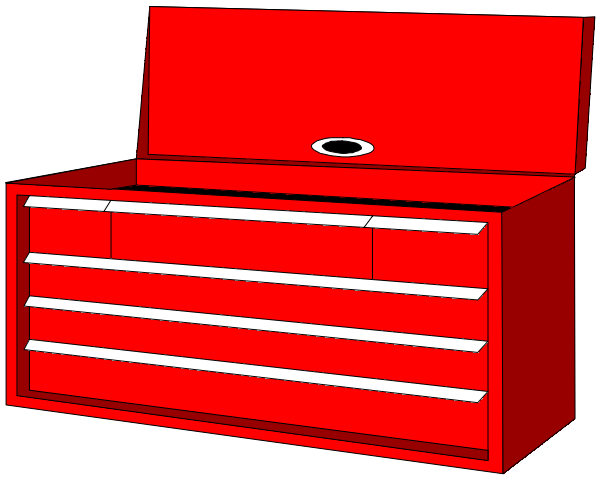
Industrial Musculoskeletal Injury Reduction Program

Common Industry Jobs (CIJs)

Planerman 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

PLANERMAN TOOL KIT
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Overview
Planerman

Job Summary

A Planerman is responsible for maintaining the planer and peripheral equipment in working condition to ensure smooth operation. A Planerman may change heads, change knives, grind side heads, joint knives, unjam the planer, lubricate machinery, and change profiles. Refer to the Physical Demands Analysis for more detail.

Physical Demands

The physical demands of the Planerman may include:

a) Awkward and static postures of the neck
b) Forceful and repeated movements of the shoulder in awkward postures
c) Forceful and repeated loading on the elbow/wrist from gripping
d) Forceful and repeated loading on the back in awkward postures
e) Walking, sitting, standing, climbing, kneeling and crouching
f) Carrying, lifting and lowering, pushing and pulling heavy objects

Mental Demands

A Planerman uses their training and experience to maintain the planer and peripheral equipment. A Planerman must be familiar with the lockout procedures of machinery.

Major Variations

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

1) Types of planer include:
   a) Manually adjusted with hand cranks
   b) Automatic set works, which automatically adjusts the planer

2) Use of profiles:
   a) Some mills use a profiler in their planer

3) Method of transporting objects:
   a) Some mills have installed overhead hoist

Minor Variations

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

1) Installing side heads:
   a) Some Planerman climb onto the planer to get closer to the side head when lifting and lowering
   b) Some Planerman reach over to lift and lower the side head

2) Cleaning knives:
   a) Some Planerman soak knives in cleaning solvent when cleaning
   b) Some Planerman scrape debris off the knives when cleaning

Physical Demands Analysis
Planerman

PDA General Instructions: Planerman

This Physical Demands Analysis (PDA) identifies the physical demands of the Planerman job as assessed by IMIRP ergonomists. The information reported was collected from a sample of Planermen 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 Planerman 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.

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Physical Demands Analysis
Planerman

Task List

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

Change heads

A Planerman changes the top and bottom heads (cylinders), and the side heads.

Does this task occur at your mill?

☐ Yes ☐ No

Change knives

A Planerman changes the knives in the heads. This requires loosening gib screws, removing, balancing, installing knives, and tightening gib screws.

Does this task occur at your mill?

☐ Yes ☐ No

Grind side heads

A Planerman grinds side heads. This requires cleaning heads, installing side heads on grinder, grinding knives, and removing side heads.

Does this task occur at your mill?

☐ Yes ☐ No

Adjust planer

A Planerman adjusts planer dimensions for different size runs. This requires adjusting the pressure board height and installing different size heads.

Does this task occur at your mill?

☐ Yes ☐ No

Joint knives

A Planerman joints knives in the planer to maintain board quality. Jointing keeps the knives on the heads sharp.

Does this task occur at your mill?

☐ Yes ☐ No

Unjam planer

A Planerman unjams boards caught in the planer. A Planerman may use objects like pry bars to knock out boards.

Does this task occur at your mill?

☐ Yes ☐ No

Change profiles

A Planerman changes profiles, which are used to split wood. This requires carrying profiles from the shop, and installing the profiles into the planer.

Does this task occur at your mill?

☐ Yes ☐ No

Lubricate machinery

A Planerman lubricates machinery to ensure equipment operates smoothly.

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 Planerman. These tasks may vary between mills. To ensure accuracy, consult with a Planerman at your mill regarding percent of shift, task duration, and frequencies. Percent of shift is not completed due to large variations among mills

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

	Task	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Change heads					• *Side heads are changed more often (2 to 4 times per week) than top and bottom heads (1 to 2 times per week)* • *It takes 30 to 15 minutes per change*
	Change knives					• *Frequency varies* • *Depends on the number of knives and gib screws* • *Cylinders with 16 knives and 144 gib screws take approx. 20 minutes per cylinder* • *When knives become dull or damaged, they are replaced (0 to 10 times per week)*
	Grind side heads					• *Frequency varies* • *When side head knives are dull or damaged, the side heads are removed and knives ground (2 to 4 times per week on average)*
	Adjust planer					• *Frequency varies* • *When different size boards are run through the planer, the planer needs to be adjusted*
	Joint knives					• *Approx. 2 minutes to joint the top and bottom heads.* • *10 to 15 minutes to joint the side heads* • *Jointing frequency varies* • *Done as required (2 to 6 times per shift)*

	Task	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Unjam planer					• *Duration depends on severity and location of jam (2 to 5 minutes per jam)* • *Jam frequency ranges from 5 to 10 times per shift*
	Change profiles					• *Frequency varies* • *When profiles are dull or damaged, they are replaced* • *Ranges from 6 to 10 times per shift to 1 to 2 times per week* • *Some mills do not use profiles*
	Lubricate machinery					• *Planer is lubricated as required* • *Typical frequency is 1 time per week* • *Duration ranges from 1 to 15 minutes per lubricating*
	Other:					

Organisational Factors

The table below contains a list of organisational factors for a Planerman. 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* ☐ *8.5 hours* ☐
Formal breaks	☐ *Two 10 minute breaks* ☐ *Two 15 minute breaks* ☐ *One 30 minute lunch break*
Informal breaks	☐ *Yes – amount of time varies depending on amount of work and number of breakdowns* ☐
Work pace	☐ *Not Applicable* ☐
Work pace control	☐ *Self-paced* ☐
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) Side head height	cm
(B) Pressure bar height	cm
(C) Bottom head height	cm
(D) Top head height	cm

1. Outfeed rolls
2. Pressure plate or bar
3. Top head or cylinder
4. Bottom head or cylinder
5. Bed plate
6. Infeed rolls
7. Side head

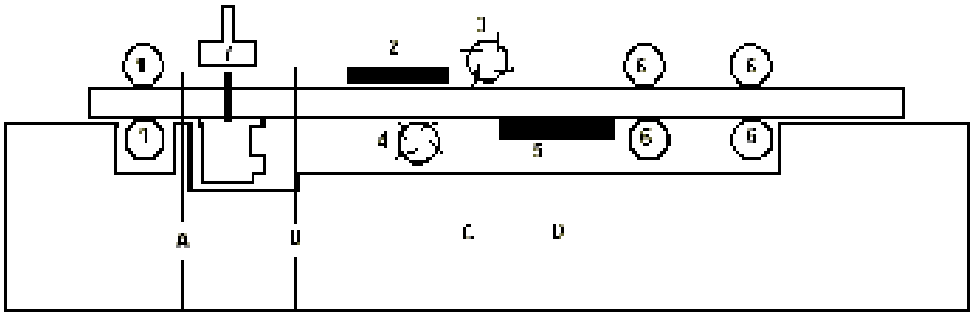


Figure 1: Front View of Planer

Flooring, Displays, and Seating

The table below lists several components of a workstation. For Flooring and Displays there are several options provided. Please indicate all of the options that apply to the workstation 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 Height of seat: _____ cm ☐ Industrial ☐ In-house Design Depth of seat: _____ cm Width of seat: _____ cm
	Check all that apply ☐ Armrests ☐ Backrest ☐ Swivel Seat ☐ Slide track ☐ Foot rest ☐ Lumbar support ☐ Castors # _____ 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 Planerman. These controls may vary between types of planers. To ensure accuracy, consult with a Planerman at your mill. If controls are different at your mill, check off *other* box(es) and fill in information in the space provided.

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

	Type of Control	Function	Frequency	Comments
	Push buttons	• *Start/stop controls*	*Depends on the number of jams*	
	Push buttons	• *Change direction of planer*	*Depends on the number of jams*	
	Hand wheel	• *Change position of cylinder*	*Depends on the number of adjustments that need to be made, varies each day*	
	Hand wheel	• *Change position of pressure bar*	*Depends on the number of adjustments that need to be made, varies each day*	
	Dial	• *Change planer speed*	*Depends on the number of adjustments that need to be made, varies each day*	
	Other:			
	Other:			
	Other:			
	Other:			
	Other:			

Physical Demands

Whole Body Physical Demands

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

Check marks (✓) in the Percent of TASK columns correspond to percentages found during the ergonomic investigation. The Comments section may contain information relating to duration, frequencies, and other variations in the physical demands.

Physical Demands		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Walking	• *Change heads*		✓			• *Transporting heads between shop and planer*
		• *Grind side heads*	✓				• *Transporting side head from cleaning table to grinder*
		• *Unjam planer*		✓			• *Walking to area where the jam occurred*
		• *Change profiles*		✓			• *Transporting profiles between shop and planer*
		• *Lubricate machinery*			✓		• *Walking to the machinery to be lubricated*
	Sitting	• *Change knives*				✓	• *Sitting on machinery while removing knives in the cylinders* • *Does not occur at mills that remove the cylinder when changing knives*
		• *Grind side heads*				✓	• *Does not occur at mills that have auto-grinders or where the Planerman stands while grinding*
	Standing	• *Change heads*				✓	• *Installing and removing heads*

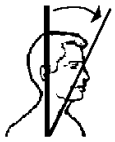
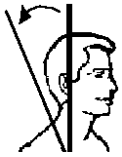
Physical Demands		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Standing	• *Change knives*				✓	• *Removing knives* • *Does not occur at mills that remove the cylinder when changing knives*
		• *Grind side heads*		✓			• *Cleaning (scraping) knives* • *Does not occur at mills that soak the heads in cleaning solvent*
		• *Grind side heads*				✓	• *Does not occur at mills where they use an auto-grinder or the Planerman sits when grinding*
		• *Joint knives*				✓	• *Jointing top and side heads*
		• *Unjam planer*				✓	• *Removing boards and debris from planer*
		• *Change profiles*				✓	• *Installing and removing profiles*
		• *Lubricate machinery*			✓		
	Climbing	• *Change side heads*	✓				• *Climbing onto planer to remove side heads* • *Some Planerman choose to remove side heads this way*
		• *Change knives*	✓				• *Climbing onto planer to remove knives from top head* • *Does not occur for mills that remove heads when changing knives*
		• *Unjam planer*	✓				• *Occasionally the Planerman will have to climb onto equipment to remove boards and debris*
	Balancing						*Not Applicable*
	Kneeling/ Crouching	• *Joint knives*		✓			• *Jointing bottom head*
		• *Lubricate machinery*		✓			• *Lubricating machinery close to the ground*

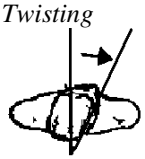
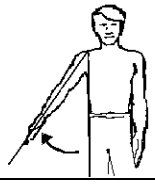
Body Postures

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

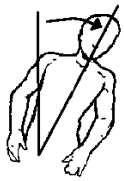
For each of the postures identified, indicate whether it occurs by placing a check mark (✓) in the far left column.

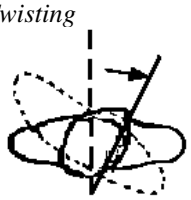
Check marks (✓) in the Percent of TASK columns correspond to percentages found during the ergonomic investigation. The Comments section may contain information relating to duration, frequencies, and other variations in posture.

	Body Posture	Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Neck							
	Flexion 	• *Change heads*		✓			• *Installing and removing side and bottom heads*
		• *Change knives*				✓	• *Removing and installing knives in top and bottom heads*
		• *Grind side heads*		✓			• *Cleaning side heads*
		• *Grind side heads*				✓	
		• *Joint knives*			✓		• *Jointing side heads*
		• *Unjam planer*		✓			• *Removing debris from planer*
		• *Change profile*		✓			• *Installing and removing bottom profile*
		• *Lubricate machine*		✓			• *Lubricating machinery at or below waist height*
	Extension 	• *Joint knives*		✓			• *Looking up when stooped over while jointing bottom head*
		• *Unjam planer*		✓			• *Looking up when stooped over while removing debris from planer*
		• *Lubricate machinery*		✓			• *Looking up when stooped over while lubricating machinery below waist height*

Body Posture		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Twisting 	• *Joint knives*		✓			• *Jointing bottom head*
		• *Unjam planer*		✓			• *Removing debris from planer*
		• *Lubricate machinery*		✓			• *Lubricating machinery below waist height*
Shoulder							
	Flexion 	• *Change heads*		✓			• *Installing and removing side heads*
		• *Change knives*			✓		• *Changing knives on top cylinder*
		• *Grind side heads*				✓	• *Pushing and pulling gib on grinder* • *Does not occur with auto-grinders*
		• *Joint knives*				✓	• *Jointing knives on all heads*
		• *Unjam planer*			✓		• *Removing debris from planer*
		• *Change profile*		✓			• *Installing and removing profiles*
		• *Lubricate machinery*			✓		• *Lubricating machinery at or above shoulder height*
	Abduction 	• *Change knives*		✓			• *Removing knives*
		• *Unjam planer*		✓			• *Removing debris from the planer*
	Extension 	• *Joint knives*		✓			• *Arms are pulled back when jointing*
		• *Unjam planer*		✓			• *Arms are pulled back when pulling debris out of planer*

Body Posture		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Forearm							
	Rotation 	• *Change heads*		✓			• *Removing and tightening bolts*
		• *Change knives*				✓	• *Removing and tightening gib screws*
		• *Joint knives*			✓		• *Jointing top and bottom heads*
Wrist							
	Flexion 	• *Change heads*		✓			• *Installing and removing side heads*
		• *Change knives*			✓		• *Removing and installing gib screws on top head*
		• *Joint knives*			✓		• *Jointing side heads*
	Extension 	• *Grind side head*			✓		• *Pushing and pulling on jig* • *Does not occur for auto-grinder*
		• *Lubricate machinery*		✓			• *Holding onto the grease gun handle*
	Ulnar Deviation 	• *Change heads*	✓				• *Installing and removing side heads*
		• *Grind side heads*		✓			• *Pushing and pulling on side head during grinding*
		• *Unjam planer*		✓			• *Pulling boards out of planer*
		• *Lubricate machinery*		✓			• *Holding onto grease gun*
	Radial Deviation 	• *Joint knives*		✓			• *Jointing bottom heads*

Body Posture		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back							
	Flexion 	• *Change heads*		✓			• *Installing and removing side heads*
		• *Change knives*				✓	• *Sitting forward on planer when removing and installing knives in top head* • *Does not occur in mills that remove the top head before removing knives*
		• *Joint knives*		✓			• *Jointing the bottom head*
		• *Unjam planer*		✓			• *Removing debris from planer*
		• *Lubricate machinery*		✓			• *Lubricating machinery below waist height*
	Lateral Flexion 	• *Grind side head*				✓	• *Grinding while seated* • *Does not occur in mills with auto-grinder*
		• *Joint knives*		✓			• *Jointing bottom head*
		• *Unjam planer*		✓			• *Reaching into planer to remove debris*
		• *Lubricate machinery*		✓			• *Lubricating machinery below waist height*

Body Posture		Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back							
	Twisting 	• *Joint knives*		✓			• *Jointing bottom head*
		• *Unjam planer*		✓			• *Removing debris from planer*
		• *Lubricate machinery*		✓			• *Lubricating machinery below waist height*
	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 Planerman.

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.

Check marks (✓) in the Percent of TASK columns correspond to percentages found during the ergonomic investigation. The Comments section may contain information relating to duration, frequencies, hand used, etc.

	Type	Task(s)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Power 	• *Change heads*	✓				• *Carrying side head*
		• *Change knives*				✓	• *Gripping T-handled hex key when loosening and tightening gib screws*
		• *Joint knives*				✓	• *Gripping jointer when sharpening top and bottom heads*
		• *Unjam planer*	✓				• *Holding pry bar to unjam board from planer*
		• *Change profiles*		✓			• *Carrying profiles*
		• *Lubricate machinery*				✓	• *Holding grease gun handle*
	Pinch 	• *Change knives*			✓		• *Handling knives*
		• *Grind side heads*		✓			• *Handling scraper when cleaning heads* • *Does not occur at mills that soak the heads in cleaning solvent*
		• *Joint knives*		✓			• *Jointing of the side head*
		• *Unjam planer*		✓			• *Pulling boards out of planer*
	Hook 	• *Change heads*	✓				• *Carrying side heads*
		• *Grind side heads*	✓				• *Carrying side heads*
	Precision 						*Not Applicable*

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 Planerman.

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 (kg)	Percent of TASK				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Change heads – carrying side heads	*33 to 38*	✓				• *2 to 4 times per week, 10 meters each time*
	Change profiles – carrying profiles	*45 to 55*		✓			• *Does not occur at mills that do not use profiles*
	Lubricate machinery – carrying lubricate/grease gun	*2.2*				✓	• *Usually once per week for 15 minutes*
	Change heads – lowering/lifting side head into position in planer	*33 to 38*	✓				• *2 to 4 times per week*
	Grind side heads – lifting side head onto grinder	*33 to 38*	✓				• *2 to 4 times per week*
	Grinding side heads - pushing and pulling on side head when grinding					✓	• *Does not occur at mills with auto-grinder* • *Can take as long as one hour* • *Force = 2.4 to 5.4*
	Other:						

Hand Tools

Indicate the hand tools used by a Planerman 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.

Check marks (✓) in the Percent of TASK columns correspond to percentages found during the ergonomic investigation. The Comments section may contain information relating to duration and frequencies of use.

	Type of Tool	Task(s)	Weight (kg)	Percent of TASK				Comments
				Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Wrench	• *Change heads*	*0.3 to 1.6*		✓			• *Loosening or tightening bolts*
	Air hose	• *Change heads*	*1.2*		✓			• *Blowing down debris*
	T-handled hex key	• *Change knives*	*0.4*				✓	• *Loosening or tightening gib screws*
	Chisel	• *Grind side heads*	*0.2*		✓			• *Cleaning grit off knives*
	Jointer	• *Joint knives*	*9.0*				✓	• *Sharpening knives on planer*
	Pry bar	• *Unjam planer*	*11.1*	✓				• *Removing jammed boards*
	Lubricate /grease gun	• *Lubricate machinery*	*2.0*				✓	
	Other:							

Environmental Conditions

Work Environment

The table below contains a list of environmental conditions that may be of concern at the Planerman 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 Planerman. For the lighting level, include the location of the measurements within the workstation.

Factor	
Vibration ☐ Yes *(Check one)* ☐ No	☐ Whole body ☐ Seat ☐ Floor
	☐ Hand transmitted ☐ Tool ☐ Other: _____

Noise level (dB)	*Range found: 89.0 to 99.4 in planer room* *Mill Specific:*
Lighting level (lux)	*Range found: 190 to 1020 in planer room* *Mill Specific:*
Temperature (^{o}C)	*See Regional Temperatures on next page*

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 Planerman 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.

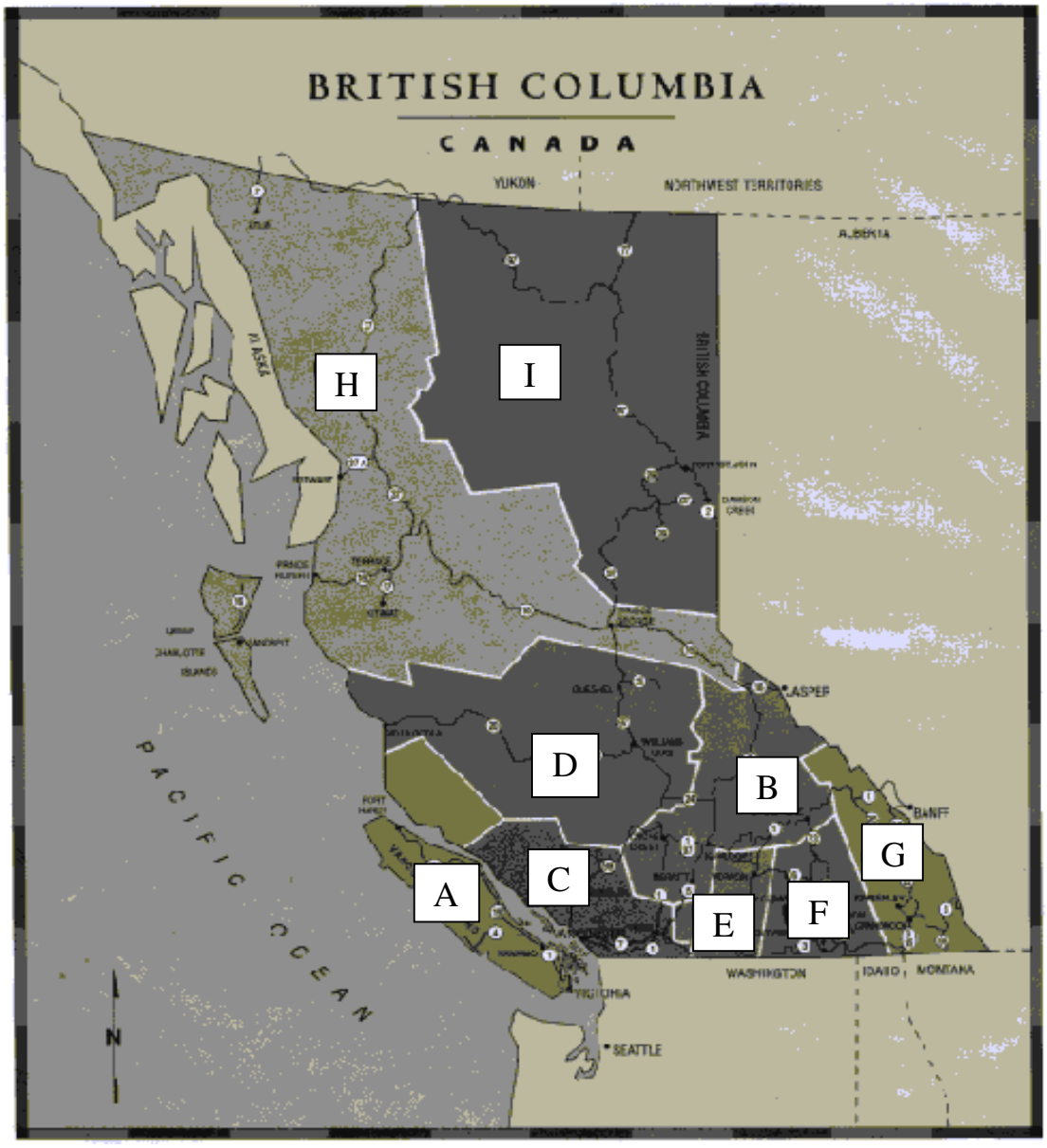
For the lightest species handled, enter the lb./board foot value, the multiple for the smallest size of wood, and the shortest length of this wood. Multiply these values together to determine the weight of the board in pounds.

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
Planerman

Purpose

The Risk Factor Identification Checklist for a Planerman 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 – Planerman

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.

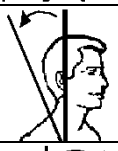
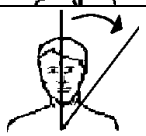
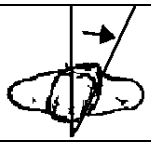
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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.

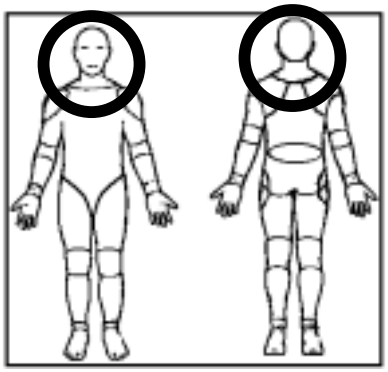
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

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., grinding side heads)			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 for long periods)			S O	
Awkward Posture				
Flexion 			S O	
Extension 			S O	
Lateral Bending 			S O	
Rotation 			S O	

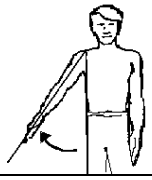
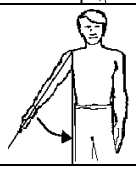
Please indicate whether the following direct risk factors were identified at the **NECK**.		
Direct Risk Factors	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Neck or Head/Eye or Upper Back? (see Worksheet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



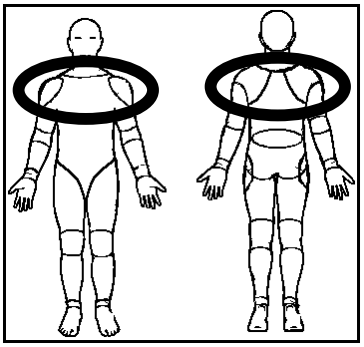
Body parts within the circled area will be classified as NECK issues.

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., tightening gib screws)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., grinding side heads)			S O	
Static Posture				
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., grinding side heads)			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., T-handled hex key)			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



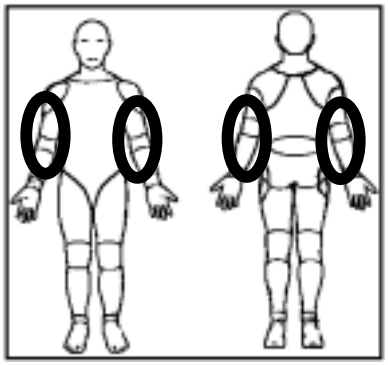
Body parts within the circled area will be classified as SHOULDER issues.

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., wrench) 			S O	
Are objects handled in a pinch grip? (e.g., knives) 			S O	
Are objects handled in a hook grip? (e.g., grip used to carry side head) 			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., tightening gib screws)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., grinding side heads)			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., wrench)			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



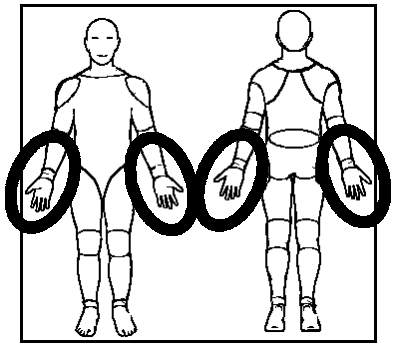
Body parts within the circled area will be classified as ELBOW issues.

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., wrench) 			S O	
Are objects handled in a pinch grip? (e.g., knives) 			S O	
Are objects handled in a hook grip? (e.g., grip used to carry side head) 			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., tightening gib screws)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., grinding side heads)			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., wrench)				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	

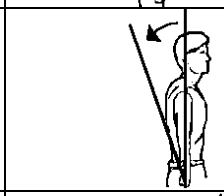
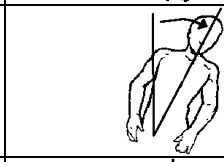
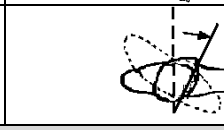
Please indicate whether the following direct risk factors were identified at the **WRIST/HAND**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there 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



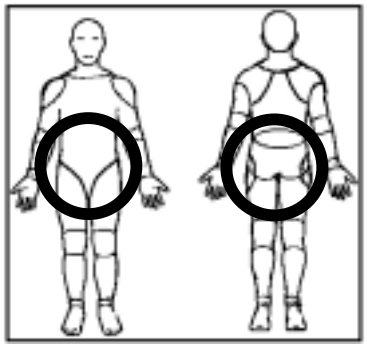
Body parts within the circled area will be classified as WRIST issues.

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., tightening gib screws)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., grinding side heads)			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 change knives)			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	

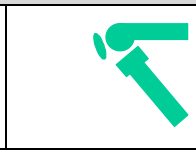
Awkward Posture		N	Y		Comments:
Flexion				S O	
Extension				S O	
Lateral Bending				S O	
Twisting				S O	
Vibration					
Ask the worker: Is your whole body exposed to vibration for significant portions of the work shift? (e.g., standing on vibrating surface)				S O	

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

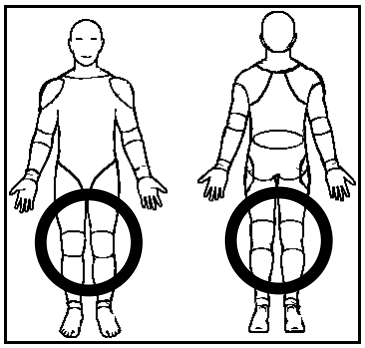


Body parts within the circled area will be classified as LOW BACK issues.

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)? (e.g., kneeling down to joint bottom head in planer)			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

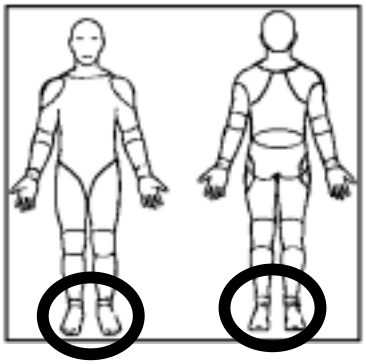


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

Repetition	N	Y		Comments:
Are identical or similar motions performed over and over again? (e.g., walking on uneven ground)			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]

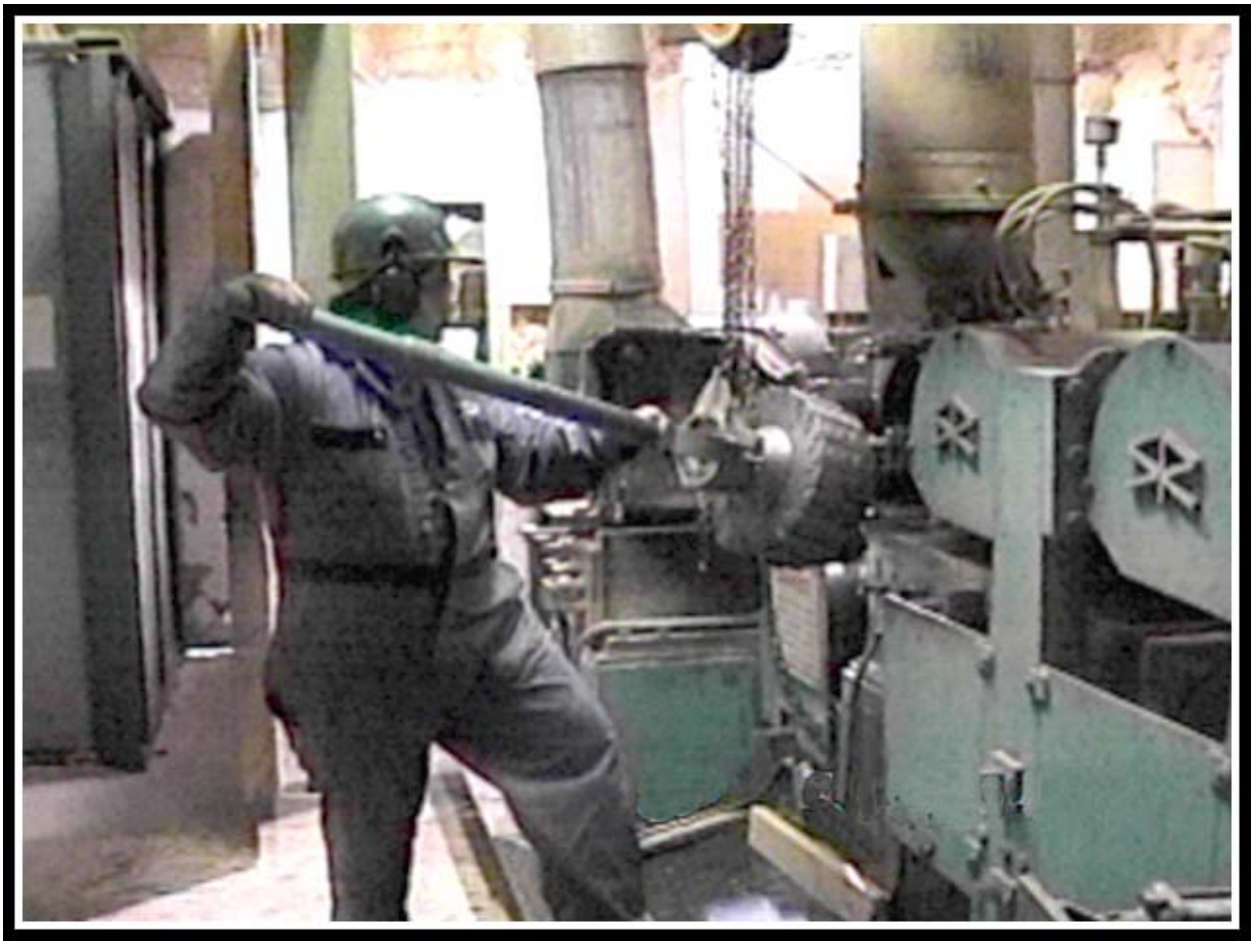
Noise	N	Y		Comments:
Have there been complaints on the level of noise in the work area?			S O	
Ask the worker: Are there any distracting or annoying noises at the workstation?			S O	

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



Planerman

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

Planerman

Disclaimer

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

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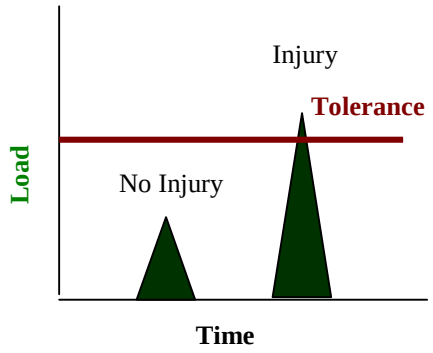
Injury Education

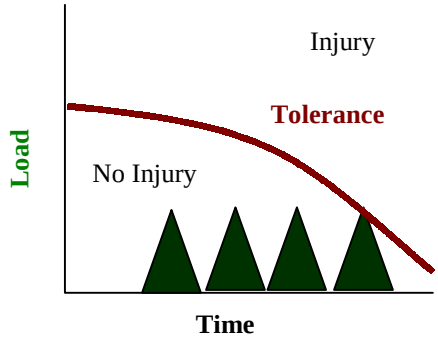
Injuries occur when …
Loads exceed tissue tolerances



Excessive Force

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

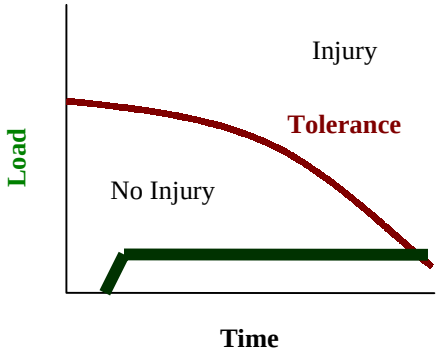
Example – a worker going over on their ankle and spraining it.



Excessive Repetition

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

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



Excessive Duration

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

Example – a Grader developing neck tension.

Body Parts at Risk

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

After all of the appropriate information is collected during the investigation of the Planerman 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 Planerman. 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
Static Postures

A Planerman may hold the head forward in order to perform tasks like grinding side heads, changing knives, and cleaning (scraping) knives.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Awkward Postures

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

Static Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the neck muscles is increased from bending the neck forward while side head grinding. The neck bends further when the height of the grinder is too low.
- Loading on the neck muscles is increased from bending the neck forward while changing knives. The neck bends further forward when the height of the bottom head is low.

Environmental Conditions

Lighting

- Loading on the neck may be increased from adopting more awkward postures as a result of poor lighting.

CONSEQUENCES

- When the head is held in a forward position, 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 86 & 87.
- For exercises that can help to prevent ***neck*** injuries, see the ***Neck section of the Body Manual.***

SHOULDER

Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planerman may repeatedly push and pull on a grinder jig when grinding side heads.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

- The rotator cuff stabilises the shoulder joint when objects are pushed/pulled. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. The force required to push and pull on a grinder jig is relatively small.

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

- Repeated pushing and pulling subjects the rotator cuff to repetitive stress. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the shoulder muscles is increased when the grinder height is too high. When the grinder height causes the arms to be raised to shoulder height, the rotator cuff tendon rubs against bones in the shoulder (impingement).

Characteristics of Object Being Handled

Size and Shape

- Loading on the shoulder muscles is increased when the heavy jig in the grinder does not slide easily.

CONSEQUENCES

- 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 86 & 87.
- For exercises that can help to prevent ***shoulder*** injuries, see the ***Shoulder section of the Body Manual.***

SHOULDER

Direct Risk Factors:
Force
Awkward Postures

A Planerman may lift heavy side heads out of the planer when changing them.

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 lifted. The heavier the object, the greater the load on the rotator cuff.

Awkward Postures

- The farther away the arms are from the body, the greater the load on the rotator cuff.
- An injury can occur if the load on the rotator cuff exceeds its tolerance.

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Loading on the shoulder muscles is increased significantly when a Planerman reaches into the planer to lift the heavy side heads. This type of lift is extremely stressful on the shoulder.

Characteristics of Object Being Handled

Size and Shape

- Loading on shoulder muscles is increased because the side head is extremely heavy, approximately 35 kg.
- Loading on shoulder muscles is increased because of the shape of the side head requires it to be held away from the body.

CONSEQUENCES

- Forceful lifting with the arms away from the body can strain the rotator cuff.
- 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 86 & 87.
- For exercises that can help to prevent ***shoulde****r* injuries, see the ***Shoulder section of the Body Manual.***

ELBOW/WRIST

Direct Risk Factors:
Force
Repetition

A Planerman may grip a T-handled hex key to loosen and tighten gib screws when changing knives.

A Planerman may grip a side head handle when changing heads.

A Planerman may grip a crank when adjusting the planer.

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.

Repetition

- Repeated stress to soft tissue in the elbow/wrist without adequate rest could slowly fatigue tissues to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Loading on the soft tissues in the elbow/wrist is significantly increased when lifting side heads due to its weight.
- Loading on the soft tissues in the elbow/wrist is increased because of the shape of the side head. The shape of the side head requires the use of a pinch grip, which can slightly increase loading on tissue.

Container, Tool, and Equipment Handles

- Loading on the soft tissues in the elbow/wrist is increased when the T-handled hex key has a small cross handle size. Smaller keys require muscles to generate more torque when tightening and loosening gib screws.
- Loading on the soft tissues in the elbow/wrist is increased when using the hand crank. The harder the crank is to turn, the larger the force needed, and consequently the more loading on the elbow/wrist.

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 86 & 87.
- For exercises that can help to prevent ***elbow*** injuries, see the ***Elbow section of the Body Manual.***

LOW BACK

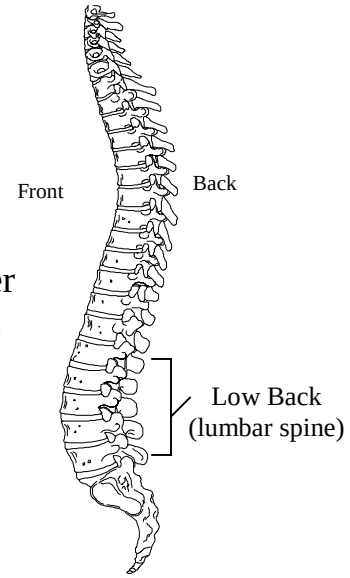
Direct Risk Factors:
Force
Awkward Postures
Repetition

A Planerman may bend forward in order to lift side heads out of the planer when changing heads, and when installing the side head on the grinder.

BACKGROUND INFORMATION

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

Neutral Spine



DIRECT RISK FACTORS

Force

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

Awkward Postures

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

Repetition

- Repeated forward 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

- Loading on the back is increased when a Planerman has to reach over the equipment to slide the side head onto the grinder.

- Loading on the back is increased significantly when a Planerman reaches into the planer to lift the heavy side heads. This type of lift is extremely stressful on the back.

Characteristics of Objects Being Handled

Size and Shape

- Loading on the back is significantly increased because of the weight of the side heads.

CONSEQUENCES

- Repeatedly bending forward when lifting 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 86 & 87.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

LOW BACK

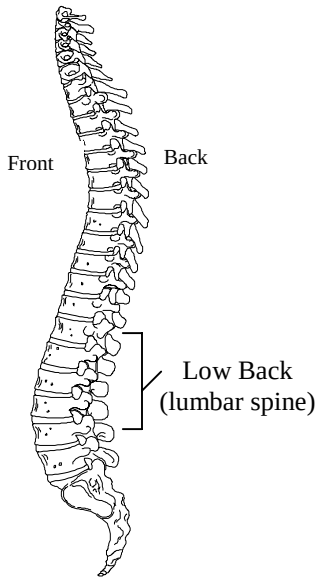
Direct Risk Factors:
Awkward Postures
Repetition

A Planerman frequently bends down to adjust machinery, and to retrieve equipment from storage.

BACKGROUND INFORMATION

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

Neutral Spine



DIRECT RISK FACTORS

Awkward Postures

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

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the back increases when the layout of the planer room is poor. The design of shelving units will affect the degree of back bending, and, as a result, back loading.
- Loading on the back increases when adjusting the planer using controls and manual hand cranks are located below waist height.

CONSEQUENCES

- Repeatedly bending forward 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 86 & 87.
- For exercises that could help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

LOW BACK

Direct Risk Factors:
Force
Repetition

A Planerman may lift heavy objects like profiles, side heads, and occasionally cylinders.

BACKGROUND INFORMATION

- The spine is designed to protect the spinal cord. The muscles surrounding the spine are designed to provide the support necessary to keep the spine in an upright position.

DIRECT RISK FACTORS

Force

- The back muscles stabilise the spine when lifting heavy objects. The heavier the object, the greater the tension developed in the muscles.

Repetition

- Repeated heavy lifting could gradually fatigue the muscles in the back. If the repetitive stress is excessive, and recovery is not adequate, the muscles may fatigue to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Loading on the back is increased because the profiles, side heads, and cylinders are all heavy.

CONSEQUENCES

- Repeated heavy lifting can strain the back muscles.
- Signs and symptoms include pain and stiffness. Muscle spasms may also be present.

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 86 & 87.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

Summary of Body Parts at Risk

NECK

- A Planerman may hold the head forward in order to perform tasks like grinding side heads, changing knives, and cleaning (scraping) knives.

SHOULDER

- A Planerman may repeatedly push and pull on grinder jig when grinding side heads.

SHOULDER

- A Planerman may lift heavy side heads out of the planer when changing them.

ELBOW/WRIST

- A Planerman may grip a T-handled hex key to loosen and tighten gib screws when changing knives.
- A Planerman may grip a side head handle when changing heads.
- A Planerman may grip a crank when adjusting the planer.

LOW BACK

- A Planerman may bend forward in order to lift side heads out of the planer when changing heads, and when installing the side head on the grinder.

LOW BACK

- A Planerman frequently bends down to adjust machinery, and to retrieve equipment from storage.

LOW BACK

- A Planerman may lift heavy objects like profiles, side heads, and occasionally cylinders.

Risk Factors by Body Part

Direct Risk Factors	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	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
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.*

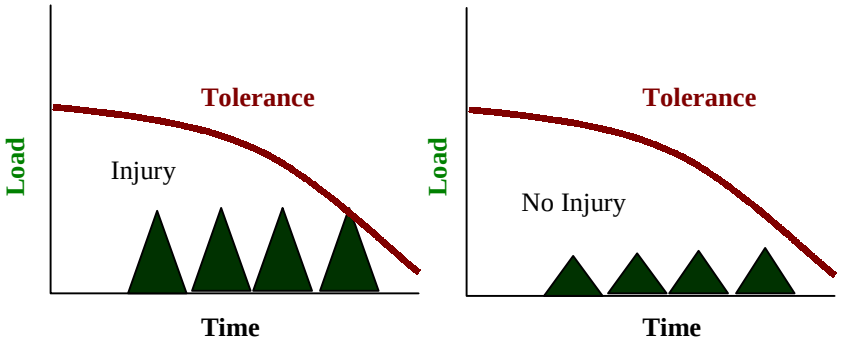
= Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.

♦ = Indicates that the risk factor assessed is commonly found in sawmills, and may need to be addressed at your mill. See the appropriate section of the General Risk Factor Solutions Manual for more information.

✓ = Indicates that the risk factor was assessed as a contributor to the body part problem. Please see the Summary of Solutions Table on pages 86 & 87 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

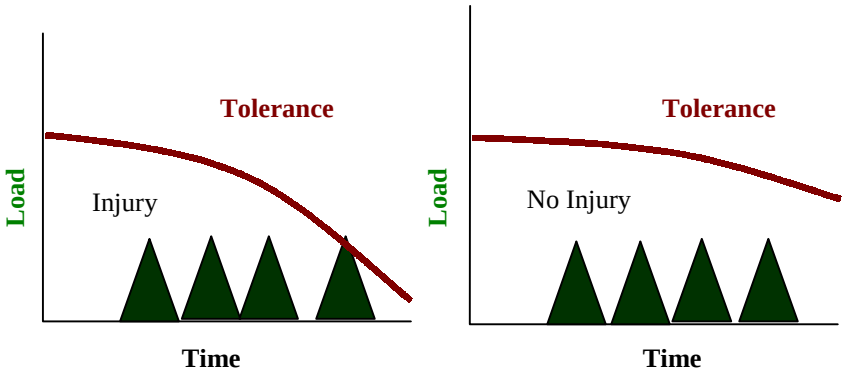
Injury Prevention

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 Planerman 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

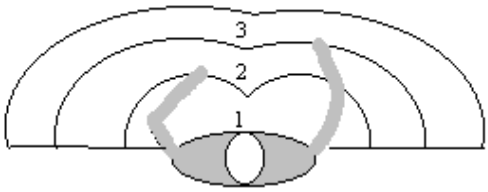
PERSONAL PROTECTIVE EQUIPMENT
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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.

A working reach that is too far away can significantly load the shoulders and back. When handling heavy loads, like side heads, over-extending the body can be very hazardous.

Grinding jig with bases that pivot

WP

To significantly reduce loading on the back, turn the grinder jig sideways when installing the side head on the grinder. Some jigs are designed with bases that pivot (see picture on right).

Loading on the back is increased when installing the side head on the grinder this way.

Loading on the back is decreased when installing the side head on the grinder this way.

WORKING HEIGHTS

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

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

To determine the appropriate work height specific for the Planerman, 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.

Increase grinding height

E

To reduce neck flexion when grinding, increase grinder height, or decrease worker height by having the Planerman sit while grinding. Note that increasing the height may increase loading on the shoulder. Variation in working posture when grinding may reduce the demands to both the neck and the shoulder.

Decrease grinding height

E

To reduce shoulder impingement while grinding, try to keep the arms below shoulder height. If workers are experiencing shoulder problems, decrease loading on the shoulder by lowering the grinder, providing a cushion to act as an arm rest, or encouraging the Planerman to alternate between sitting and standing.

More neck flexion during standing

More shoulder flexion during sitting

Auto-grinder

E

To reduce the duration of the neck flexion and/or shoulder flexion when grinding, use auto-grinders.

Biodegradable solvent

A

To reduce the duration of neck flexion when cleaning knives, soak the knives in a biodegradable solvent, instead of scraping knives.

Earplugs

PPE

To reduce loading on the neck while looking down, encourage workers to wear earplugs instead of heavier earmuffs. If more protection is required custom fitted earpieces can be worn. Note that ear protection needs to meet WCB requirements.

Postural exercises

WP

To reduce adverse postural changes from looking down for long periods, perform the wall exercise found in the *Neck Section of the Body Manual*.

Slide-out shelves

E

To reduce forward flexion of the back, store heavy side heads and profiles on slide-out shelves. Ensure that the shelves slide out easily.

More forward bending, increased loading on back.

Less forward bending, decreased loading on back.

Characteristics of Objects Being Handled

SIZE AND SHAPE

Grease grinder track

A To reduce loading on the shoulder when grinding the side heads, decrease the force required to push and pull on the side head by greasing the track.

Climb up on planer to lift side heads

WP To reduce loading on the shoulder and back when lifting the side heads out of the planer, encourage workers to climb onto the planer and bend over to raise the head. To reduce loading on the back, brace the upper body with an arm, and bend at the hips, not the back.

More loading on shoulder and back when reaching into planer to lift side heads

Less loading on shoulder and back when stooping over to lift side heads

Remove and install side heads using an overhead hoist

E

To significantly reduce loading on the shoulder, forearms, and back when handling the side heads out of the planer, install an overhead hoist. Electric hoists would be preferred over chain hoists, to prevent damaging the knives when lifting and lowering. When lowering the head using the chain hoist, the chain can come in contact with the knives, resulting in damage. Electric hoist controls need to be sensitive enough to accurately place the side head on the shaft.

Profile cart

E

To reduce loading on the back when moving heavy profiles, use a cart that is stable and rolls smoothly. Carts with larger wheels will roll easier. An overhead hoist on rails can also be used to transport the heavy profiles.

Bar and overhead hoist

E

To reduce loading on the back when changing top and bottom heads, attach a lightweight bar to the cylinder and use an overhead hoist on rails.

CONTAINER, TOOL AND EQUIPMENT HANDLES

T handle torque wrench

E

To reduce duration of loading on the forearm (elbow/wrist) when changing knives, use a large T-handled hex key with a torque wrench to tighten gib screws. Large handle reduces torque required to loosen or tighten gib screws. Padding on the handle would improve gripping, and would reduce contact stress. A torque wrench minimises over-tightening.

Automatic set works

E

To eliminate loading on the forearm (elbow/wrist) when adjusting the planer, purchase or refit a planer with automatic set works. An automated planer would eliminate the need to use cranks to adjust the machine, and would make it easier to unjam the planer. Another option is to use an air driven, torque controlled wrench to adjust the planer.

Head bolt tightening

WP

To reduce loading on the forearm (elbow/wrist) when changing side heads, place wrench on head bolts, and accelerate the wrench into a hard surface (e.g., guard). Allow the weight of the head to tighten or loosen bolt.

Environmental Conditions

Task lighting on grinder

E

To reduce neck flexion while grinding, improve visibility by adding task lighting.

Please refer to the General Risk Factor Solutions Manual for solutions regarding environmental condition 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
Grinding jig with bases that pivot	**79**							**F A**				
Increase grinding height	**80**	**S**										
Decrease grinding height	**80**			**A**								
Auto-grinder	**81**	**S**		**A**								
Biodegradable solvent	**81**	**S**										
Earplugs	**81**	**F**										
Postural exercises	**81**	**A**										
Slide-out shelves	**81**							**A**				
Grease grinder track	**82**			**F**								
Climb up on planer to lift side heads	**82**			**F A**				**F A**				
Remove and install side heads using an overhead hoist	**83**				**F**			**F A**				
Profile cart	**83**				**F**			**F**				
Bar and overhead hoist	**84**				**F**			**F**				

Direct Risk Factors

F = *Force* **R** = *Repetition* **A** = *Awkward Postures*
S = *Static Postures* **C** = *Contact Stress* **V =** *Vibration*

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	**Page**	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/Hand	Low Back	Hip	Knee	Ankle	Foot
T handle torque wrench	**84**				**F**							
Automatic set works	**84**				**F R**			**A R**				
Head bolt tightening	**84**				**F R**							
Task lighting on grinder	**85**	**S**										
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

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

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

◆ = *See General Risk Factor Solutions Manual*

PLANERMAN MSI SAFETY GUIDE

OBJECTIVE: To identify ergonomic risks involved in with the Planerman job the potential for musculoskeletal injuries.
More detailed information about risk reducing recommendations can be found in the Work Manual for the Planerman.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck A Planerman may hold the head forward in order to perform tasks like grinding side heads, changing knives, and cleaning (scraping) knives.	**Awkward Postures** **Static Postures**	• Neck muscles must support the weight of the head while in a forward position. The more the neck bends the greater the load on the muscles and tendons. • When the neck is held still in a forward position, the muscles of the neck must remain tense to support the weight of the head. With no time allowed for recovery, the constant state of tension in the neck muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, the tissues may fatigue to the point of injury.	• To minimise loading on the neck, workers should be encouraged to wear lighter earplugs rather than heavier earmuffs. If more protection is required, custom fitted earpieces can be worn. • To reduce adverse postural changes, as a result of looking down for long periods, perform the wall exercise found in the ***Neck Section of the Body Manual.*** • For exercises that can help prevent ***neck*** injuries, ***see the Neck section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Shoulder A Planerman may repeatedly push and pull on grinder jig when grinding side heads.	**Force** **Awkward Posture** **Repetition**	• The rotator cuff stabilises the shoulder joint when objects are pushed/pulled. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. • The rotator cuff stabilises the shoulder joint when the arms are away from the body. The further away the arms are from the body, the greater the load on the rotator cuff. • Repeated pushing and pulling subjects the rotator cuff to repetitive stress. If the repetitive stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.	• To reduce loading on the shoulder when grinding the side heads, decrease the force required to push and pull on the grinder jig by greasing the track. • For exercises that can help prevent ***shoulder*** injuries, ***see the Shoulder section of the Body Manual***.
	A Planerman may lift heavy side heads out of the planer when changing them.	**Force** **Awkward Postures**	• The rotator cuff stabilises the shoulder joint when objects are lifted. The heavier the object, the greater the load on the rotator cuff. • The further away the arms are from the body, the greater the load on the rotator cuff. • An injury can occur if the load on the rotator cuff exceeds its tolerance.	• To reduce loading on the shoulder when lifting the side heads out of the planer, encourage workers to climb onto the planer and bend over to raise the head. • For exercises that can help prevent ***shoulder*** injuries, ***see the Shoulder section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Elbow/Wrist A Planerman may repeatedly grip objects like wrenches, heavy side heads, and cranks.	**Force** **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. • Repeated stress to soft tissue in the elbow/wrist without adequate rest could slowly fatigue tissues to the point of injury.	• To reduce loading on the forearm (elbow/wrist) when changing side heads, place wrench on head bolts, and accelerate the wrench into a hard surface (e.g., guard). Allow the weight of the head to tighten or loosen bolt. • To prevent injuries by increasing tissue tolerances, ***refer to the Elbow section of the Body Manual***. Strengthen exercises should be used by new employees or employees who have been off work for extended periods.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Planerman may bend forward in order to lift side heads out of the planer when changing heads, and when installing the side head on the grinder	**Force** **Awkward Posture** **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. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. • Repeated forward 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.	• To significantly reduce loading on the back when installing the side head on the grinder, turn the grinder jig sideways. To be done with grinding jigs with bases that pivot. • To reduce loading on the back when lifting the side heads out of the planer, climb onto the planer and bend over to raise the head. To reduce loading on the back, brace the upper body with arm and bend at the hips, not the back. • For exercises that can help prevent ***back*** injuries, ***see the Back section of the Body Manual***.
	A Planerman frequently bends down to adjust machinery, and to retrieve equipment from storage.	**Awkward Posture** **Repetition**	• Back muscles must support the weight of the upper body when leaning forward. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. • Repeated forward 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.	• To reduce loading on the back, brace the upper body with the hand and bend at the hips, not the back. • For exercises that can help prevent ***back*** injuries, ***see the Back section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Planerman may lift heavy objects like profiles, side heads, and occasionally cylinders.	**Force** **Repetition**	• The back muscles stabilise the spine when lifting heavy objects. The heavier the object, the greater the tension developed in the muscles. • Repeated heavy lifting could gradually fatigue the muscles in the back. If the repetitive stress is excessive, and recovery is not adequate, the muscles may fatigue to the point of injury.	• To reduce loading on the back, use lifting assists like hoists and carts to carry heavy objects. • For exercises that can help prevent ***back*** injuries, ***see the Back section of the Body Manual***.