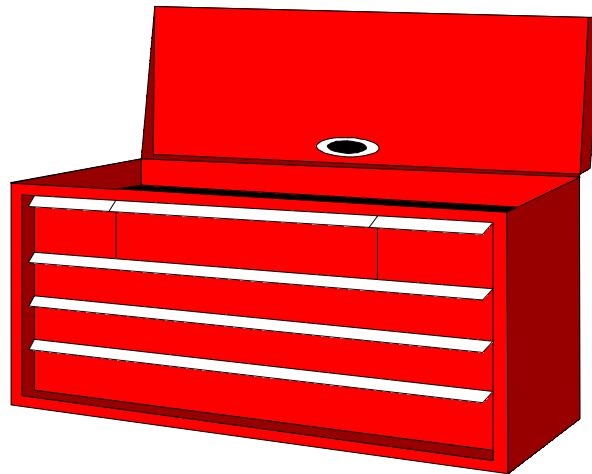


# INDUSTRIAL MUSCULOSKELETAL INJURY REDUCTION PROGRAM

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## Common Industry Jobs (CIJs) Cornerperson Tool Kit



**IMIRP** program coordinated by:

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Council of  
Forest  
Industries



Industrial  
Wood & Allied  
Workers of  
Canada



Advanced  
Ergonomics  
Inc.

In cooperation with the Workers' Compensation Board of British Columbia

# CORNERPERSON TOOL KIT

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# Cornerperson Tool Kit

# Overview

## Cornerperson

### Job Summary

A Cornerperson is responsible for transferring wood pieces from the jointer to the assembler. A Cornerperson will inspect wood pieces, joints, and glue, and advance acceptable pieces to the assembler. Off-grade wood pieces and pieces with defective finger joints or glue spread are diverted for reuse. Unjamming of the assembler and infeed conveyors can also be required. A Cornerperson may be responsible for maintenance tasks on the jointer and assembler, including adjusting for dimension and changing glue heads. Refer to the Physical Demands Analysis for more detail. A Cornerperson may also be called a Joint Inspector or a Crowder.

### Physical Demands

The physical demands of the Cornerperson may include:

- a) Forceful exertion of back muscles
- b) Repetitive movements of neck, shoulder, and elbow
- c) Awkward postures of the neck, shoulder, elbow, and back
- d) Static postures of the neck and back
- e) Walking to perform machine maintenance
- f) Standing, with less than 1.0 metres of walking, to inspect pieces, advance pieces, and reject/reuse pieces
- g) Sitting where a chair is available
- h) Climbing onto assembler for performing machine maintenance
- i) Handling of wood pieces with one or two hands

### Mental Demands

A Cornerperson needs to maintain alertness to inspect each piece during the fast transfer of wood blocks. Effectively inspecting the quality of wood, finger joint cut, and glue requires rapid decision making. Technical knowledge is required for machine maintenance and glue head changing.

## **Major Variations**

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

- 1) A Cornerperson may inspect pieces and advance pieces while:
  - a) Sitting
  - b) Standing
  - c) Alternating between sitting and standing as desired
  
- 2) Pieces may pass :
  - a) From the Cornerperson's right to left after the jointer (working inside the corner)
  - b) Head on to the worker (working outside the corner)
  
- 3) A Cornerperson may reject pieces into:
  - a) A rolling bin that can be positioned in preferable location
  - b) A stationary bin that is positioned in a set location
  - c) A conveyor that is positioned in a set location

# Physical Demands Analysis Cornerperson

## PDA General Instructions: Cornerperson

The purpose of this PDA is to familiarise healthcare professionals with the physical demands of a Cornerperson. 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 Cornerperson(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.

### **Disclaimer**

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

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# Physical Demands Analysis Cornerperson

## Task List

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

### **Inspect pieces**

A Cornerperson will inspect the quality of lumber pieces, especially the finger jointing and glue spread, before the pieces advance to the assembler. This inspection typically involves handling of the pieces, as well as checking the far side in a mirror.

*Does this task occur at your mill?*

Yes       No



### **Advance pieces**

Acceptable pieces are advanced to the assembler. To prevent jamming of the assembler, pieces are often held in place on the moving conveyor and released to the assembler in a singulated fashion.

*Does this task occur at your mill?*

Yes       No



## Reject/reuse pieces

Pieces that are below grade or defective (e.g., broken finger joint, not enough glue) are diverted for reuse. Conveyors or bins are used for removing these pieces.

*Does this task occur at your mill?*

Yes       No



## Unjam pieces

Unjamming of single or joined wood pieces in the assembler is a task of the Cornerperson. Pieces get jammed at either the infeed area or inside the assembler. This task can be done by hand or with the help of handtools. In some cases, some disassembling of the assembler is required to remove pieces.

*Does this task occur at your mill?*

Yes       No



## Machine maintenance

A Cornerperson can be responsible for maintenance of the assembler, planer, and glue applier. Assembler maintenance can include unjamming and changing settings for different lumber dimensions.

*Does this task occur at your mill?*

Yes       No



## Job Profile

Date: \_\_\_\_\_

Company Name: \_\_\_\_\_

Division: \_\_\_\_\_

Employee Name: \_\_\_\_\_

Supervisor: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

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

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

Describe:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Length of shift \_\_\_\_\_ hours

Formal breaks

- Two 10 minute breaks
- One 30 minute lunch break
- Other: \_\_\_\_\_

Informal breaks

- Yes, length of break varies
- Yes, \_\_\_\_\_ minutes/shift

Work pace control

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

Job rotation

Describe:

Yes  No

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Work Organisation

### Task Description

The table below contains a list of tasks performed by a Cornerperson. 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%	
<i>Inspect pieces</i>					<ul style="list-style-type: none"> <li>• Visual inspection of wood grade, end joints, and glue application</li> <li>• Some handling required</li> <li>• 20 to 70 pieces per minute</li> </ul>
<i>Advance pieces</i>					<ul style="list-style-type: none"> <li>• Align pieces for assembler</li> <li>• Simultaneous with task of inspecting pieces</li> </ul>
<i>Reject/reuse pieces</i>					<ul style="list-style-type: none"> <li>• Pieces thrown into conveyor or bin</li> <li>• 2 to 10 rejected pieces per minute</li> </ul>
<i>Unjam pieces</i>					<ul style="list-style-type: none"> <li>• In assembler</li> <li>• 15 to 40 per shift</li> </ul>
<i>Machine maintenance</i>					<ul style="list-style-type: none"> <li>• Adjustment of assembler for different wood dimensions</li> <li>• Changing glue heads, cleaning glue applicator</li> <li>• 2 to 4 times per shift</li> </ul>
<i>Other:</i>					

## **Workstation Characteristics**

### **Dimensions & Layout**

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

**Flooring, Displays & Seating**

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

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

## Equipment & Machinery Controls

The table below contains a list of the types of controls used by a Cornerperson. 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	
	<i>Push button</i>	<ul style="list-style-type: none"> <li>• <i>Start/stop assembler</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Used before/after machine maintenance</i></li> </ul>
	<i>Rotary switch</i>	<ul style="list-style-type: none"> <li>• <i>Start/stop conveyors</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Used to control infeed/outfeed during jam-ups</i></li> </ul>
	<i>Other:</i>		

## Physical Demands





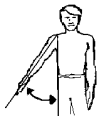
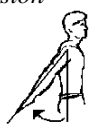
### Whole Body Physical Demands


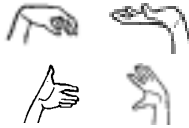
Identify each of the physical demands required by a Cornerperson and list the corresponding tasks in the second column. Check off (✓) the estimated *Percent of Shift*, and use the *Comments* section to include information related to duration, frequency, and cycle times.

Physical Demands	Tasks or Activity	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Standing</i>	<ul style="list-style-type: none"> <li>• <i>Inspect pieces</i></li> <li>• <i>Advance pieces</i></li> <li>• <i>Reject/reuse pieces</i></li> </ul>				✓	<ul style="list-style-type: none"> <li>• <i>Some walking, but less than 1.0 m in distance</i></li> <li>• <i>No seat available</i></li> </ul>
<i>Walking</i>						
<i>Sitting</i>						
<i>Standing</i>						
<i>Climbing</i>						
<i>Balancing</i>						
<i>Kneeling/ Crouching</i>						
<i>Other:</i>						





## Body Postures





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

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Shoulder Flexion</i>	<ul style="list-style-type: none"> <li>Inspect pieces</li> </ul>		✓			<ul style="list-style-type: none"> <li>20 to 70 pieces per minute</li> <li>Operator draws pieces towards themselves</li> </ul>
<b>Neck</b>						
<i>Flexion</i> 						
<i>Extension</i> 						
<i>Twisting</i> 						
<b>Shoulder</b>						
<i>Flexion</i> 						
<i>Abduction/ adduction</i> 						
<i>Extension</i> 						

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

## Manual Material Handling

The table below contains a list of general manual material handling activities performed by a Cornerperson. 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%	
<i>Pushing</i>							
<i>Pulling</i>							
<i>Lifting</i>							
<i>Lowering</i>							
<i>Carrying</i>							

## Hand Tools

Indicate the hand tools used by a Cornerperson 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%	
Pry bar	<ul style="list-style-type: none"> <li>Unjam pieces</li> </ul>	0.5 to 2.0					<ul style="list-style-type: none"> <li>Often created in-house</li> <li>Used to pry pieces out and to hold assembler press open</li> </ul>
Hammer	<ul style="list-style-type: none"> <li>Unjam pieces</li> <li>Machine maintenance</li> </ul>	0.5 to 1.2					<ul style="list-style-type: none"> <li>Rarely used</li> </ul>
Scraper (putty knife)	<ul style="list-style-type: none"> <li>Machine maintenance</li> </ul>	<0.5					<ul style="list-style-type: none"> <li>Used to scrape glue off glue heads and surrounding machinery</li> </ul>
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
<b>Vibration</b> ( <i>Indicate source</i> ) <input type="checkbox"/> Seat <input type="checkbox"/> Floor <input type="checkbox"/> Tool <input type="checkbox"/> Other: _____	
<b>Noise level</b>	
<b>Lighting level</b>	
<b>Other:</b>	

### 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.
<input type="checkbox"/> Vancouver Island	22.5 °C	-0.6 °C	36.1 °C	-18.8 °C
<input type="checkbox"/> Southwestern BC	22.9 °C	0.4 °C	35.6 °C	-18.3 °C
<input type="checkbox"/> Cariboo Chilcotin Coast	22.2 °C	-11.6 °C	36.4 °C	-42.5 °C
<input type="checkbox"/> High Country	26.3 °C	-9.9 °C	39.6 °C	-39.7 °C
<input type="checkbox"/> Okanagan Similkameen	26.5 °C	-8.4 °C	36.0 °C	-36.3 °C
<input type="checkbox"/> Kootenay Country	26.2 °C	-6.7 °C	38.5 °C	-32.0 °C
<input type="checkbox"/> British Columbia Rockies	24.7 °C	-12.3 °C	37.5 °C	-42.2 °C
<input type="checkbox"/> North by Northwest	19.5 °C	-11.7 °C	32.9 °C	-38.1 °C
<input type="checkbox"/> 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 Cornerperson at your mill, indicate with a check mark (✓) which of the PPE items are required.

<input type="checkbox"/>	Gloves Type:	<input type="checkbox"/>	Hard Hat	<input type="checkbox"/>	Leather Apron
<input type="checkbox"/>	Glove Liners	<input type="checkbox"/>	Steel-toed Boots	<input type="checkbox"/>	Dust Mask
<input type="checkbox"/>	Eye Protection	<input type="checkbox"/>	Hearing Protection	<input type="checkbox"/>	Seat Belt
<input type="checkbox"/>	Face Shield/Helmet	<input type="checkbox"/>	Life Jacket	<input type="checkbox"/>	Harness
<input type="checkbox"/>	Knee Pads	<input type="checkbox"/>	Other:	<input type="checkbox"/>	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.*

$$[(\text{Dimensions of wood}) \times 12] / 144 = \text{Multiple}$$

**For example:** For a 5 by 5 piece of wood  $[(5 \times 5) \times 12] / 144 = 2.08$

### 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
8 foot		14 foot	20 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

$$2.95 \text{ (wet lb./ board foot)} \times 0.67 \text{ (size of wood multiple for 2" x 4")} \times 16 \text{ (length of board in feet)} = 32 \text{ lbs.}$$

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) <i>From Section 1</i>	x	Multiple (size of wood) <i>From Section 2</i>	x	Length of Wood <i>From Section 3</i>	=	Weight of the Board in pounds	Divide by 2.2 to calculate value in kilograms
<b>Heaviest Species Handled</b>	x		x		=		
<b>Most Common Species Handled</b>	x		x		=		
<b>Lightest Species Handled</b>	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



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

# Risk Factor Identification Checklist

## Cornerperson

### Purpose

The Risk Factor Identification Checklist for a Cornerperson 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 – Cornerperson

Management Representative \_\_\_\_\_

Risk Identification completed:

Worker Representative \_\_\_\_\_

Before implementation of solutions

Date \_\_\_\_\_

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.

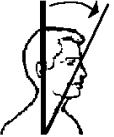

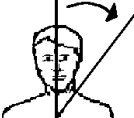
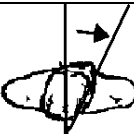
**Static Postures:** Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

**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.

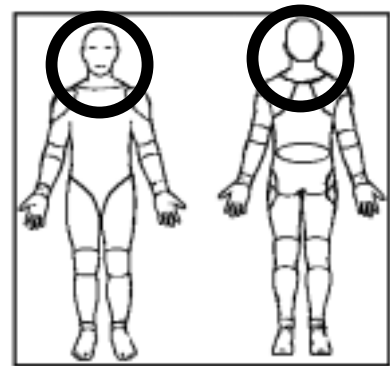
**Awkward Postures:** Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

**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 to mirror frequently)			S	
			O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., inspecting wood pieces)			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., inspecting pieces on infeed conveyor)			S	
			O	
Awkward Posture				
Flexion			S	
			O	
Extension			S	
			O	
Lateral Bending			S	
			O	
Rotation			S	
			O	



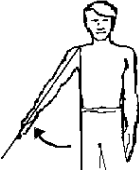
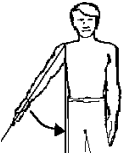
Please indicate whether the following direct risk factors were identified at the <b>NECK</b> .		
<b>Direct Risk Factors</b>	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/>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



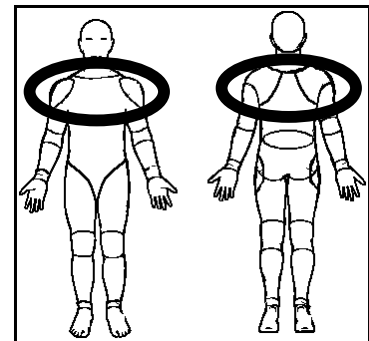
Body parts within the circled area will be classified as NECK issues.

## SHOULDER

<b>Force</b>	<b>N</b>	<b>Y</b>	<b>Comments:</b>
Is forceful physical handling performed? Such as: Lifting		S O	
Lowering		S O	
Pushing		S O	
Pulling		S O	
Carrying		S O	
<b>Repetition</b>			
Are identical or similar motions performed over and over again? (e.g., reaching to inspect and advance wood pieces)		S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., handling wood pieces)		S O	
<b>Static Posture</b>			
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., unjamming wood pieces in assembler)		S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., holding back wood pieces on moving conveyor)		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 <b>SHOULDER</b> .	
<b>Direct Risk Factors</b>	Force <input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition <input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture <input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture <input type="checkbox"/> Yes <input type="checkbox"/> No
In the <b>Injury Statistics</b> investigation, were there injury reports for the Shoulder or Neck or Upper Back? (see Worksheet 1 in the Implementation Guide) <input type="checkbox"/> Yes <input type="checkbox"/> No	
In the <b>Discomfort Survey</b> investigation, were there reports of discomfort for the Shoulder or Neck or Upper Back? (see Worksheet 2 in the Implementation Guide) <input type="checkbox"/> Yes <input type="checkbox"/> No	



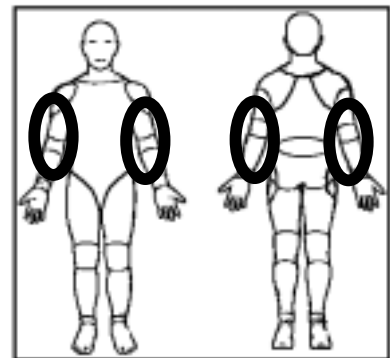
*Body parts within the circled area will be classified as SHOULDER issues.*

## ELBOW

Force		N	Y	Comments:
Is forceful physical handling performed? Such as:			S	
Lifting			O	
Lowering			S	
			O	
Pushing			S	
			O	
Pulling			S	
			O	
Carrying			S	
			O	
Turning materials			S	
			O	
Are objects handled in a power grip? (e.g., pry bar for unjamming)			S	
			O	
Are objects handled in a pinch grip? (e.g., wood pieces)			S	
			O	
Are objects handled in a hook grip? (e.g., wood pieces)			S	
			O	
Ask the worker: Do you wear gloves while performing your job? If the answer is <b>No</b> , check the <b>No</b> box and go to next section.			*	S
				O
*If the answer to the above question is <b>Yes</b> , 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., handling wood pieces)				S
				O
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., handling wood pieces)				S
				O




<b>Static Posture</b>		N	Y	Comments:
Ask the worker: Do tasks require your hand and arm to be maintained in a fixed or static posture? (e.g., handling wood pieces)			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., holding pry bar)			S O	
<b>Contact Stress</b>				
Ask the worker: Do <b>any</b> objects, tools or parts of the workstation put pressure on <b>any</b> parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm, elbow? (e.g., metal edges of workstation digging into elbow)			S O	
<b>Vibration</b>				
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment? (e.g., pry bar in assembler)			S O	





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



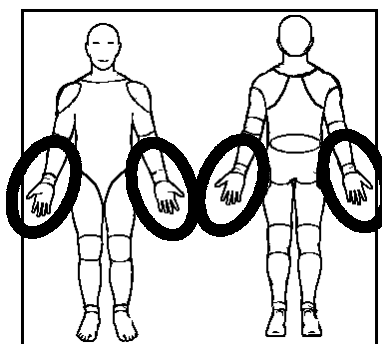
*Body parts within the circled area will be classified as ELBOW issues.*

## WRIST/HAND

Force		N	Y	Comments:
Is forceful physical handling performed? Such as:			S	
Lifting			O	
Lowering			S	
			O	
Pushing			S	
			O	
Pulling			S	
			O	
Carrying			S	
			O	
Turning materials			S	
			O	
Are objects handled in a power grip? (e.g., hammer)			S	
			O	
Are objects handled in a pinch grip? (e.g., wood pieces)			S	
			O	
Are objects handled in a hook grip? (e.g., wood pieces)			S	
			O	
Ask the worker: Do you wear gloves while performing your job? If the answer is <b>No</b> , check the <b>No</b> box and go to next section.			*	S
				O
*If the answer to the above question is <b>Yes</b> , 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., turning wood pieces)				S
				O
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., handling wood pieces)				S
				O

<b>Static Posture</b>		N	Y	Comments:	
Ask the worker: Do tasks require any part of your arm or hand to be maintained in a fixed or static posture? (e.g., holding pry bar to keep assembler open)				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., pry bar)				S	
				O	
<b>Contact Stress</b>					
Ask the worker: Do <b>any</b> objects, tools or parts of the workstation put pressure on <b>any</b> parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm? (e.g., pry bar digging into the palm of the hand)				S	
				O	
Ask the worker: Do you use your hand like a hammer for striking? (e.g., unjamming wood pieces in assembler)				S	
				O	
<b>Awkward Posture</b>					
Flexion				S	
				O	
Extension				S	
				O	
Ulnar Deviation				S	
				O	
Radial Deviation				S	
				O	
<b>Vibration</b>					
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment? (e.g., pry bar in assembler)				S	
				O	



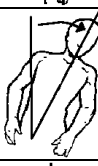

Please indicate whether the following direct risk factors were identified at the <b>WRIST/HAND</b> .		
<b>Direct Risk Factors</b>	Force	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/>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



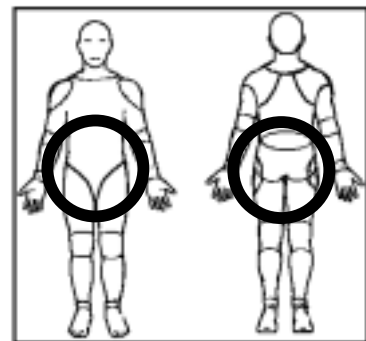
*Body parts within the circled area will be classified as WRIST issues.*

## LOW BACK OR HIP/THIGH

<b>Force</b>	N	Y	Comments:
Is forceful physical handling performed? Such as:			S
Lifting			O
Lowering			S
			O
Pushing			S
			O
Pulling			S
			O
Carrying			S
			O
<b>Repetition</b>			
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 over the infeed conveyor)			S
			O
<b>Static Posture</b>			
Ask the worker: Do tasks require your trunk and upper body to be maintained in a fixed or static posture? (e.g., inspecting and advancing wood pieces)			S
			O
Are workers required to sit or stand in a stationary position for long periods of time during the shift? (e.g., inspecting and advancing wood pieces)			S
			O
<b>Contact Stress</b>			
Ask the worker: Do <b>any</b> objects, tools or parts of the workstation put pressure on <b>any</b> parts of your hip/thigh? (e.g., conveyors that dig into the hip or thigh)			S
			O


Awkward Posture		N	Y	Comments:
Flexion			S O	
Extension			S O	
Lateral Bending			S O	
Twisting			S O	
<b>Vibration</b>				
Ask the worker: Is your whole body exposed to vibration for significant portions of the work shift? (e.g., sitting in chair connected to vibrating machinery)			S O	

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

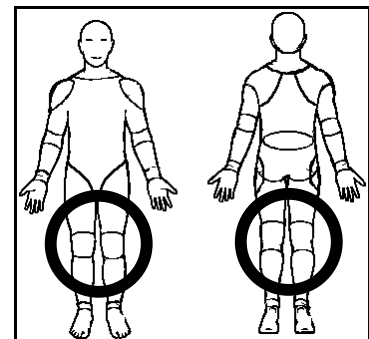


Body parts within the circled area will be classified as **LOW BACK** issues.

## KNEE



Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., climbing on to assembler)			S O	
Static Posture				
Ask the worker: Do tasks require you to maintain your knee(s) in a fixed or static posture? (e.g., standing at infeed conveyor)			S O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift? (e.g., inspecting wood pieces)			S O	
Do workers kneel (with one or both knees)? (e.g., adjust assembler)			S O	
Contact Stress				
Ask the worker: Do <b>any</b> objects or parts of the workstation put pressure on your knee(s)? (e.g., kneeling on assembler)			S O	
Awkward Posture				
Extreme Flexion			S O	

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

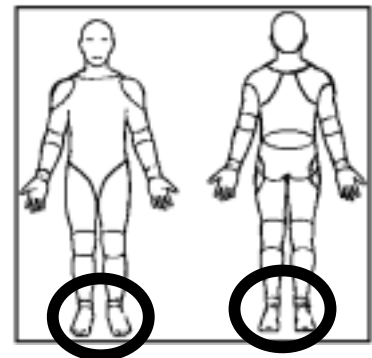


*Body parts within the circled area will be classified as KNEE issues.*

## ANKLE/FOOT

Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., walking on uneven surfaces)			S O	
Static Posture				
Are workers required to stand in a stationary position for long periods of time during the shift? (e.g., standing to inspect wood pieces)			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?			S O	

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



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

## CHARACTERISTICS OF OBJECTS BEING HANDLED

	N	Y	Comments:
Are there problems handling a load due to its size or shape?			S O
Are there problems handling a load due to its fragile, unbalanced, or non-rigid conditions? (e.g., joined wood pieces)			S O
Ask the worker: Do you experience situations where mechanical aids or equipment are not readily available to assist with manipulating an object? (e.g., unjamming pieces in the assembler)			S O
Are handles for tools and equipment inappropriate in terms of size or shape? (e.g., homemade pry bars)			S O
Ask the worker: Do any objects that you work with (other than tools or equipment) have handles? If the answer is <b>No</b> , check the <b>No</b> box and go to the next section.			S O
If the answer to the above question is <b>Yes</b> , ask the worker: Are the handles an inappropriate size or shape for the characteristics of the object?			S O

## ENVIRONMENTAL CONDITIONS

<b>Temperature</b>			
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
<b>Lighting</b>			
Ask the worker: Do you assume awkward postures to overcome problems associated with glare, inadequate lighting, or poor visibility? (e.g., working in assembler)			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., planer as part of assembler)		S O	

## WORK ORGANISATION

	N	Y	Comments:
Is the work externally-paced or controlled by a machine or the process?		S O	
Do peak workloads or sudden increases in pace occur with the tasks? (e.g., unjamming pieces)		S O	
Ask the worker: Are there indications of excessive fatigue or pain, or symptoms of adverse health effects due to extended work days or overtime? (e.g., weekend production)		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? (e.g., always handling wood pieces)		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**



# **Cornerperson**

This Work Manual contains information about the body parts found to be at risk of musculoskeletal injury (MSI) for the Cornerperson (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.

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# Work Manual

# Cornerperson

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## **Disclaimer**

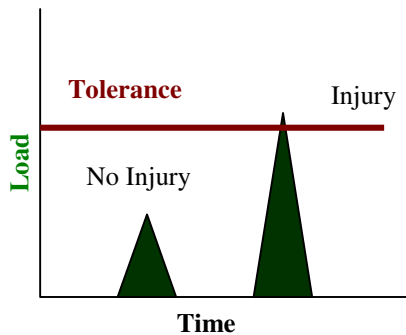
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# Injury Education

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



## ***Excessive Force***

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

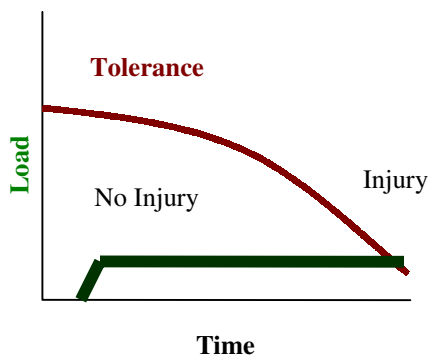
***Example – a worker going over on their ankle and spraining it.***



## ***Excessive Repetition***

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

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



## ***Excessive Duration***

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

***Example – a Grader developing neck tension.***

## Body Parts at Risk

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

After all of the appropriate information is collected during the investigation of the Cornerperson 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 Cornerperson. 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 Cornerperson position and found that the neck and shoulder are the body parts of major concern while performing their duties. Focussing on solutions that target the areas of major concern will likely reduce the greatest risks associated with this job.

**Neck:** Major risk is awkward static neck posture while inspecting and handling wood pieces on the infeed conveyor. The relative heights of the worker and work surface can increase this injury risk.

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

1. Sit/stand stool (page 74)
2. Convex mirror (page 75)
3. Far side mirror (page 75)
4. View with eyes (page 77)

**Shoulder:** Major risks include awkward posture while repetitively reaching forward to handle wood pieces. For some operators, this posture becomes static as the arm remains in a forward flexed position for handling and advancing each piece. Rejecting wood pieces can also lead to awkward shoulder postures, depending on the position of the operator and the layout of the reject system.

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

1. Cut-out in workstation (page 71)
2. Reduce reaching (page 71)
3. Angled infeed (page 72)
4. Extend reject conveyors/bins (page 72)
5. Extend tool handles (page 72)

For additional stretching and strengthening exercises that would benefit a Cornerperson, refer to the Neck and Shoulder sections of the Body Manual.

## NECK

**Direct Risk Factors:**  
Awkward Postures  
Static Postures



**A Cornerperson may hold the head in a bent forward position in order to inspect wood pieces.**

### BACKGROUND INFORMATION

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

### DIRECT RISK FACTORS

#### *Awkward Postures*

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

#### *Static Postures*

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

## INDIRECT RISK FACTORS

### *Workstation Design*

#### **Working Heights**

- Loading on neck muscles is increased because the head is held in a forward bent position while inspecting wood pieces on the infeed conveyor.

## CONSEQUENCES

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

## SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Neck, please see the column labelled “Neck” in the Summary of Solutions on pages 81 to 82.
- For exercises that can help to prevent *neck* injuries, see the *Neck section of the Body Manual*.

# NECK

<b>Direct Risk Factors:</b> Repetition Awkward Postures
---



**A Cornerperson may look up and/or to the side in order to inspect the far end of wood pieces in a mirror.**

## BACKGROUND INFORMATION

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

## DIRECT RISK FACTORS

### *Repetition*

- When the head is repeatedly turned to the side or bent backward, muscles of the neck are subjected to repeated stress with little time for recovery. If repetitive stress is excessive, and recovery is not adequate, tissues can fatigue to the point of injury.

### *Awkward Postures*

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

## INDIRECT RISK FACTORS

### *Workstation Design*

#### **Additional Workstation Design Options**

- Loading on the neck muscles is increased because the relative positions of the Cornerperson, wood infeed, and mirror, along with viewing obstructions, require the operator to repeatedly bend the neck in order to monitor the work area.

## CONSEQUENCES

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

## SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Neck, please see the column labelled “Neck” in the Summary of Solutions on pages 81 to 82.
- For exercises that can help to prevent *neck* injuries, see the *Neck section of the Body Manual*.

## NECK/SHOULDER

**Direct Risk Factors:**  
Repetition  
Awkward Postures  
Static Postures



**A Cornerperson frequently holds their arms away from the body in order to inspect, advance, and reject pieces.**



**Awkward and static shoulder postures also occur during machine maintenance and while unjamming wood pieces.**

## BACKGROUND INFORMATION

- The neck and shoulder regions work together to produce certain movements, or to hold certain postures. The larger muscles of the neck and upper back (e.g., trapezius) elevate the shoulders, and the larger muscles of the shoulders (e.g., deltoids) raise the arms.

## **DIRECT RISK FACTORS**

### ***Repetition***

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

### ***Awkward Postures***

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

### ***Static Postures***

- When the arms are repeatedly held away from the body, the muscles of the neck and shoulder must remain tense to support the weight. If the duration of constant tension is excessive, and recovery is not adequate, tissues may fatigue to the point of injury.

## **INDIRECT RISK FACTORS**

### ***Workstation Design***

#### **Working Reaches**

- Extreme forward reaches to guide wood pieces to the operator lead to repetitive awkward shoulder postures.
- Awkward shoulder postures occur when a Cornerperson has to reach over various obstructions to unjam wood pieces or perform maintenance in the assembler.

#### **Seating**

- Reaching for wood pieces from a seated position can lead to awkward shoulder postures if the seat is too low.

#### **Additional Workstation Design Options**

- Loading on the tissues in the shoulder is increased because the relative positions of the Cornerperson and the reject system (conveyor, bin) may lead to extreme shoulder postures while handling off-grade wood pieces.

## ***Characteristics of Objects Being Handled***

### **Size and Shape**

- The small size of the wood pieces can lead to awkward shoulder postures, as a Cornerperson is forced to reach further forward to inspect and advance pieces.

### **CONSEQUENCES**

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

### **SUGGESTED SOLUTIONS**

- For specific solutions that may prevent injuries to the Neck/Shoulder, please see the column labelled “Neck/Shoulder” in the Summary of Solutions on pages 81 to 82.
- For exercises that can help to prevent *neck* and *shoulder* injuries, see the *Neck* and *Shoulder sections of the Body Manual*.

## ELBOW/WRIST

**Direct Risk Factors:**  
Repetition  
Awkward Postures



**A Cornerperson may repeatedly extend and flex at the elbow in order to advance wood pieces to the assembler.**



## BACKGROUND INFORMATION

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

## DIRECT RISK FACTORS

### *Repetition*

- Repeated bending at the elbow without adequate rest could fatigue tissues to the point of injury.

### ***Awkward Postures***

- Gripping and handling wood pieces may lead to increased fatigue in the tissues of the forearm and elbow.

## **INDIRECT RISK FACTORS**

### ***Workstation Design***

#### **Working Reaches**

- Extended reaching to wood pieces to guide them into the assembler places repetitive strain on the tissues of the elbow.

### ***Characteristics of Objects Being Handled***

#### **Size and Shape**

- The small size of the wood pieces can lead to awkward and repetitive elbow motion, as a Cornerperson is forced to reach further forward to inspect and advance each piece.

## **CONSEQUENCES**

- Repeated extended motion of the elbow joint can lead to fatigue at the tendon/bone connection near the elbow.
- Signs and symptoms include pain in the elbow area and decreased grip strength.

## **SUGGESTED SOLUTIONS**

- For specific solutions that may prevent injuries to the Elbow/Wrist, please see the column labelled “Elbow/Wrist” in the Summary of Solutions on pages 81 to 82.
- For exercises that can help to prevent *elbow* injuries, see the *Elbow section of the Body Manual*.

## LOW BACK

**Direct Risk Factors:**  
Awkward Postures  
Static Postures



**A Cornerperson may be continually bent forward while inspecting and advancing pieces.**

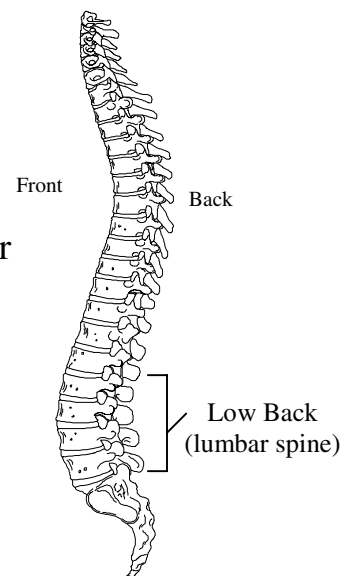


**Awkward static trunk postures also occur during machine maintenance and while unjamming wood pieces.**

## 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***

- Supporting the trunk in a forward flexed posture requires forceful exertion of muscles in the back.
- If the force placed on the back muscles exceeds the tissue tolerances, injury may occur.

### ***Awkward Postures***

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

### ***Static Postures***

- When the trunk is held in a forward bent position, muscles of the back must remain tense to support the weight of the upper body. With no time allowed for recovery, constant tension in muscles leads to fatigue. If the constant stress is sufficient, and recovery is not adequate, tissues may fatigue to the point of injury.
- Static loading on the intervertebral discs can lead to disc injuries.

## INDIRECT RISK FACTORS

### *Workstation Design*

#### **Working Reaches**

- Awkward forward trunk postures are increased in head-on wood infeed systems, where the Cornerperson has to reach over workstation obstructions to inspect and advance pieces.

#### **Working Heights**

- Infeed chains and assemblers of low height can lead to awkward forward bent trunk postures, especially for taller workers.

### *Characteristics of Objects Being Handled*

#### **Size and Shape**

- The small size of the wood pieces can lead to awkward trunk postures, as a Cornerperson is forced to reach further forward to inspect and advance each piece.

## CONSEQUENCES

- Maintaining a forward bent posture may lead to damage in the disc walls and fatigue in the supportive tissues of the back.
- Signs and symptoms may include muscle spasm and sharp or radiating pain in the back and/or lower extremities.

## SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Back, please see the column labelled “Back” in the Summary of Solutions on pages 81 to 82.
- For exercises that can help to prevent *back* injuries, see the *Back section of the Body Manual*.

## Summary of Body Parts at Risk

### NECK

- A Cornerperson may hold the head in a bent forward position in order to inspect wood pieces.
- A Cornerperson may look up and/or to the side in order to inspect the far end of wood pieces in a mirror.



## NECK/SHOULDER

- A Cornerperson frequently holds their arms away from the body in order to inspect, advance, and reject pieces.



- Awkward and static shoulder postures also occur during machine maintenance and while unjamming wood pieces.



## ELBOW/WRIST

- A Cornerperson may repeatedly extend and flex at the elbow in order to advance wood pieces to the assembler.



## LOW BACK

- A Cornerperson may be continually bent forward while inspecting and advancing pieces.



- Awkward static trunk postures also occur during machine maintenance and while unjamming wood pieces.



# 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
<b>Duration*</b>	Duration	✓	✓		✓			✓				
<b>Workstation Design</b>	Working Reaches		✓		✓			✓				
	Working Heights	✓						✓				
	Seating		✓									
	Floor Surfaces											
<b>Characteristics of Objects Being Handled</b>	Size and Shape		✓		✓			✓				
	Load Condition and Weight Distribution											
	Container, Tool and Equipment Handles											
<b>Environmental Conditions</b>	Heat Exposure	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Cold Exposure	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Lighting	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Noise	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Vibration**	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>Work Organisation</b>	Work-Recovery Cycles	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Task Variability	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	Work Rate	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

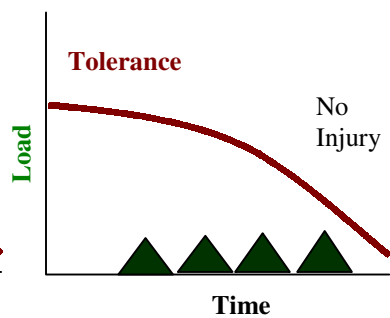
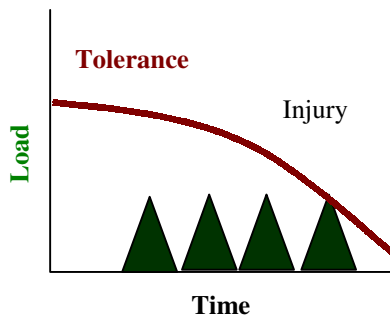
\* Extended exposure to any risk factor can increase the likelihood of injury. For solutions designed to decrease the duration of exposure to any risk factor please refer to the Work Organisation section of the General Risk Factor Solutions Manual

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

- = Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.
- ◆ = Indicates that the risk factor assessed is commonly found in sawmills, and may need to be addressed at your mill. See the appropriate section of the General Risk Factor Solutions Manual for more information.
- ✓ = Indicates that the risk factor was assessed as a contributor to the body part problem. Please see the Summary of Solutions Table on pages 81 to 82 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

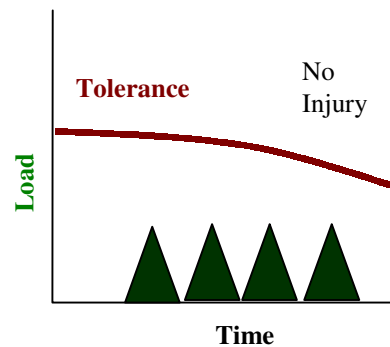
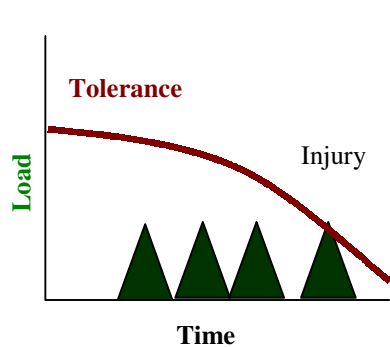
# Injury Prevention

*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 Cornerperson job. The solutions are presented under the headings of Workstation Design, Characteristics of Objects Being Handled, Environmental Conditions, and Work Organisation.

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

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

# Risk Control Key

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

E

## **ENGINEERING CONTROLS**

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

A

## **ADMINISTRATIVE CONTROLS**

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

WP

## **WORK PRACTICE CONTROLS**

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

PPE

## **PERSONAL PROTECTIVE EQUIPMENT**

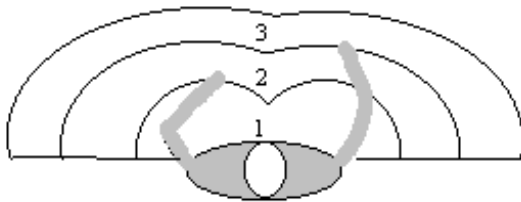
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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

# Workstation Design

## WORKING REACHES

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



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

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

### *Cut-out in workstation*

E

In order to reduce awkward and static forward flexed postures of the shoulder and back, a cutout should be provided in the workstation. This cutout area would allow the Cornerperson to get closer to the conveyor and wood pieces for safer handling. All edges in the cutout should be well padded, to prevent contact stress and encourage the operator to get as close to the pieces as possible.

### *Reduce reaching*

WP

In order to decrease awkward and repetitive shoulder, elbow and low back postures during reaching, a Cornerperson should wait for the wood pieces to be advanced closer to them.

### ***Angled infeed***

E

In order to reduce awkward and static forward flexed postures of the shoulder and back, the infeed conveyor from the jointer can be angled towards the Cornerperson workstation. This layout allows pieces to advance more easily and quickly, reducing the need to reach to handle pieces. Timing of the conveyor needs to be carefully controlled to make sure pieces are not arriving too quickly, as this forces the Cornerperson to hold pieces back to prevent jam-ups in the assembler.

### ***Research workstation layout with operators***

A

A Cornerperson can effectively identify potential challenges with awkward and static postures by being part of the workstation design process. If possible, mock-up the workstation area and attempt to anticipate issues that may come up. In some cases it may be possible to speak with suppliers of equipment about trying products (e.g., sit/stand stools, tools) for trial periods. Doing some early investigation with the help of operators will minimise the need to retrofit equipment and workstations.

### ***Extend reject conveyors/bins***

E

In order to decrease awkward shoulder and trunk postures while reaching to reject conveyors and throwing reject pieces, bring the reject system closer to the Cornerperson. Extending conveyor tail spools or creating a large ramped bin that feeds to the conveyor can reduce these awkward postures.

### ***Extend tool handles***

E

In order to decrease awkward shoulder and trunk postures from reaching while using handtools, extension handles can be attached to items like wrenches and pry bars. These extended handles allow operators to access obstructed positions in the assembler or jointer during machine maintenance without adopting awkward postures.

## 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 Cornerperson, 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.

### *Braced postures*

WP

To reduce the load on the low back due to awkward and static flexed postures during machine maintenance, a Cornerperson should use the structure of the assembler to brace the lower body. When reaching forward, bracing the lower body against the assembler reduces the amount of muscle activity in the low back. This technique should not be used in positions where the edge of the assembler will cause excessive contact stress. The Cornerperson should try to use a free arm to support the upper body when possible.

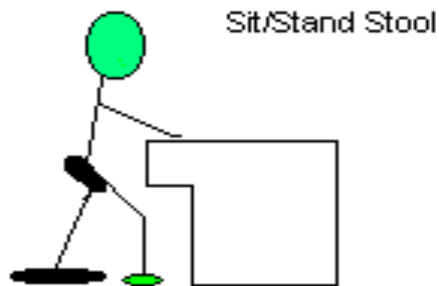
## SEATING

Many Cornerpersons choose to sit when inspecting and advancing pieces. The seated posture helps to bring workers closer to the level of the work. However, sitting for long periods of time increases the load on the spine, which stresses the ligaments and discs of the low back. The load is increased when the Cornerperson does not maintain a neutral spine (see Injury Education for the Low Back on page 60).

### *Sit/stand stool*

E  
WP

In order to minimise awkward static neck flexion and fatigue in the lower extremities, sit/stand stools can be used. Sit/stand stools are preferred over regular stools, as the design makes it easier to alternate between sitting and standing, and allows the larger muscles of the lower extremities to be recruited when handling objects. If sit/stand stools are not possible, foot rests or foot rails can be provided to encourage frequent changes in posture.



## ADDITIONAL WORKSTATION DESIGN OPTIONS

### *Convex mirror*

E  
WP The Cornerperson has to monitor the flow of product coming from the jointer and advancing to the assembler. To do this, repetitive neck twisting is required, placing strain on neck muscles and putting the worker at risk for an injury. To decrease this motion, install a convex mirror to give an overall view of work areas. Only when a problem occurs does the operator have to turn their head to assess the corrective action necessary.

### *Far side mirror*

E  
WP To reduce repetitive and awkward postures of the neck, shoulder and elbow during the handling and inspecting of pieces, a flat mirror can be installed on the far side of the conveyor just after the jointer. This mirror allows the worker to perform an initial inspection of the joint on the far side of the pieces. Only pieces that look questionable need to be handled. This mirror should be cleaned regularly to allow for easier inspection.



*A flat mirror on the far side of the infeed conveyor lets the Cornerperson inspect the hidden joint on the pieces.*

## Additional Work Practices

### Stretches

WP

In order to minimise awkward and static posture of the neck, shoulder, wrist and low back, stretch these body parts throughout the day to enhance tissue tolerance for those muscle groups. See additional stretches in the Body Manual.

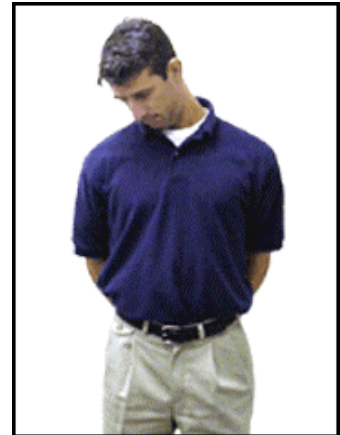
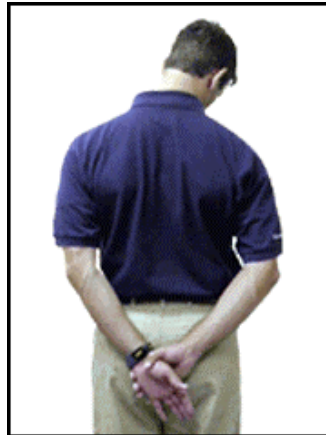
#### Chin Tuck (neck)

With your head upright, tuck chin in. You should feel a gentle stretch, in the back of the neck. Hold for 20 seconds and then relax. Repeat 3 times.



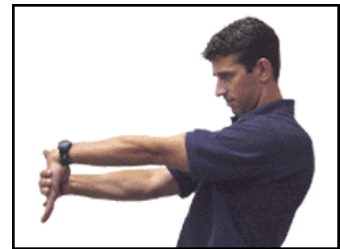
#### Neck Stretch

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.



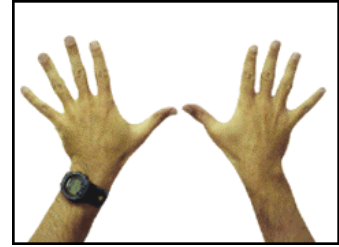
#### Wrist Flexor and Extensor Stretch

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.



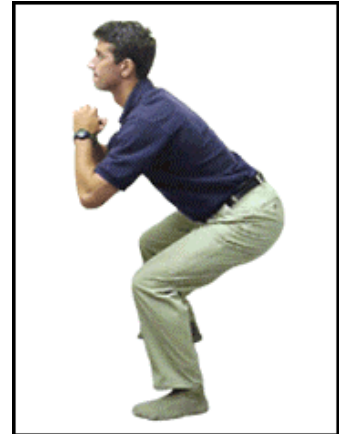
### **Hands and Fingers Stretch**

Clench both fists and hold for 3 seconds. Then open your hands and spread fingers apart. Hold for 3 seconds. Repeat.



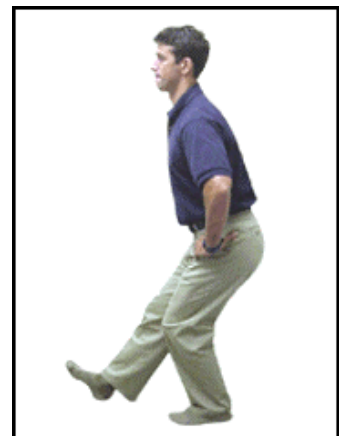
### **Squats**

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



### **Hamstring Stretch**

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



### ***View with eyes***

WP

In order to reduce awkward postures of the neck, rotate the eyes to view the work area. If neck twisting cannot be avoided, try to alternate turning the head in both directions. When twisting the head, keep the chin tucked in and the ears in alignment with the shoulders.

# Characteristics of Objects Being Handled

## *Power positions*

WP

Use power positions when exerting force on objects while unjamming the assembler or performing other machine maintenance. Using larger and stronger muscles when doing heavy or forceful work reduces the risk of muscle strain. For lifting, a power position is adopted when a worker remembers to ‘lift with the legs, not the back’. This phrase is based on the fact that the muscles of the thighs are larger and more powerful than the muscles of the low back. Other examples of using power positions include using leverage to help move heavy objects and lumber when possible, and using the hips and legs to push debris on the floor when sweeping.

## *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 handle and advanced pieces.
- 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 possible, balance loads being carried on each side of the body. This minimises loading on the soft tissues of the back and hips.
- When lifting, carrying, or holding objects, keep them as close to the body as possible. The further the load is away from the body, the more stress it puts on the back.

## SIZE AND SHAPE

### *Modified tools*

E WP	In order to reduce awkward shoulder and elbow postures when reaching for lumber pieces, lightweight reaching tools, such as a short pike pole, can be used to get hold of more distant pieces. These tools should only be used when there is a jam-up on the infeed conveyor – waiting for the lumber pieces to reach the Cornerperson is the preferred work practice for reducing tissue strain.
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## CONTAINER, TOOL AND EQUIPMENT HANDLES

### *Modify tool handle friction*

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

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

## Work Organisation

### *Job rotation*

A To reduce loading on the body parts of concern listed in this Work Manual, the Cornerperson can be rotated to other job positions that have different physical and mental demands. By rotating to jobs that have different physical demands the working muscles get a chance to recover and repair, decreasing the risk of injury. Job rotation is more effective if it occurs intermittently throughout the shift, for example, every hour or every two hours. The duration of exposure to risk has a large effect on the amount of time required for the tissue to recover.

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.

		<b>Injury Prevention Potential</b>										
<b>SOLUTIONS</b>	<b>Page</b>	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
<b>Cut-out in workstation</b>	<b>71</b>		<b>A S</b>		<b>A</b>			<b>F A S</b>				
<b>Reduce reaching</b>	<b>71</b>		<b>R A</b>		<b>R A</b>			<b>F A</b>				
<b>Angled infeed</b>	<b>72</b>		<b>A S</b>		<b>A</b>			<b>F A S</b>				
<b>Research workstation layout with operators</b>	<b>72</b>	<b>R A S</b>	<b>R A S</b>		<b>R A</b>			<b>F A S</b>				
<b>Extend reject conveyors/bins</b>	<b>72</b>		<b>A</b>					<b>F A</b>				
<b>Extend tool handles</b>	<b>72</b>		<b>A</b>					<b>F A</b>				
<b>Braced postures</b>	<b>73</b>							<b>F A S</b>				
<b>Sit/stand stool</b>	<b>74</b>	<b>A S</b>										
<b>Convex mirror</b>	<b>75</b>	<b>R A</b>										
<b>Far side mirror</b>	<b>75</b>	<b>R A</b>	<b>R A</b>		<b>R A</b>							
<b>Stretches</b>	<b>76</b>	directly reduces risk of injury to the body										

### Direct Risk Factors

**F** = Force

**S** = Static Postures

**R** = Repetition

**C** = Contact Stress

**A** = Awkward Postures

**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.

		<b>Injury Prevention Potential</b>										
<b>SOLUTIONS</b>	<b>Page</b>	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
View with eyes	77	A										
Power positions	78		A		A			F A				
Manual material handling	78		R A					F A				
Modified tools	79		A		A							
Modify tool handle friction	79		R		R							
Job rotation	80 ♦	indirectly reduces risk of injury to the body										
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										
Task Rotation	♦	indirectly reduces risk of injury to the body										
Work Pace	♦	indirectly reduces risk of injury to the body										
Scheduling	♦	indirectly reduces risk of injury to the body										

### Direct Risk Factors

**F** = Force

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♦ = See General Risk Factor Solutions Manual

## CORNERPERSON MSI SAFETY GUIDE

### OBJECTIVE:

**To identify ergonomic risks involved in the Cornerperson 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 Cornerperson.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p><b>Neck</b></p> <p>A Cornerperson may hold the head in a bent forward position in order to inspect wood pieces.</p>	<p><b>Awkward Postures</b></p> <p><b>Static Postures</b></p>	<ul style="list-style-type: none"> <li>• Neck muscles must support the weight of the head while in a forward bent position. The more the neck is bent, the greater the load on the muscles and tendons.</li> <li>• When the head is held in a forward position, neck muscles must remain tense to support the weight of the head. With no time for recovery, constant tension in neck muscles may cause fatigue. If constant stress is sufficient, and recovery is not adequate, tissues may fatigue to the point of injury.</li> </ul>	<ul style="list-style-type: none"> <li>• Turn the trunk and the eyes, not just the neck, to watch flow of pieces.</li> <li>• Use mirrors where available to check wood pieces and jointing, especially on the far side.</li> <li>• For exercises that can help prevent <i>Neck</i> injuries, <i>see the Neck section of the Body Manual</i>.</li> </ul>
	<p>A Cornerperson may look up and/or to the side in order to inspect the far end of wood pieces in a mirror.</p>	<p><b>Repetition</b></p> <p><b>Awkward Postures</b></p>	<ul style="list-style-type: none"> <li>• When the head is repeatedly turned to the side or bent backward, muscles of the neck are subjected to repeated stress with little time for recovery. If repetitive stress is excessive, and recovery is not adequate, tissues can fatigue to the point of injury.</li> <li>• Neck muscles must support the weight of the head while in a forward bent position. The more the neck is bent, the greater the load on muscles, tendons, and ligaments.</li> </ul>	

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p><b>Neck/Shoulder</b></p> <p>A Cornerperson frequently holds their arms away from the body in order to inspect, advance, and reject pieces.</p> <p>Awkward and static shoulder postures also occur during machine maintenance and while unjamming wood pieces.</p>	<p><b>Repetition</b></p> <p><b>Awkward Postures</b></p> <p><b>Static Postures</b></p>	<ul style="list-style-type: none"> <li>• When the arms are repeatedly lifted, muscles of the neck and shoulder are subjected to repeated stress with little or no time for recovery. If repetitive stress is excessive, and recovery is not adequate, tissues may fatigue to the point of injury.</li> <li>• Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on muscles and tendons.</li> <li>• When the arms are repeatedly held away from the body, the muscles of the neck and shoulder must remain tense to support the weight. If the duration of constant tension is excessive, and recovery is not adequate, tissues may fatigue to the point of injury.</li> </ul>	<ul style="list-style-type: none"> <li>• Get close to pieces when handling, to decrease the level of awkward postures.</li> <li>• Only handle pieces when necessary. This will reduce the repetition of awkward postures.</li> <li>• Use tools with extended handles to reduce awkward postures and forceful exertion.</li> <li>• Use power positions for machine maintenance and unjamming pieces.</li> <li>• For exercises that can help prevent <i>Neck</i> and <i>Shoulder</i> injuries, <i>see the Neck and Shoulder sections of the Body Manual.</i></li> </ul>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p><b>Elbow/Wrist</b></p> <p>A Cornerperson may repeatedly extend and flex at the elbow in order to advance wood pieces to the assembler.</p>	<p><b>Repetition</b></p> <p><b>Awkward Postures</b></p>	<ul style="list-style-type: none"> <li>• Repeated bending at the elbow without adequate rest could fatigue tissues to the point of injury.</li> <li>• Gripping and handling wood pieces may lead to increased fatigue in the tissues of the forearm and elbow.</li> </ul>	<ul style="list-style-type: none"> <li>• Move the elbow and the shoulder, not just the wrist, when handling pieces.</li> <li>• Do not over-grip boards or tools.</li> <li>• Only handle pieces when necessary. This will reduce the repetition of awkward postures.</li> <li>• Use tools with extended handles to reduce awkward postures and forceful exertion.</li> <li>• Use power positions for machine maintenance and unjamming pieces.</li> <li>• For exercises that can help prevent <i>Elbow</i> and <i>Wrist</i> injuries, <i>see the Elbow and Wrist sections of the Body Manual.</i></li> </ul>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p><b>Low Back</b></p> <p>A Cornerperson may be continually bent forward while inspecting and advancing pieces.</p> <p>Awkward static trunk postures also occur during machine maintenance and while unjamming wood pieces.</p>	<p><b>Force</b></p> <p><b>Awkward Postures</b></p> <p><b>Static Postures</b></p>	<ul style="list-style-type: none"> <li>• Supporting the trunk in a forward flexed posture requires forceful exertion of muscles in the back.</li> <li>• If the force placed on the back muscles exceeds the tissue tolerances, injury may occur.</li> <li>• Back muscles must support the weight of the upper body when leaning forward. Increased bending of the back increases the loading on the back and trunk tissues and increases pressure on the walls of the discs.</li> <li>• When the trunk is held in a forward bent position, muscles of the back must remain tense to support the weight of the upper body. With no time allowed for recovery, constant tension in muscles leads to fatigue. If the constant stress is sufficient, and recovery is not adequate, tissues may fatigue to the point of injury.</li> <li>• Static loading on the intervertebral discs can lead to disc injuries.</li> </ul>	<ul style="list-style-type: none"> <li>• Brace the body against machinery to perform machine maintenance and unjamming with reduced back exertion.</li> <li>• Support the upper body with one arm while performing machine maintenance and unjamming pieces.</li> <li>• Alternate between sitting and standing postures while inspecting and advancing pieces.</li> <li>• For exercises that can help prevent <b>Back</b> injuries, <i>see the Back section of the Body Manual.</i></li> </ul>