the spine and pressure on the walls of discs.	• Refer to the Leverage recommendation in the Shoulder section. • To reduce the load on the low back when reaching onto a conveyor or transfer deck to pull boards, use the safety rail or guard (if available) to brace the lower body. This helps to reduce the amount of force on the low back while bending forward. Ideally, the safety rail or guard should be padded to avoid excessive contact stress. Also, try to use a free arm to support the upper body when possible.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS

	Low Back (continued)
	
	Seated office work also contributes to loading on the low back
		see above	*see above*	• To reduce the risk of low back strain due to handling lumber, build a "warm up period" into your work schedule. For example after prolonged sitting (e.g., while doing office work), the tissues of the low back are not in the ideal condition for lifting - soft tissues are stretched, discs are compressed. This can significantly increase the risk of injury to the low back. Therefore, try to do lifting and handling tasks after a period of standing and walking (e.g., after walking throughout the mill for 15 minutes to monitor wood coming out of various machines).
				• **Manual Material Handling Tips** (for lifting, lowering, pushing, pulling, carrying, and holding objects) to reduce force and awkward postures of the back:
				  • Use the entire body, especially the large muscle groups of the lower body, to perform a movement.
				  • Lift heavy objects with a neutral back posture while maintaining the 3-point curve (the natural "S" shaped curve of the back. Do not use pelvic tilt to position the trunk for lifting.
				  • Do not twist while holding or moving a load. This places the back in a weaker posture that can lead to injury.
				  • When lifting, lowering, carrying, or holding objects, keep them as close to the body as possible. The farther the load is away from the body, the more stress it puts on the back.
				  • For exercises that can help prevent ***Back*** injuries, ***see the Back section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Knee A Grade/Quality Control Inspector may squat or kneel to inspect finished loads. Repeated climbing up and down stairs also places stress on structures of the knee	**Repetition** **Awkward Postures** **Static Postures** **Contact Stress**	• 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 kneecap on the thighbone and increased contact stress between these bones. • 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 thighbone.	• Use kneepads for tasks that require kneeling to reduce contact stress on the knees. • For exercises that can help prevent ***Knee*** injuries, ***see the Knee section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Foot A Grade/Quality Control Inspector may stand and walk on hard surfaces continuously throughout a shift.	**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.	• If you must stand in several different areas for long periods of time, anti-fatigue insoles in work boots will help to minimise fatigue in the lower extremities. The cushioned surface of the insole can absorb repeated impact from walking on concrete and (metal) catwalks, and may aid in damping vibration while standing in one spot. • For exercises that can help prevent ***Foot*** injuries, ***see the Foot section of the Body Manual***.