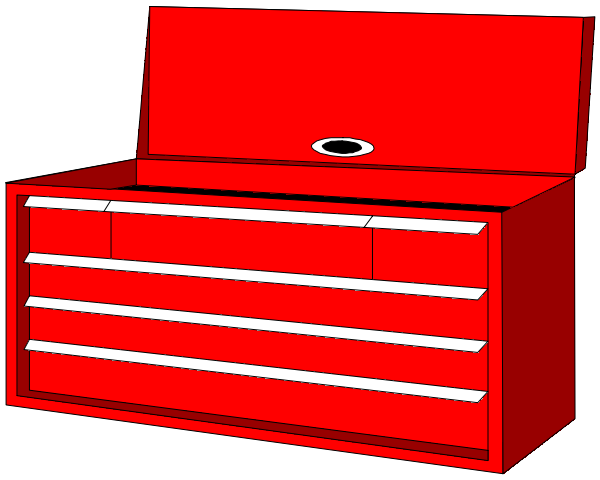
Industrial Musculoskeletal Injury Reduction Program

Common Industry Jobs (CIJs)

Planer Feeder Tool Kit



IMIRP program coordinated by:

Council of Forest Industries

Industrial Wood & Allied Workers of Canada

Advanced Ergonomics Inc.

In cooperation with the Workers' Compensation Board of British Columbia

PLANER FEEDER TOOL KIT
Table of Contents

Overview
Planer Feeder

Job Summary

The Planer Feeder is responsible for ensuring an even flow of lumber to the infeed of the planer, and for turning lumber as required to ensure the best recovery. The Planer Feeder will straighten and space lumber, discard or reject broken pieces of lumber, return lumber for re-trim, clear cross-ups, and clean up the work area. Refer to the Physical Demands Analysis for more details.

Physical Demands

The physical demands of the Planer Feeder job may include:

a) Walking
b) Standing
c) Balancing
d) Repetitive motions of the hands, arms, shoulders, neck and eyes
e) Awkward postures of the hands, shoulders, neck and back
f) Forceful gripping
g) Pulling boards off the chain
h) Pulling boards to clear cross-ups
i) Lifting boards off the chain and lowering them into the waste conveyor

Mental Demands

The Planer Feeder has to determine the maximum yield from a piece of dry lumber. To do this the operator must view the lumber for wane, rocks, curve of board, saw step, and then decide how to orient the lumber to flow into the planer to get the best possible yield. This requires sustained alertness and constant visual inspection and decision making.

Major Variations

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

1) In addition to the tasks mentioned in the Job Summary, a Planer Feeder may operate:
   a) The planer
   b) A drop gate
   c) A tilt hoist

2) When clearing jams, hand tools used may include:
   a) Pike pole
   b) Picaroon
   c) Pry bar

Minor Variations

Depending on the mill, the following minor workstation variations may be found:

1) The pace that the operator works depends upon the mill. The average work pace is 15 to 60 pieces/minute. This pace is dependant on:
   a) The performance or pace of the proceeding process
   b) Machine's pace
   c) Dwell area
   d) Time limit on one or more tasks

2) When operating machinery, control types used may include:
   a) Foot pedals
   b) Rotary selector switches
   c) Knee bar
   d) Push/pull buttons

3) When operating machinery, displays used may include:
   a) Mirrors
   b) Video monitors
   c) LCD displays

Physical Demands Analysis
Planer Feeder

PDA General Instructions: Planer Feeder

This Physical Demands Analysis (PDA) identifies the physical demands of the Planer Feeder job as assessed by IMIRP ergonomists. The information reported was collected from a sample of Planer Feeders in the BC Sawmill Industry. Where possible, state-of-the-art equipment and techniques were used in data collection and analysis to increase accuracy. However, some information is based on third party comments that are often subjective and not subject to verification.

Subsequent changes to the work process may reduce the validity of any pre-existing physical demands analysis. The IMIRP Society accepts no responsibility for the use or misuse of the Physical Demands Analysis, or for the accuracy of the PDA as it applies to any specific workplace.

To make the PDA specific to your workplace, determine which of the tasks identified are present in your mill. For each section, check off the items (e.g., tasks, tools, etc.) listed that reflect the Planer Feeder job at your mill.

Rehabilitation professionals are encouraged to verify and update critical information through the client and through workplace sources to ensure that the content (e.g., tasks, weights of objects handled, etc.) accurately reflects the job.

Disclaimer

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

PDA Table of Contents

Physical Demands Analysis
Planer Feeder

Task List

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

Inspect & turn lumber

A Planer Feeder must orient and feed the boards into the planer based on wane, rocks, curve of the board and saw step.

Does this task occur at your mill?

☐ Yes ☐ No

Remove waste lumber

A Planer Feeder may be required to remove waste lumber.

Does this task occur at your mill?

☐ Yes ☐ No

Return lumber for re-trim

A Planer Feeder may be required to return lumber for re-trim.

Does this task occur at your mill?

☐ Yes ☐ No

Clear cross-ups

A Planer Feeder may have to clear cross-ups on the chain.

Does this task occur at your mill?

☐ Yes ☐ No

Clear planer of debris

A Planer Feeder may have to clear the planer of debris when a jam-up occurs.

Does this task occur at your mill?

☐ Yes ☐ No

Clean up work area

A Planer Feeder may be required to clean up around their workstation.

Does this task occur at your mill?

☐ Yes ☐ No

Operate tilt hoist

A Planer Feeder may be required to operate the tilt hoist from their workstation.

Does this task occur at your mill?

☐ Yes ☐ No

Operate drop gate

A Planer Feeder may be required to operate a drop gate at from their workstation.

Does this task occur at your mill?

☐ Yes ☐ No

Company Profile

Company Name: _____ Division: _____

Number of Employees: _____ Turnover in last 12 months: +/- _____ or ____ %

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

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

Work Organisation

Task Description

The table below contains a list of tasks performed on an everyday basis by a Planer Feeder.

Indicate each of the tasks performed by placing a check mark (✓) in the far left column.

Note the corresponding values for the percentage of the shift spent performing the task (Percent of Shift) as found during the ergonomic investigation. The Comments section may be used to elaborate on the task description (e.g., variations between mills, frequencies, cycle times, etc.).

	Task	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Inspect & turn lumber				✓	• *Frequency of 25 to 60 times per minute*
	Remove waste lumber		✓			• *Frequency of 1 to 10 times per minute*
	Return lumber for re-trim	✓				• *Frequency of 1 to 2 times per hour*
	Clear cross ups	✓				• *Frequency of 3 times per hour*
	Clear planer of debris		✓			• *Frequency of 1 to 3 times per hour*
	Clean up work area	✓				
	Operate tilt hoist		✓			*See Tilt Hoist PDA*
	Operate drop gate	✓				*See Drop Sort Operator PDA*
	Other:					

Organisational Factors

The table below contains a list of organisational factors for a Planer Feeder. For each of the items input the necessary information to reflect the situation at your mill.

For the last item, if the job has scheduled job rotation (i.e., rotate from one job to another during a shift) check 'Yes' and then write in the jobs the worker rotates to and how often these rotations occur. If you do not have job rotation for this job, check 'No'.

Length of shift	☐ *8 hours* ☐ *10 hours* ☐
Formal breaks	☐ *50 (two 10 to 15 minute breaks, one 30 minute lunch)* ☐ *55 minutes (on 10 minute, one 15 minute break, one 30 minute lunch)*
Informal breaks	☐ *5 to 10 minutes*
Work pace	☐ *25 to 60 pieces per minute*
Work pace control	☐ *Pace depends on performance or pace of process before* ☐ *Machine paced* ☐ *Dwell area* ☐ *Time limit on one or more tasks.*
Job rotation ☐ Yes *(Check one)* ☐ No	If **Yes:** Rotation with what job(s):_____ _____ How often: (e.g., every 2 hours)_____

Workstation Characteristics

Dimensions & Layout

Indicate the specified dimensions of the workstation to the nearest centimetre. Please refer to Figure 1 for the measurement locations.

Workstation Dimensions	
A) Height of chain	cm
B) Height of control panel	cm
C) Height of re-trim chain	cm

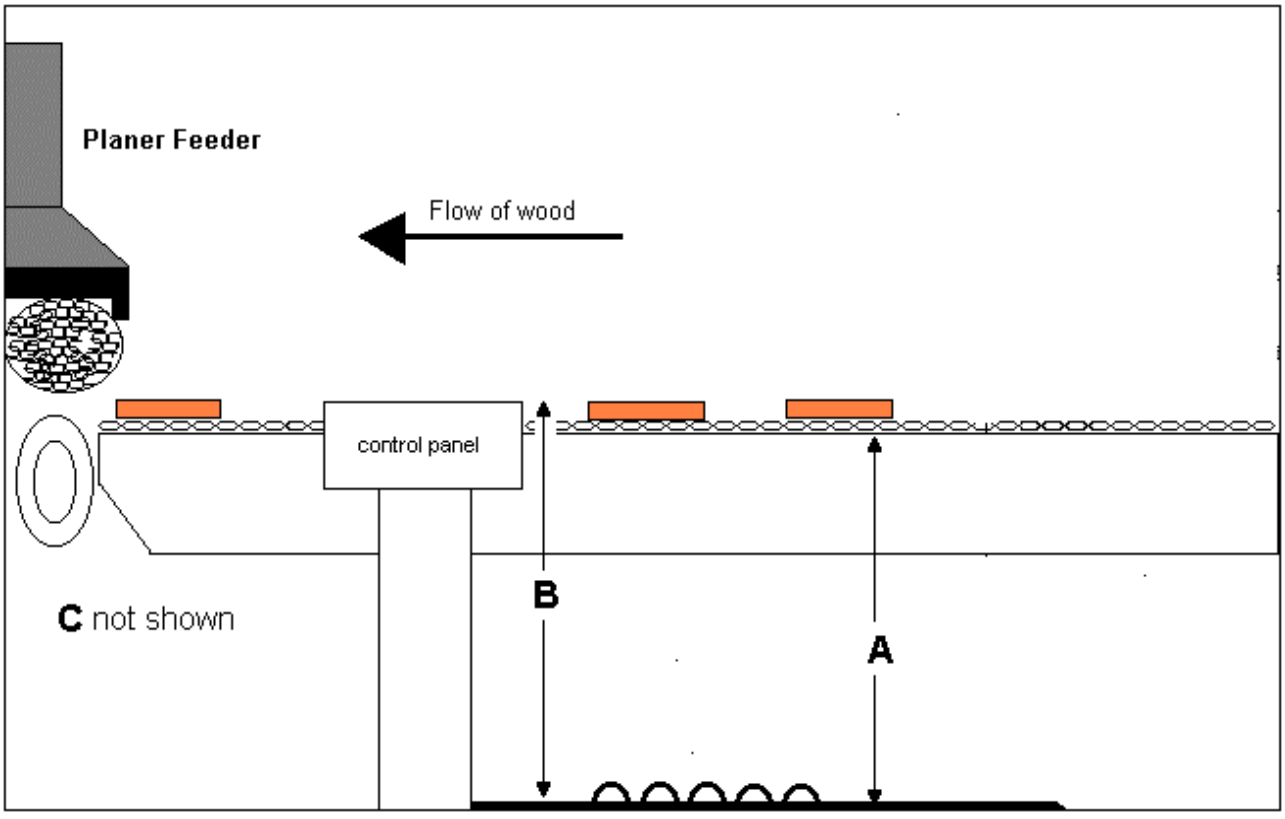


Figure 1: Workstation (right side view)

Flooring, Displays and Seating

The table below lists several components of a workstation. For **Flooring** and **Displays** there are several options provided. Please indicate all of the options, which apply to the workstation at your mill.

For the **Seating** section, first indicate whether seating is present at the workstation and then continue by elaborating on the features of the seating.

Workstation Characteristics	
Flooring	*Check all that apply* ☐ Cement ☐ Wood ☐ Rubber Matting ☐ Metal ☐ Other (e.g., tile, carpet) _____
Displays	*Check all that apply* ☐ Lights on Console ☐ Mirrors ☐ Video Monitors ☐ Computer Monitors ☐ None ☐ Scrolling Display ☐ Signal Lights ☐ Other _____
Seating: ☐ Yes *(Check one)* ☐ No	☐ Sit/stand ☐ Office ☐ Industrial ☐ In-house Design Height of seat: _____cm Depth of seat: _____cm Width of seat: _____cm
	Check all that apply ☐ Armrests ☐ Backrest ☐ Swivel Seat ☐ Slide track ☐ Castors #_____ ☐ Lumbar support ☐ Foot rest Covering type: _____ Seat adjustable? ☐ Yes ☐ No If yes, adjustable: ☐ Height ☐ Armrests ☐ Backrest ☐ Forward tilt

Equipment & Machinery Controls

The table below contains a list of the types of controls used by a Planer Feeder.

Indicate the controls which are present at your mill by placing a check mark (✓) in the far left column.

Indicate their corresponding functions by checking off the applicable box(es). The Comments section may contain information that describes variations between mills.

	Type of Control	Function	Frequency	Comments
	Foot pedal	☐ *Board dealer* ☐ *Stop and start chains* ☐ *Pineapple up/down* ☐ *Planer speed*	*1 to 5 times per minute*	
	Foot pedal	☐ *Tilt hoist up/down* ☐ *Tilt hoist infeed*	*1 to 6 times per hour*	
	Rotary selector switch	☐ *Speed of planer* ☐ *Bridge hold down* ☐ *Pineapple position* ☐ *Speed of chains*	*1 to 3 times per hour*	
	Knee bar	☐ *Start/stop feed table*		
	Push/pull button	☐ *Stop, start & speeds (planer room)* ☐ *Pineapple position* ☐ *Feed table*	*7 to 30 times per hour*	
	Other:			

Physical Demands

Whole Body Physical Demands

Identify each of the physical demands required by a Planer Feeder by placing a check mark (✓) in the far left column.

The Comments section may contain information relating to duration, frequencies and other variations in the physical demands.

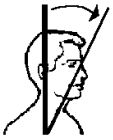
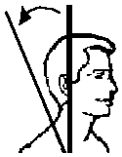
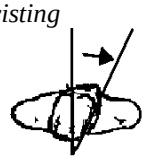
	Physical Demands	Tasks or Activity	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Walking	• *Walking to reject belt, drop gate, controls, re-trim area and planer room*		✓			• *Frequency of .5 to 7 times per hour* • *Duration of 10 seconds to 2 minutes*
	Sitting	• *Inspecting and turning boards* • *Moving boards to conveyor* • *Using control panel* • *Working in planer*				✓	• *The Planer Feeders stand continuously though out the shift, allowing them to handle the boards more efficiently*
	Standing	• *Sitting down during down time*	✓				• *The Planer Feeder may sit down during down time to vary posture.*
	Climbing (stairs)						*Not Applicable*
	Climbing (other)						*Not Applicable*
	Balancing	• *Using foot pedals with both feet*	✓				• *Frequency of 1 to 5 times per minute*
	Kneeling/ Crouching						*Not Applicable*
	Other:						

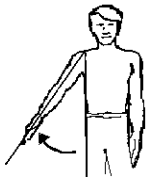
Body Postures

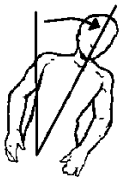
The table below outlines the body postures held or repeated throughout the shift by a Planer Feeder.

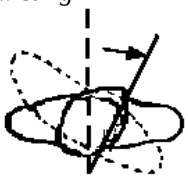
For each of the postures identified, indicate whether it occurs by placing a check mark (✓) in the far left column.

The Comments section may contain information relating to duration, frequencies, and other variations in posture.

	Body Posture	Task(s)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Neck							
	Flexion 	• *Looks down to inspect the boards*	✓				• *Depending on the height of the operator and the chain, the Planer Feeder may have to look down to view the lumber*
	Extension 						*Not Applicable*
	Twisting 	• *Twists to view monitors and wood flow*		✓			• *Frequency of 2 times per minute*

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Shoulder						
Flexion 	• *Reaches out to the side to turn, direct and uncross boards*			✓		• *Frequency of 30 times per minute*
Abduction 	• *Reaches out in front to sort and inspect boards*	✓				• *Frequency of 1 to 3 times per hour*
Extension 	• *Extends the arm back when pulling boards off of the chain* • *Extends the arm when reaching for the control panel*	✓				• *Depending on the type of wood running, the Planer Feeder may have to pull boards off the chain for re-trim or to discard*

Body Posture		Task(s)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Forearm							
	Rotation 	• *Rotates the forearm when turning boards*				✓	• *Frequency of 25-60 pieces per minute*
Wrist							
	Flexion 	• *Bends the wrist when turning boards*	✓				• *The Planer Feeder hand will assume a variety of postures while turning the board depending on their technique*
	Extension 	• *Bends the wrist when turning boards*	✓				• *The Planer Feeder hand will assume a variety of postures while turning the board depending on their technique*
	Ulnar Deviation 	• *Extends the wrist when turning boards*	✓				• *The Planer Feeder hand will assume a variety of postures while turning the board depending on their technique.*
	Radial Deviation 	• *Flexes the wrist when turning boards*	✓				• *The Planer Feeder hand will assume a variety of postures while turning the board depending on their technique*
Back							
	Flexion 	• *Bends forward to handle the boards* • *Bends forward to use a pike pole* • *Bends forward to uncross or un-jam lumber*			✓		• *Depends on the height of the operator and the height of the chain*
	Lateral Flexion 	• *Leans to the side when handling boards* • *Leans to the side when uncrossing or un-jamming boards*		✓			• *Depends on the technique of the operator and set up of the workstation.*

Body Posture		Task(s)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back							
	Twisting 	• *Twist with the flow of the wood while inspecting the boards*		✓			• *Depends on the technique of the operator and set up of the workstation.*
	Extension 						*Not Applicable*
Other:							

Hand Grips

The table below contains a list of the common types of hand grips (i.e., how objects are held) used by a Planer Feeder.

For each of the hand grips, indicate which types of grips are used at your mill by placing a check mark (✓) in the far left column.

The Comments section may contain information relating to duration, frequencies, hand used, etc.

	Type	Task(s)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Power 	☐ *Gripping pike poles* ☐ *Gripping picaroons* ☐ *Gripping pry bars* ☐ *Gripping wrenches*	✓				• *Frequency of 1 to 2 times per shift* • *Duration of 5 to 30 seconds*
	Pinch 	☐ *Turing boards*				✓	• *Frequency of 25 to 60 times per minute*
	Hook 	☐ *Turning boards*				✓	• *Frequency of 25 to 60 times per minute*
	Precision 						*Not Applicable*
	Other:						

Manual Material Handling

The table below contains a list of manual material handling tasks (e.g., pushing, pulling, lifting, lowering, and carrying) performed by a Planer Feeder.

Indicate which tasks are performed by placing a check mark (✓) in the far left column. Fill in the weight (or force) required to move the objects (may have to estimate).

The Comments section may contain information relating to duration, frequencies, and details regarding characteristics of the object handled.

	Task Description	Weight	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Pulling board to uncross or unjam them.				✓		• *Frequency of 2 to 10 times per minute*
	Pulling boards off the chain.				✓		• *Frequency of 2 to 10 times per minute*
	Lifting the boards off the chain and lowering then into the waste conveyor		✓				• *Duration of 5 to 10 minutes*
	Other:						

Hand Tools

Indicate the hand tools used by a Planer Feeder at your mill by placing a check mark (✓) in the far left column. Determine the weight of the hand tool and enter it in the appropriate column.

The Comments section may contain information relating to duration and frequencies of use.

	Type of Tool	Task(s)	Weight of Tool (kg)	Percent of Shift				Comments
				Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Pike pole	• *Uncrossing jam-ups*	*2.5*	✓				• *Depends on the type of wood being run.*
	Hook	• *Clearing the planer of debris*	*0.4*	✓				• *Depends on the type of wood being run.*
	Picaroon	• *Pulling boards closer to the Planer Feeder*	*1.3*	✓				• *Depends on the type of wood being run.*
	Pry bar	• *Clearing the planer of debris*	*4.3*	✓				• *Depends on the type of wood being run.*
	Other:							

Environmental Conditions

Work Environment

The table below contains a list of environmental conditions that may be of concern at the Planer Feeder job.

Vibration occurs when the body is in contact with a vibrating object or surface such as a tool, a seat, or the floor. If vibration occurs at this job, check 'Yes' and then mark whether the vibration is whole body and/or hand transmitted and the path through the body by which the vibration is transmitted. If vibration does not occur at this job, check 'No'.

If possible, indicate the appropriate value for the noise and lighting levels at your mill for the Planer Feeder. For the lighting level, include the location of the measurements within the workstation.

Factor	
Vibration ☐ Yes *(Check one)*	☐ Whole body ☐ Seat ☐ Floor
☐ No	☐ Hand transmitted ☐ Tool ☐ Other: _____
Noise level	*Range found: 98.2 to 101.1 dB* *Mill specific:*
Lighting level	*Range found: 116 to 828 lux (in front of the worker)* *Mill specific:*
Other:	

Location of Workstation

The table below contains a list of the type of work environments a workstation may be located in.

For the workstation, indicate which of the following types of work environments apply with a check mark (✓) in the left column.

For example, the workstation may be inside the main building but exposed to the outside via a doorway that is always open and has both a fan and a heater. In this situation all three, 'Inside exposed', 'Fan' and 'Heater', would be checked for this workstation.

	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.

For your mill, indicate the appropriate region with a check mark (✓) in the left column.

Refer to the regional map in Appendix B of the PDA.

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

Personal Protective Equipment

The table below contains a list of the personal protective equipment (PPE).

For the Planer Feeder job at your mill, indicate which of the PPE items are required with a check mark (✓).

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

Appendix A – Weight of Wood Equation

1. Type of Wood Handled

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

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

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

2. Size of Wood*

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

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

* Conservative estimates of actual wood dimensions

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

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

3. Length of Wood

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

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

4. Weight of Wood Equation*

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

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

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

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

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

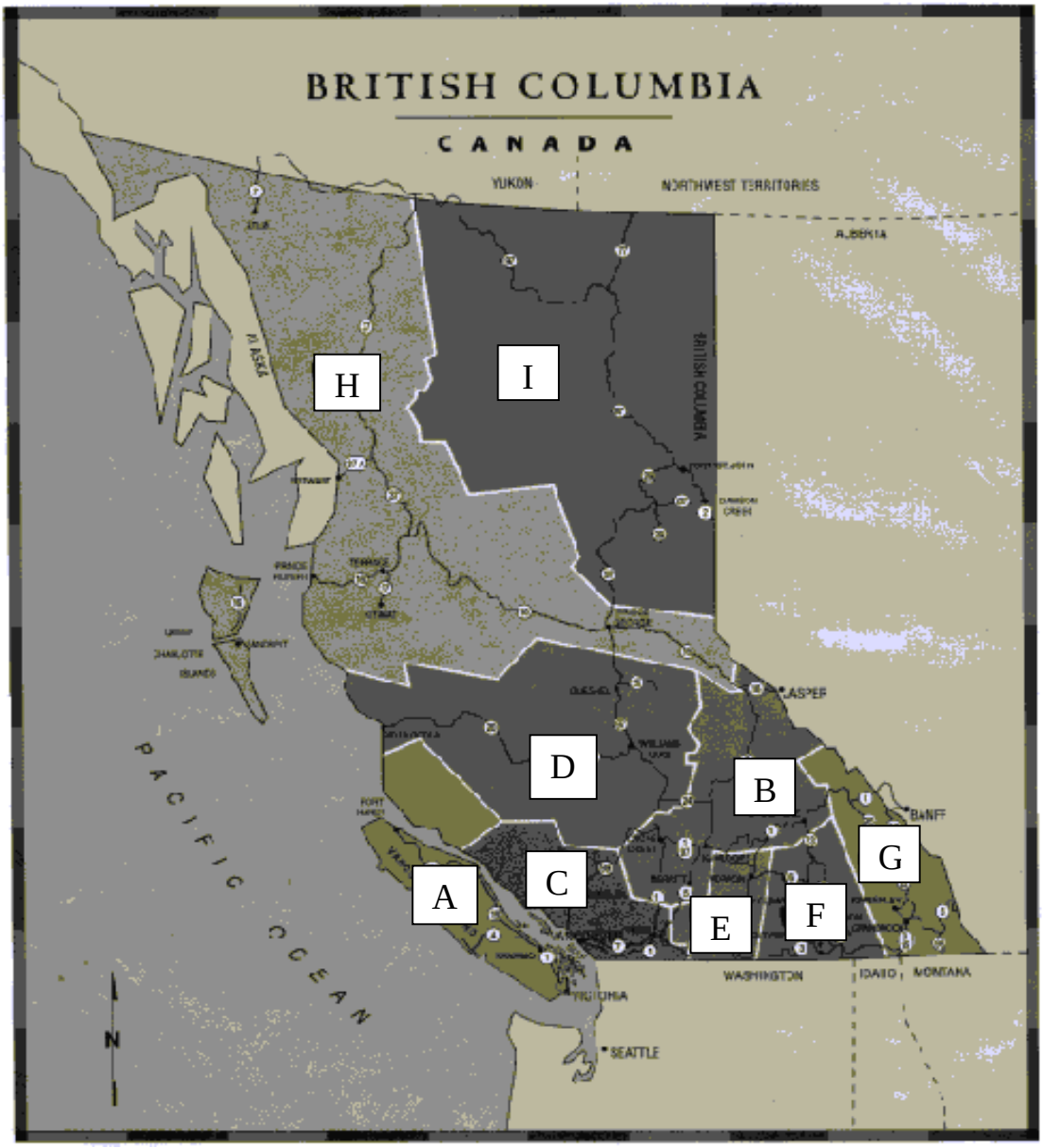
For the lightest species handled, enter the lb./board foot value, the multiple for the smallest size of wood, and the shortest length of this wood. Multiply these values together to determine the weight of the board in pounds.

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

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

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

Appendix B – Regional Map



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

Risk Factor Identification Checklist
Planer Feeder

Purpose

The Risk Factor Identification Checklist for a Planer Feeder 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 – Planer Feeder

Management Representative _____

Worker Representative _____

Date _____

Risk Identification completed:

☐ Before implementation of solutions

☐ After implementation of solutions

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

Definitions

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

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

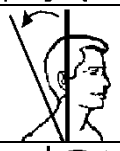
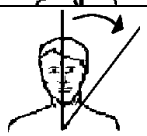
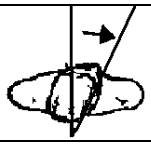
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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

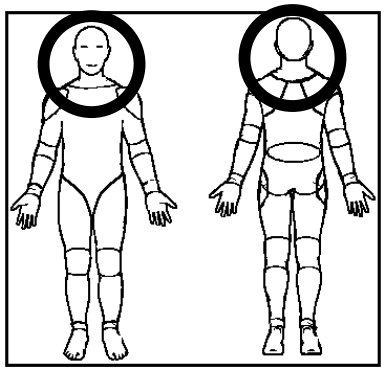
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

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

NECK

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

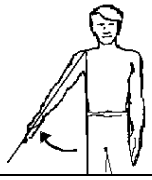
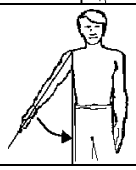
Please indicate whether the following direct risk factors were identified at the **NECK**.		
Direct Risk Factors	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Neck or Head/Eye or Upper Back? (see Worksheet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



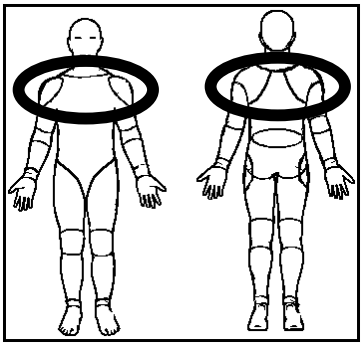
Body parts within the circled area will be classified as NECK issues.

SHOULDER

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

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

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



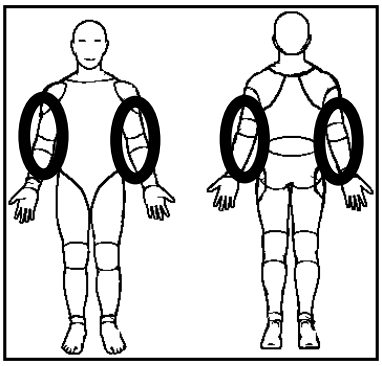
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

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

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

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



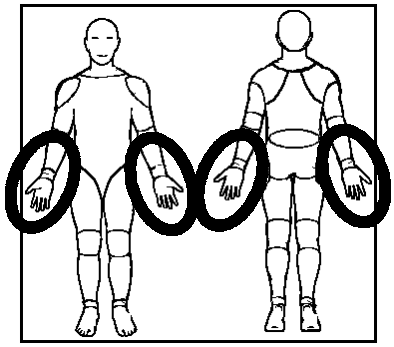
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

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

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

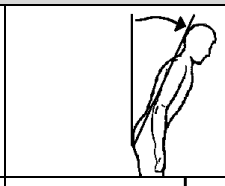
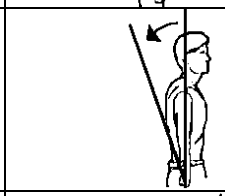
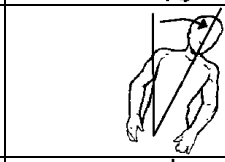
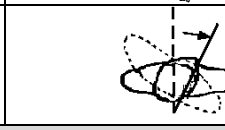
Please indicate whether the following direct risk factors were identified at the **WRIST/HAND**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there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



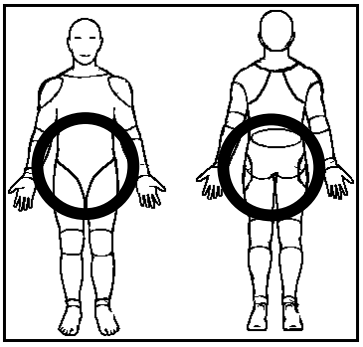
Body parts within the circled area will be classified as WRIST issues.

LOW BACK OR HIP/THIGH

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

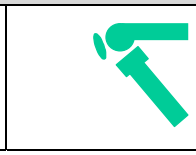
Awkward Posture		N	Y		Comments:
Flexion				S O	
Extension				S O	
Lateral Bending				S O	
Twisting				S O	
Vibration					
Ask the worker: Is your whole body exposed to vibration for significant portions of the work shift? (e.g., standing on vibrating surface)				S O	

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

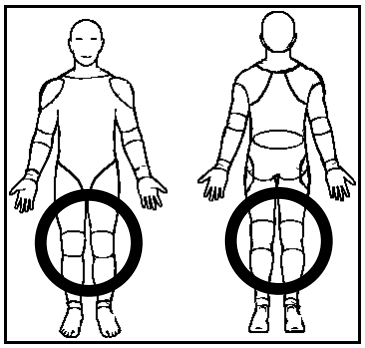


Body parts within the circled area will be classified as LOW BACK issues.

KNEE

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

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

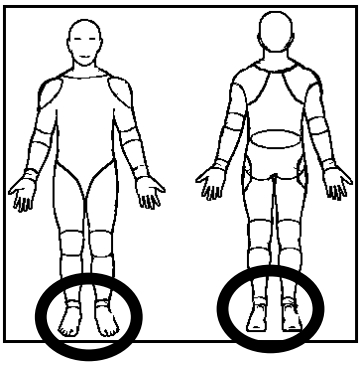


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

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

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



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

CHARACTERISTICS OF OBJECTS BEING HANDLED

	N	Y		Comments:
Are there problems handling a load due to its size or shape?			S O	
Are there problems handling a load due to its fragile, unbalanced, or non-rigid conditions?			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., hoists)			S O	
Are handles for tools and equipment inappropriate in terms of size or shape? (e.g., hand tools)			S O	
Ask the worker: Do any objects that you work with (other than tools or equipment) have handles? If the answer is **No**, check the **No** box and go to the next section.			S O	
If the answer to the above question is **Yes**, ask the worker: Are the handles an inappropriate size or shape for the characteristics of the object?			S O	

ENVIRONMENTAL CONDITIONS

Temperature				
Ask the worker: Are your hands or arms exposed to cold from exhaust air, cold liquids or solids?			S O	
Ask the worker: Are you exposed directly to temperature extremes that may cause you to use more force or cause you to fatigue quicker than normal? (e.g., hot or cold, either by equipment or natural environment)			S O	
Lighting				
Ask the worker: Do you assume awkward postures to overcome problems associated with glare, inadequate lighting, or poor visibility?			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?			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?			S O	
Ask the worker: Are there indications of excessive fatigue or pain, or symptoms of adverse health effects due to extended work days or overtime?			S O	
Ask the worker: Are there indications of excessive fatigue or adverse health effects due to shiftwork?			S O	
Ask the worker: Are rest periods or task variety insufficient to prevent the build-up of fatigue or the risk of adverse health effects?			S O	
Ask the worker: Are tasks in a job rotation program similar to one another, and therefore not providing a variation in movements?			S O	

Work Manual

Industrial
Musculoskeletal
Injury
Reduction
Program

Planer Feeder

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

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

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

Work Manual

Planer Feeder

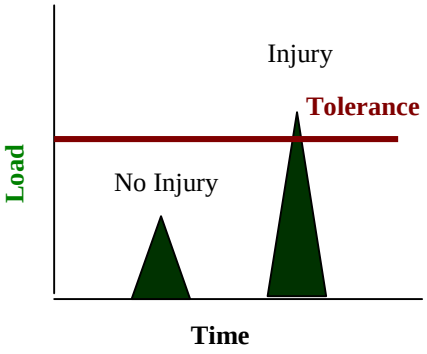
Disclaimer

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

WM Table of Contents

Injury Education

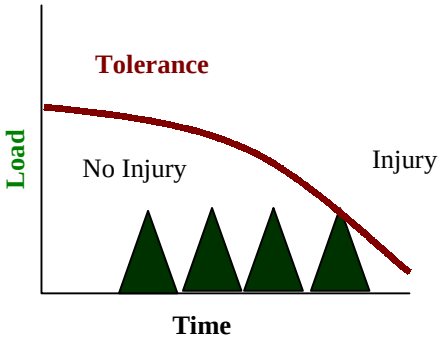
Injuries occur when …
Loads exceed tissue tolerances



Excessive Force

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

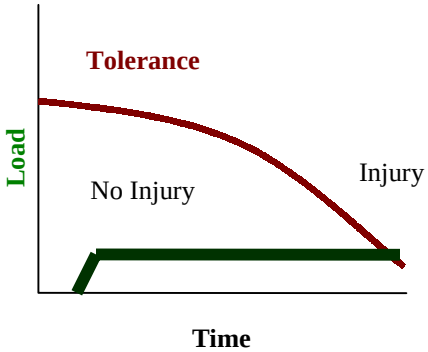
Example – a worker going over on their ankle and spraining it.



Excessive Repetition

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

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



Excessive Duration

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

Example – a grader developing neck tension.

Body Parts at Risk

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

After all of the appropriate information is collected during the investigation of the Planer Feeder 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 Planer Feeder. 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.

NECK

Direct Risk Factors:
Awkward Postures
Repetition

A Planer Feeder must look down and to the sides in order to observe boards.

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 are required to turn the head to the side. The further the head is turned to the side, the greater the load on the muscles and tendons.
- Neck muscles must support the weight of the head while in a forward bent position. The more the neck bends, the greater the load on the muscles and tendons.

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- The height of the mirrors and monitors can greatly affect the degree to which the neck must be turned.

Additional Workstation Design Options

- Loading on the neck muscles is increased because the orientation of the worker, with respect to the infeed and outfeed, and the location of mirrors and monitors, requires the operator to repeatedly bend and twist the neck in order to monitor the work area.

CONSEQUENCES

- When the head is held in a forward bent and/or twisted 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 92 & 93.
- For exercises that can help to prevent ***neck*** injuries, see the ***Neck section of the Body Manual.***

NECK/SHOULDER

Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planer Feeder must turn boards in order to inspect 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) move the shoulders, and the larger muscles of the shoulders (e.g., deltoids) move the arms.

DIRECT RISK FACTORS

Force

- Neck and shoulder muscles support the weight of objects held in the hands. The heavier the object, the greater the load on the muscles and tendons.

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 the muscles and tendons.

Repetition

- When workers repeatedly pull on logs, the muscles of the neck and shoulder are subjected to repeated stress with little time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues can fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Planer Feeders who have to reach farther forward to turn lumber have an increased risk of shoulder and neck injury. This increased forward reach can be a result of obstructed access to the transfer chain.

Working Heights

- The awkward arm postures of the Planer Feeder can become more extreme if the transfer deck is too high for the operator. These extreme postures can lead to an increased risk of injury in the shoulder and neck tissues.

Characteristics of Objects Being Handled

Size and Shape

- Larger the boards require greater force from the Planer Feeder for turning. This increased force can lead to injury, especially when it is repetitive.

CONSEQUENCES

- Forceful and repeated pulling on logs can lead to neck and/or shoulder strain.
- Signs and symptoms of neck and shoulder tissue injury include pain, tenderness, muscle spasm in the neck/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 92 & 93.
- To help prevent ***neck*** discomfort, see the upper trapezius stretch in the ***Neck section of the Body Manual.***

SHOULDER

Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planer Feeder must pull boards in order to remove waste pieces.

A Planer Feeder extends the arm backward to operate process controls.

BACKGROUND INFORMATION

- The shoulder joint is designed for mobility. The joint is held together by muscles and soft tissues. The larger muscle groups around the shoulder are responsible for producing movement (e.g., deltoids). The deeper muscles stabilise the shoulder joint as well as produce movement. These deeper muscles and their tendons are referred to as the rotator cuff.

DIRECT RISK FACTORS

Force

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

Awkward Postures

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

Repetition

- When the arms are repeatedly raised, the rotator cuff is subjected to repeated stress with little time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- A Planer Feeder is required to pull waste boards arriving at the workstation, forcing the arm to be extended back away from the body repeatedly throughout the day. The injury risks of this posture may be more significant if the workstation is not designed to suit the worker.
- Locating controls behind the Planer Feeder requires awkward shoulder postures for operation.

Working Heights

- Extended arm postures at inappropriately high working heights can increase the risk of shoulder injury.

Characteristics of Objects Being Handled

Size and Shape

- The Planer Feeder often has to pull reject waste boards at the workstation. The size and shape of the board may affect how the operator handles the board. The larger the board, the greater the force that is needed to manipulate the board.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Shoulder, please see the column labelled “Shoulder” in the Summary of Solutions on pages 92 & 93.
- For exercises that can help to prevent ***shoulder*** injuries, see the ***Shoulder section of the Body Manual.***

ELBOW/WRIST

Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planer Feeder must grip boards in order to turn pieces.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

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

Awkward Postures

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

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

Repetition

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

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Larger pieces of lumber require more force to turn. A Planer Feeder operator also has to use a wider grip span to turn larger pieces, which can increase the force in the forearm and elbow.
- Some control styles, especially rotary selector switches, can lead to sustained awkward wrist postures.

CONSEQUENCES

- Repeated forceful gripping may 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 92 & 93.
- For exercises that can help to prevent ***elbow*** injuries, see the ***Elbow section of the Body Manual.***

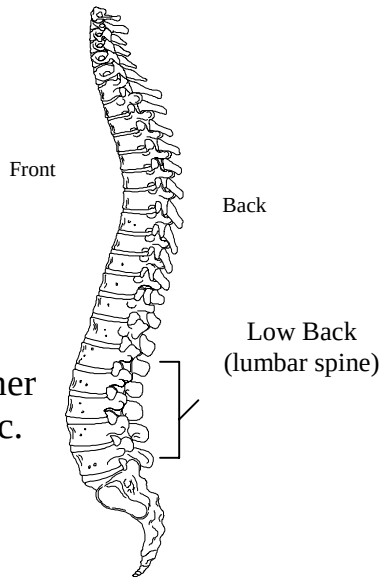
LOW BACK

Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planer Feeder must bend forward and to the side in order to turn boards.

A Planer Feeder may also twist to operate controls and turn boards.

Neutral Spine



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.

DIRECT RISK FACTORS

Force

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

Awkward Postures

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

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Extreme working reaches when handling lumber, cleaning machines, and using controls can cause awkward back postures.

Working Heights

- A Planer Feeder may have to assume an awkward posture to reach and turn the boards coming into the workstation. The height of the workstation may increase the prevalence of awkward postures for certain operators.

Floor Surfaces

- Flooring that is uneven, too hard, or too soft can lead to an increased risk of low back injury.

Characteristics of Objects Being Handled

Size and Shape

- Handling larger pieces of lumber can increase the forces on the back.

CONSEQUENCES

- Repeatedly bending forward and to the side may lead to damage in the disc walls.
- 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 92 & 93.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

KNEE

Direct Risk Factors:
Contact Stress
Repetition

A Planer Feeder may hit a knee bar in order to activate the feed table.

BACKGROUND INFORMATION

- There are muscles around the knee that must work together to ensure the knee cap tracks properly on the thigh bone.

DIRECT RISK FACTORS

Contact Stress

- Using the knee to activate a control increases the contact stress between the knee cap and the thigh bone lying beneath the knee cap.

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Additional Workstation Design Options

- The Planer Feeder may have to repetitively activate a knee bar to control the feed or transfer table. The properties of the knee bar can increase the chance of injury to the knee for the operator.

CONSEQUENCES

- Repeated activation of a knee bar may cause inflammation under the knee cap, which may cause pain and change the mechanics of knee cap tracking. Changes in knee cap tracking may lead to premature wear of the knee cap and/or the thigh bone.
- Signs and symptoms include muscle wasting around the inner knee, creaking in the knee, and chronic pain if left unchecked.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Knee, please see the column labelled “Knee” in the Summary of Solutions on pages 92 & 93.
- For exercises that can help to prevent ***knee*** injuries, see the ***Knee section of the Body Manual.***

ANKLE

Direct Risk Factors:
Awkward Postures
Repetition

A Planer Feeder frequently activates foot pedals in order to operate the planer, transfer chains, and other equipment.

BACKGROUND INFORMATION

- The muscle responsible for pulling the foot upwards is found in the front of the shin. Its tendon runs beneath thick bands at the ankle before attaching to the foot bones.

DIRECT RISK FACTORS

Awkward Postures

- Lifting the foot to activate a foot pedal puts the ankle into an awkward posture, which increases the loading in the muscle on the front of the shin. The further away from the neutral posture the ankle is, the greater the loading to this muscle. If the shoes worn are rigid or heavy, the loading is also increased.

Repetition

- Repetitive use of foot pedals may gradually cause small tears in the muscle on the front of the shin. If the repetitive stress is excessive, and recovery is not adequate, the small tears in the muscle on the front of the shin may progress to a more significant problem.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Foot pedals with a large height can increase the range of awkward ankle/foot postures.

CONSEQUENCES

- Repeated use of foot pedals can cause damage to the tissues in the shin.
- Signs and symptoms include inflammation, and pain with walking.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Ankle, please see the column labelled “Ankle” in the Summary of Solutions on pages 92 & 93.

FOOT

Direct Risk Factors:
Awkward Postures
Static Postures

A Planer Feeder must continually press down on foot pedals in order to activate transfer chains.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Awkward Postures

- Pressing down on a foot pedal while the ankle is bent leads to increased loading on the plantar fascia.

Static Postures

- Continual standing on foot pedals can cause tissue in the foot to deform and breakdown over time. If the tissue deformation is excessive and recovery not adequate, an injury may occur.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the plantar fascia is increased because the height of the foot pedals requires a Planer Feeder to repeatedly activate foot pedals with the ankle bent.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Foot, please see the column labelled "Foot" in the Summary of Solutions on pages 92 & 93.
- For exercises that can help to prevent ***foot*** injuries, see the ***Foot section of the Body Manual.***

FOOT

Direct Risk Factors:
Static Postures
Vibration

A Planer Feeder must stand on a hard, vibrating surface in order to operate controls and turn boards.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Static Postures

- While standing, the weight of the body loads the plantar fascia. If the duration of standing is excessive, and recovery is not adequate, the fascia may deform to the point of injury.

Vibration (whole body)

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

INDIRECT RISK FACTORS

Workstation Design

Floor Surfaces

- A Planer Feeder may have to stand for the entire shift while turning the boards. A hard floor surface may greatly increase the risk of injury due to continual standing on the vibrating surface.

Environmental Conditions

Vibration

- Exposure to vibration occurs because the workstation is linked with vibrating machinery, such as conveyors and transfer chains. The amount of vibration that is transferred to the body will directly affect the operator's chances of injury in their feet.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Foot, please see the column labelled "Ankle/Foot" in the Summary of Solutions on pages 40 & 41.
- For exercises that can help to prevent ***foot*** injuries, see the ***Foot section of the Body Manual.***

Summary of Body Parts at Risk

NECK

- A Planer Feeder must look down and to the sides in order to observe boards.

NECK/SHOULDER

- A Planer Feeder must turn boards in order to inspect pieces.

SHOULDER

- A Planer Feeder must pull boards in order to remove waste pieces.

- A Planer Feeder extends the arm backward to operate process controls.

ELBOW/WRIST

- A Planer Feeder must grip boards in order to turn pieces.

LOW BACK

- A Planer Feeder must bend forward and to the side in order to turn boards.

- A Planer Feeder may also twist in order to operate controls and turn boards.

KNEE

- A Planer Feeder may hit a knee bar in order to activate the feed table.

ANKLE

- A Planer Feeder frequently activates foot pedals in order to operate the planer, transfer chains, and other equipment.

FOOT

- A Planer Feeder must continually press down on foot pedals in order to activate transfer chains.

- A Planer Feeder must stand on a hard, vibrating surface in order to operate controls and turn boards.

Risk Factors by Body Part

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

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

***** *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.*

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

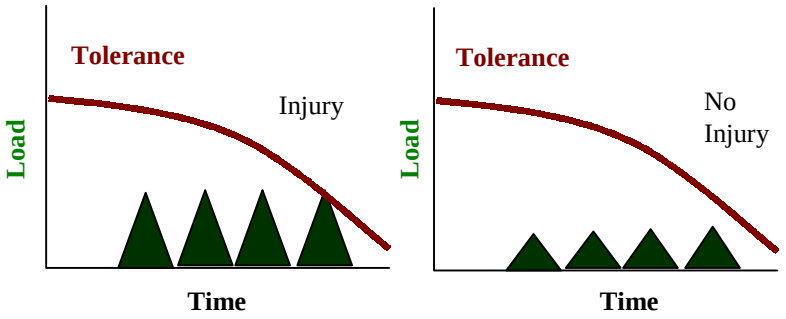
☐ = Indicates that the risk factor was assessed and was not found to be a contributor to the problem.

♦ = 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 40 & 41 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

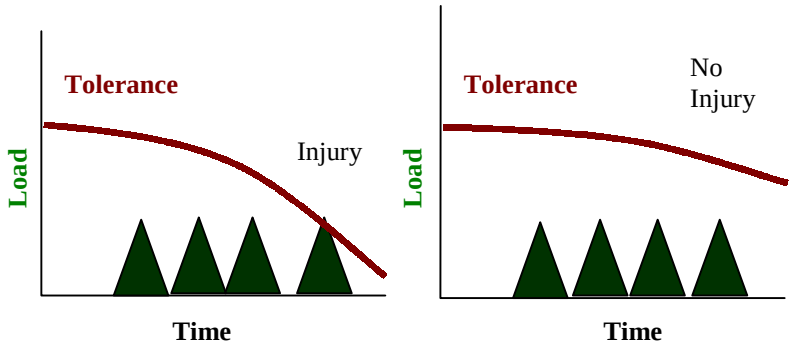
Injury Prevention

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 Planer Feeder 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

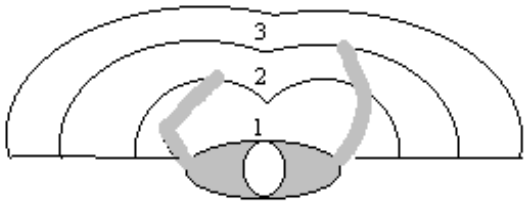
PERSONAL PROTECTIVE EQUIPMENT
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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.



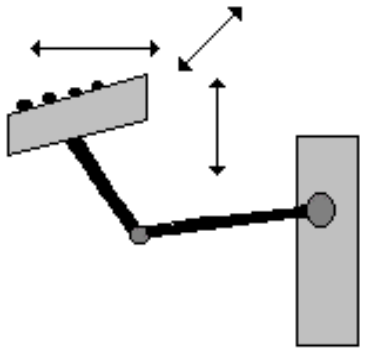
1 = Controls/items most frequently used
2 = Controls/items less frequently used
3 = Controls/items least frequently used

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.

Movable console

E

Planer Feeders often have to reach behind themselves to activate controls on the control panel. This movement places the shoulder in an awkward posture and puts the operator at risk for injury. By relocating the console adjacent to the conveyor on a movable arm, the control panel could be placed where the operator would like it, removing the backward reach and allowing the console to be at a convenient angle. The console could be readily pushed aside when access to the transfer deck was needed.



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 height specific for the Planer Feeder, 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.

Adjustable workstation height

E

A workstation that is adjustable in height would be preferable for multiple Planer Feeders. This can be accomplished in two ways:

1) Platforms can be built for individual workers if the height of the chain is above hip height. This will bring the workers up to the height of the chain, reducing the stress on the shoulder from awkward postures. The edges of the platform should be clearly marked, as the platform may be a potential tripping hazard at the workstation.

2) A pneumatic floor that the operator can adjust to a height that is optimal for him/her, as shown in the figures below, can also minimise awkward shoulder and back postures. The difference in height should be apparent for the worker, as this may be a potential tripping hazard if the height difference is not well marked.

Figure 1: Platform lowered

Figure 2: Platform raised

Monitor height

E

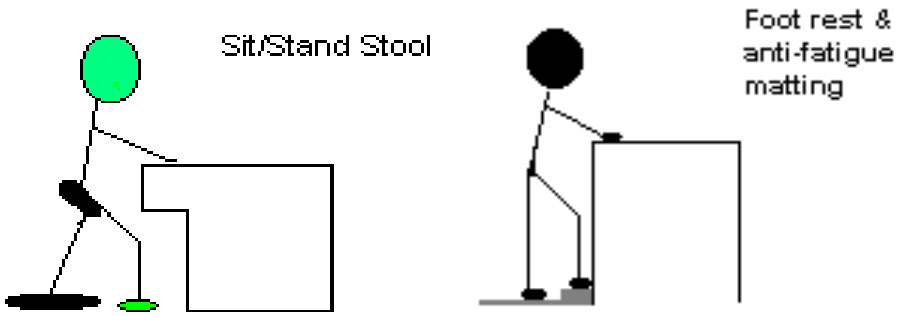
Planer Feeders often view monitors to ensure the constant flow of lumber through the drop sort workstation, and to other workstations. If the monitors are improperly placed, awkward and repetitive postures of the neck can result. Monitor heights are preferably between eye level and up to 20^0 below this horizontal. Monitors should also be less than 15^0 to the left or right from the centre of an operator who is facing forward. With a slightly lower viewing line you could decrease the possibility of causing eye fatigue but increase the strain on the muscles of the eye and neck. Ensure that monitors are kept clean and glare free.

SEATING

Sit/stand stool

E
WP

In order to minimise fatigue the lower extremities, sit/stand stools can be provided. 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.



FLOOR SURFACES

Anti-fatigue matting

E

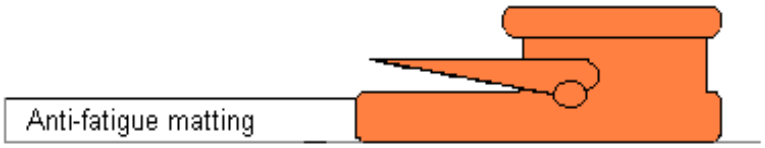
In order to minimise fatigue in the lower extremities, anti-fatigue matting can be installed. The use of anti-fatigue matting in the work area will help to increase comfort and reduce muscle fatigue. The cushioned surface encourages continuous micro-movements of the feet, which minimises blood pooling in the feet and legs and the associated discomfort. Addition of anti-fatigue matting may also aid in damping vibration levels.

Foot pedals

Recessed foot pedals

E

In order to minimise awkward postures of the ankle, recess foot pedals into anti-fatigue matting to decrease the height of the foot pedal base. To recess foot pedals, and provide a more comfortable standing surface in the process, position anti-fatigue matting as close as possible to the foot pedal base. If the pedals are stationary, cut the matting to surround the front of the foot pedal. For moveable foot pedals, place the matting as close to the base of the foot pedal as possible. The height of the matting should not exceed the base of the foot pedal (see diagram below). It is important to ensure pedals are kept clean of debris and are well maintained.



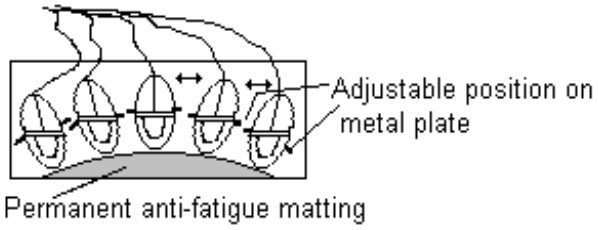
Movable foot pedals

E

In order to reduce awkward postures of the lower extremities, allow operators to choose the most appropriate position for the pedals, based on their body dimensions and the workstation design.

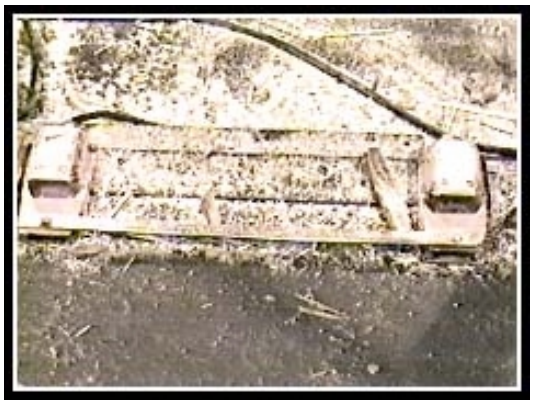
Securing the foot pedals may be required or desirable. Three solutions include:

1) Providing moveable foot pedals on a metal plate. The foot pedals are positioned in slide tracks cut into the metal, which allow pedals to move into the desired positions. The pedals are then fastened into place. The operator is able to move the set of foot pedals to any desired position in the workstation.



2) Providing several positions on the floor where clips or nails may be used to secure foot pedals. If this option is considered, make sure each possible position is highly visible to all operators, to prevent tripping or injuries.

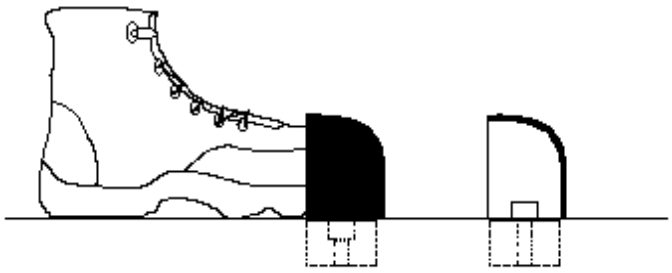
3) Providing a physical link (e.g., a metal bar) between two foot pedals with the same function. This solution is most appropriate where a worker may move to manipulate lumber but still needs to operate the foot pedals.



Foot push buttons

E

In order to eliminate awkward ankle postures, foot buttons can be chosen over foot pedals in certain circumstances. In general, foot controls leave the upper body free to manipulate or handle items, while still maintaining control over the process or equipment. For processes or equipment that require a control to produce a discrete action (e.g., on/off, start/stop) or maintain a continuous process (e.g., movement of a chain), a foot push button may be appropriate. The desired operation (e.g., chain running) is easily activated by the weight of the operator on the push button. When the foot is removed, the switch is deactivated, causing the process to stop. For safety reasons, a foot push button needs to be protected from accidental activation. A guard, similar to those used on foot pedals, may be appropriate.



ADDITIONAL WORKSTATION DESIGN OPTIONS

Drop gate

E

A Planer Feeder workstation may have a re-trim chain that is above the infeed chain to the planer. To send the lumber back to the tilt hoist for re-trim, the operator has to lift the lumber up onto the re-trim chain. This motion may increase the risk for injury to the shoulder and upper back, as the operator's arms are often raised above shoulder level. To decrease or eliminate this motion, add drop gates to replace re-trim chains. When using the drop gate, the amount of unnecessary wood handling is decreased and lifting is eliminated.

Camel back chains

E

Boards may cross up at the planer feeder station for a number of reasons. When they do cross up, the Planer Feeder must exert force to uncross them. Uncrossing boards may also place the Planer Feeder in awkward postures, placing stress on the shoulders, back, elbows, and wrists. By using camel back chains on the transfer deck, the number of cross-ups that occur at the workstation may be reduced. Since the camel back chains are smooth on the top they decrease the potential for large slivers on the wood getting caught in the chain, pulling the load out of alignment.

Convex mirror

E

The Planer Feeder has to monitor the lumber coming entering and leaving the workstation. Repetitive neck twisting is required to do this, placing strain on the neck muscles, and increasing the risk of injury. To decrease this motion, install a convex mirror, giving an overall view of the transfer deck. Only when a problem occurs does the operator have to turn their head to assess the corrective action necessary.

Padded knee bar

E

Padding the knee bar, if one is present and used at the workstation, will decrease the amount of contact stress that occurs at the knee, and the risk of knee injury.

Turning aid

E

Installing a turn about, as shown in Figures 3 & 4 below, will aid the worker in turning lumber that needs to be re-trimmed on the far end. This assist reduces the excessive force required in pulling lumber off of the chain and manually turning it around. With the turning aid, the operator places lumber on the turn about using leverage, and then swings the piece around.

Figure 3: Lifting the lumber up

Figure 4: Swing the lumber around

Characteristics of Objects Being Handled

SIZE AND SHAPE

Leverage

WP

Leverage can be used to help get lumber off the main chain and in to the conveyors. By pushing down on one end of the lumber you create a lever to aid in lifting the rest of the piece of lumber up on to the chain. Pulling the lumber out before pushing down would create a better leverage point. Once one side of the board is up on the re-trim chain, the part of the board that is on the higher chain should be at least half the length of the board before lifting the rest of the board up onto the chain. This can reduce risk of injury for the shoulder and low back, as it decreases the force needed to manipulate the lumber.

Figure 5: Using a lever point

Alternating hands

WP

Alternating hands to turn the lumber will decrease the load taken on by one hand individually. A one handed technique should only be used when handling smaller lumber. By using both your right and left hands evenly to turn lumber, you decrease the risk of injury by sharing the load.

Figure 6: Using both hands

Two hands at once

WP Using both hands to flip larger pieces of lumber will significantly decrease the load on one hand when doing the same task.

Unnecessary handling

WP Handling every piece of lumber can increase the chance of injury to the wrist, elbow, shoulder, and back of the operator. Try not to unnecessarily handle every piece of lumber going by. The less handled the lower the chance of injury.

LOAD CONDITION AND WEIGHT DISTRIBUTION

Pike pole use

WP Pike poles should be lightweight and the right length for the job. The pike pole should be longer than the distance from the operator to the object to be retrieved. This extra distance will prevent the pike pole from striking the operator if the pike pole detaches from the object and will also give the operator some extra grip length if the pike pole pulls away from the operator. Two hands should be used when handling the pike pole. Once the sharp end of the pike pole is stuck in the lumber, only pull on it twice before removing it from the wood. Repeat the process again until the lumber is uncrossed or the jam is cleared.

CONTAINER, TOOL AND EQUIPMENT HANDLES

Wrap tools

E In order to reduce the force required to grip hand tools, increase the friction between the tool handles and the operator's glove. Due to the smooth, slippery surface of metal or wooden tool handles (e.g., pike pole, picaroon) a Planer Feeder 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 Planer Feeder's glove, decreasing the grip forces required.

Proper gloves

PPE

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

Electric drill

WP

The Planer Feeder often opens the planer to clear debris. A portable electric drill could be used for this, instead of a hand crank. The hand crank requires more force, and can put the operator at greater risk for hand, wrist, elbow, and shoulder injuries due to the repetitive and awkward nature of the movement.

Environmental Conditions

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

Work Organisation

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

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	**Page**	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/Hand	Low Back	Hip	Knee	Ankle	Foot
Movable console	**81**		**A**	**A**	**A**							
Adjustable workstation height	**82**		**F R A**	**F R A**	**F A**			**F R A**				
Monitor height	**83**	**A**										
Sit/stand stool	**84**							**A S**			**A**	**S**
Anti-fatigue matting	**84**							**S**				**S V**
Foot pedals	**85**							**A**			**R A**	**S**
Drop gate	**87**		**F R A**	**F R A**	**F R A**			**F R A**				
Camel back chains	**87**		**F**	**F**	**F**			**F**				
Convex mirror	**87**	**R A**										
Padded knee bar	**87**									**C**		

Direct Risk Factors

F = *Force* **R** = *Repetition* **A** = *Awkward Postures*

S = *Static Postures* **C** = *Contact Stress* **V** = *Vibration*

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Turning aid	**88**		**F**	**F**	**F**			**F**				
Leverage	**89**		**F**	**F**				**F**				
Alternating hands	**89**				**F**							
Two hands at once	**90**				**F**							
Unnecessary handling	**90**		**F**	**F**	**F**							
Pike pole use	**90**		**F A**	**F A**								
Wrap tools	**90**				**F**							
Proper gloves	**91**				**F**							
Electric drill	**91**		**F R A**	**F R A**	**F R A**			**F A**				
Heat Exposure	◆	indirectly reduces risk of injury to the body										
Cold Exposure	◆	indirectly reduces risk of injury to the body										
Lighting	◆	indirectly reduces risk of injury to the body										
Noise	◆	indirectly reduces risk of injury to the body										
Vibration	◆	directly reduces risk of injury to the back and wrist										
Rest breaks	◆	indirectly reduces risk of injury to the body										
Job Rotation	◆	indirectly reduces risk of injury to the body										
Task Rotation	◆	indirectly reduces risk of injury to the body										
Work Pace	◆	indirectly reduces risk of injury to the body										
Scheduling	◆	indirectly reduces risk of injury to the body										

Direct Risk Factors

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◆ = *See General Risk Factor Solutions Manual*

PLANER FEEDER MSI SAFETY GUIDE

OBJECTIVE: To identify ergonomic risks involved in the Planer Feeder 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 Planer Feeder.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck A Planer Feeder must look down and to the sides in order to observe boards.	**Awkward Postures** **Repetition**	• Neck muscles are required to turn the head to the side. The further the head is turned to the side, the greater the load on the muscles and tendons. • Neck muscles must support the weight of the head while in a forward bent position. The more the neck bends, the greater the load on the muscles and tendons. • When the head is repeatedly turned to the side or bent forward, the muscles of the neck are subjected to repeated stress with little time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues can fatigue to the point of injury.	• If twisting cannot be avoided, try to turn the head in both directions. • When twisting the neck, keep the chin tucked in and the ears in alignment with the shoulders. • For exercises that can help prevent ***neck*** injuries, ***see the neck section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck/Shoulder A Planer Feeder must turn boards in order to inspect pieces.	**Force** **Awkward Postures** **Repetition**	• Neck and shoulder muscles support the weight of objects held in the hands. The heavier the object, the greater the load on the muscles and tendons. • Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on the muscles and tendons. • When workers repeatedly pull on logs, the muscles of the neck and shoulder are subjected to repeated stress with little time for recovery. If the stress is excessive, tissues can fatigue to the point of injury.	• Position yourself as close to the lumber as possible. • Avoid sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body. • For exercises that can help prevent ***neck*** and ***shoulder*** injuries, ***see the neck and shoulder sections of the Body Manual.***
	Shoulder A Planer Feeder must pull boards in order to remove waste pieces. A Planer Feeder extends the arm backward to operate process controls.	**Force** **Awkward Postures** **Repetition**	• The rotator cuff stabilises the shoulder joint when objects are pulled or manipulated. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. • If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur. • The rotator cuff stabilises the shoulder joint when the arms are away from the body. The farther away the arms are from the body, the greater the load on the rotator cuff. • When the arms are repeatedly raised, the rotator cuff is subjected to repeated stress with little time for recovery. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.	• Try to keep the arms as close to the body as possible. • Avoid sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body. • Pike poles should be lightweight and the right length for the job. • For exercises that can help prevent ***shoulder*** injuries, ***see the shoulder section of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Elbow/Wrist A Planer Feeder must grip boards in order to turn pieces.	**Force** **Awkward Postures** **Repetition**	• Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection. • The width of an object affects how much muscle tension needs to be generated. Using either an overly large or a small grip requires more muscle force, and can lead to tissue fatigue at the tendon/bone connection. • The position of the wrist also affects how much muscle tension needs to be generated. Gripping objects with the wrist bent increases the tension generated by muscles. • Repeated stress to the elbow without adequate rest could fatigue tissues to the point of injury.	• Use only as much gripping force as is necessary. • Maintain a straight wrist position. • Whenever possible, try using both hands. • Alternate the hands used to turn the lumber this will decrease the load taken on by one hand individually. By using both you right and left hands evenly to turn lumber you decrease the risk of injury by sharing the load. • Handling every piece of lumber can increase the chance of injury to the wrist, elbow, shoulder, and back of the operator. Try not to unnecessarily handle lumber. • For exercises that can help prevent ***elbow*** and ***wrist*** injuries, ***see the neck and shoulder sections of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Planer Feeder must bend forward and to the side to turn boards. A Planer Feeder may also twist to operate controls and turn boards.	**Force** **Awkward Postures** **Repetition**	• Lifting increases the loading on the spine. Weight held in the hands is transmitted to the low back. The greater the weight, the greater the loading on the structures of the low back. • Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. • Repeated forward and side bending can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, the disc walls may fatigue to the point of injury.	• Try to keep the back in a neutral position (ears, shoulders, and hips aligned). • When lifting, hold object close to the body and do not twist the torso. • Use leverage to help get the lumber off of the main chain and on to the re-trim chain or to move the lumber. By pushing down on one end of the lumber you can create a lever to aid in lifting the rest of the piece of lumber up onto the chain. Pulling the lumber out before pushing down would create a better leverage point. Once one side of the board is up on the top chain, the part of the board that is on the higher chain should be half the length of the board before lifting the rest of the board up onto the chain. • Pull off on alternating sides (left and right) of your body during the day to balance the stress on your back. • Move a board down the chain by flipping it side over side, or by using the edge of the chain as a point of leverage. • For exercises that can help prevent ***low back*** injuries, ***see the back section of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Knee A Planer Feeder may hit a knee bar in order to activate the feed table.	**Contact Stress** **Repetition**	• Using the knee to activate a control increases the contact stress between the kneecap and the thighbone lying beneath the kneecap. • Repeated pounding (contact stress) with the knee may gradually irritate the knee. Irritation of the knee may lead to muscle wasting, which in turn leads to poor tracking of the knee cap on the thigh bone and increased contact stress between these bones.	• ***See the knee section of the Body Manual***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Ankle A Planer Feeder frequently activates foot pedals in order to operate the planer, transfer chains, and other equipment.	**Awkward Postures** **Repetition**	• Lifting the foot to activate a foot pedal puts the ankle into an awkward posture, which increases the loading in the muscle on the front of the shin. The further away from the neutral posture the ankle is, the greater the loading to this muscle. If the shoes worn are rigid or heavy, the loading is also increased. • Repetitive use of foot pedals may gradually cause small tears in the muscle on the front of the shin. If the repetitive stress is excessive, and recovery is not adequate, the small tears in the muscle on the front of the shin may progress to a more significant problem.	• Stretch the ankles before and during work to make sure the muscles and ligaments are loose. • Alternate using the toe of the foot and the heel of the foot to activate the foot pedals. This will use more muscles of the leg, increasing circulation in this area. • For exercises that can help prevent *ankle* and ***foot*** injuries, ***see the ankle and foot sections of the Body Manual.***
	Foot A Planer Feeder must continually press down on foot pedals in order to activate transfer chains.	**Awkward Postures** **Static Postures**	• Pressing down on a foot pedal while the ankle is bent leads to increased loading on the plantar fascia. • Continual standing on foot pedals can cause tissue in the foot to deform and break down over time. If tissue deformation is excessive and recovery not adequate, an injury may occur.	