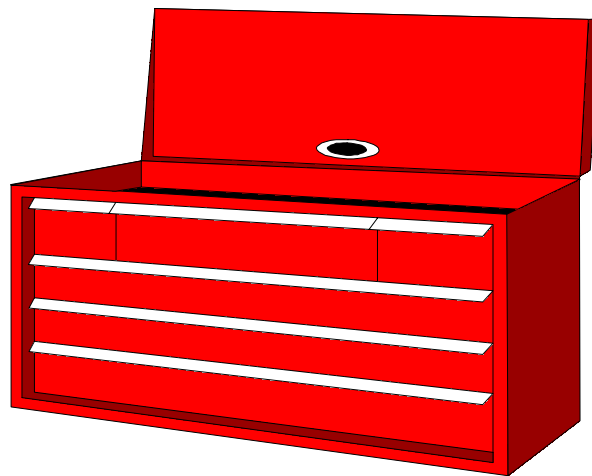


INDUSTRIAL MUSCULOSKELETAL INJURY REDUCTION PROGRAM

Common Industry Jobs (CIJs)

Auto Trimmer 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

AUTO TRIMMER TOOL KIT

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Auto Trimmer
Tool Kit

Overview

Auto Trimmer

Job Summary

An Auto Trimmer is responsible for maintaining a constant flow of lumber into the Trim Saw (which trims both ends of a board of lumber) by ensuring the lugs are fed properly, and clearing any cross ups or jam ups that occur on the infeed deck. An Auto Trimmer monitors and controls the unscrambler and infeed deck, and manually turns and/or straightens boards to orient them properly. Waste wood must be manually pulled off of the conveyer and discarded into a waste chute. Refer to the Physical Demands Analysis for more detail.

Physical Demands

The physical demands of this job may include:

- a) Continuous standing and walking, or continuous sitting, depending on workstation layout and worker preference
- b) Frequent forward reaching involving repetitive movements of the shoulders, elbows, and wrists
- c) Frequent back flexion (depending on work technique and workstation design)
- d) Frequent use of foot pedals and/or control panel
- e) Occasional to frequent turning and/or lifting of lumber on conveyer chains

Mental Demands

Workers are required to make a judgement for every board. Rapid decision making is involved when deciding whether or not to pull (waste) lumber, and whether boards are properly oriented to feed into trim saw. Quick response time is also required when clearing cross ups or jam ups. Less experienced operators have reported feeling stressed about making mistakes. When there is a Trim Spotter in addition to the Auto Trimmer, workers are less likely to report feeling 'mentally tired' at the end of a shift.

Major Variations

With different mills, the following major variations have been observed:

- a) Some mills split the Auto Trimmer job into two jobs: a Trim Spotter who is responsible for removing waste wood off of the conveyer and clearing cross ups near the unscrambler, and a Auto Trimmer who is mainly responsible for turning/straightening the lumber to be fed into the trim saw, and clearing any cross ups that occur near the scanners. In this scenario, less walking and less manual material handling is involved for each worker throughout the work day.
- b) For mills that have a Trim Spotter and an Auto Trimmer, these two workers may rotate throughout the work day (i.e. every two hours).
- c) Depending on the experience of the worker and preferences for work techniques, boards are lifted/turned at frequencies ranging from once every 4 to 6 minutes, to once every 3 seconds.
- d) Some workers stand through out the shift, whereas others prefer to sit on a stool for part of the shift.

Minor Variations

The following minor variations have been observed:

- 1) The drop chute for waste lumber may be located:
 - a) Under the infeed deck (workers generally dispose of waste wood by lifting one end and letting wood fall between the chains)
 - b) Behind the operator (workers pull waste wood back and to one side to drop into the chute)
 - c) To the sides of the operator (left or right), or at a nearby workstation
- 2) Workers may control the infeed to the trim saw using:
 - a) Between 2 and 5 foot pedals
 - b) Push buttons on a control panel located behind or beside the worker
 - c) A combination of foot pedals and other controls

Physical Demands Analysis

Auto Trimmer

PDA General Instructions: Auto Trimmer

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

Auto Trimmer

Task List

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



Monitor trim saw infeed

The Auto Trimmer monitors the infeed chains to the trim saw.

Does this task occur at your mill?

Yes No



If necessary, the Auto Trimmer straightens and/or flips lumber so that it is properly oriented into the lugs.

Does this task occur at your mill?

Yes No



Clear cross-ups and jam-ups

In some situations, cross-ups and jam-ups are cleared by manually handling the lumber.

Does this task occur at your mill?

- Yes No



A pike pole may also be used to push and pull boards.

Does this task occur at your mill?

- Yes No



Pull waste lumber off of conveyor

Waste lumber is pulled off of a conveyor into a drop chute behind the conveyor, or beside the workstation.

Does this task occur at your mill?

- Yes No



Control infeed/outfeed deck movement

Infeed/outfeed chain movement is controlled using a control panel and/or foot pedals.

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?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
If yes, check all that apply:		<input type="checkbox"/> Modified Job	<input type="checkbox"/> Modified Worksite	<input type="checkbox"/> Graduated RTW

Work Organisation

Task Description

The table below contains a list of tasks performed on an everyday basis by an Auto Trimmer.

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

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

Task	Percent of Shift				Comments
	Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Monitor trim saw infeed and outfeed, and straighten/flip boards</i>				✓	<ul style="list-style-type: none"> <i>This occurs whenever the trim saw (autotrimmer) is running</i>
<i>Clear cross-ups and jam-ups on conveyor</i>		✓			<ul style="list-style-type: none"> <i>Length of time required is 3 seconds to 5 minutes for each cross-up or jam-up.</i>
<i>Pull waste lumber off of conveyor, and discard</i>		✓			
<i>Control infeed/outfeed deck movement</i>		✓			<ul style="list-style-type: none"> <i>Control panel (with push buttons and rotary switches) and/or foot pedals are used.</i>
<i>Clean scanners/photo eyes</i>	✓				<ul style="list-style-type: none"> <i>Generally required once or twice per shift, this task may take up to 5 minutes to complete</i>
<i>Other:</i>					

Organisational Factors

The table below contains a list of organisational factors for an Auto Trimmer. 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	<input type="checkbox"/> 8 hours <input type="checkbox"/>
Formal breaks	<input type="checkbox"/> Two 10 minute breaks <input type="checkbox"/> 30 minute lunch <input type="checkbox"/>
Informal breaks	<input type="checkbox"/> Less than 10 minutes/shift (down-time) <input type="checkbox"/>
Work pace	<input type="checkbox"/> 90 to 95 lugs/min <input type="checkbox"/>
Work pace control	<input type="checkbox"/> Machine-paced <input type="checkbox"/>
Job rotation <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Check one)</i>	If Yes: Rotation with what job(s): _____ _____ How often: (e.g., every 2 hours) _____

Workstation Characteristics

Dimensions & Layout

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

Workstation Dimensions	
A) Height of conveyer (chains)	cm
B) Height of control panel	cm
Dimensions of drop chute for waste lumber	cm

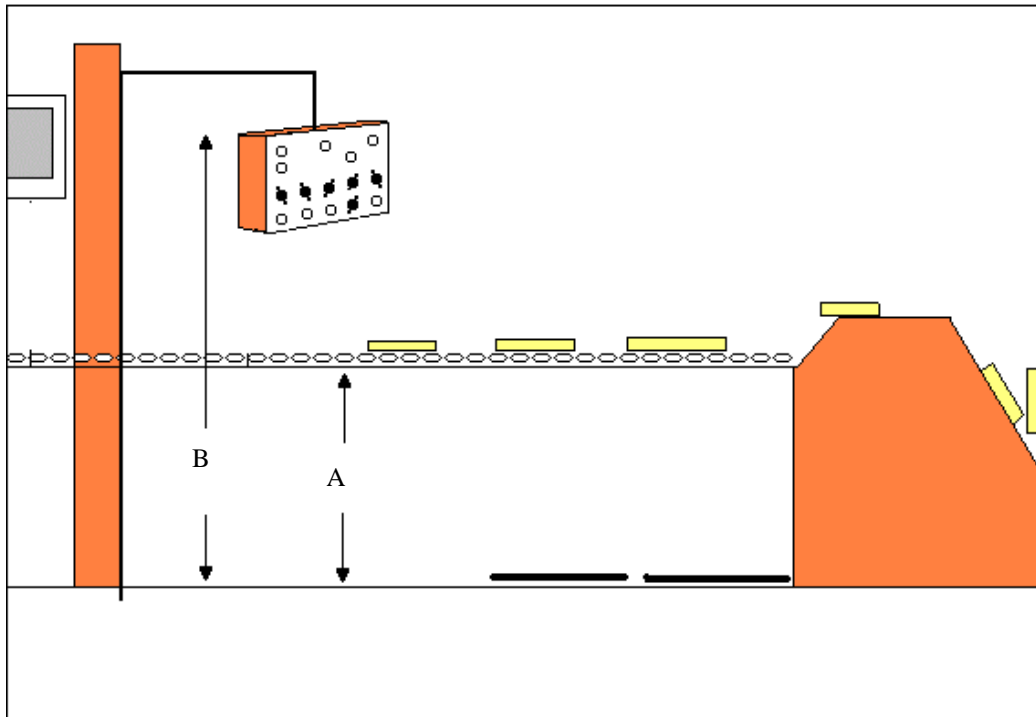


Figure 1: Workstation (right side view)

Flooring, Displays and Seating

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

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

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

Equipment & Machinery Controls

The table below contains a list of the types of controls used by an Auto Trimmer.

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

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

Type of Control		Function	Frequency	Comments
<input type="checkbox"/>	<i>Foot pedals (2-5)</i>	Stop/start: <input type="checkbox"/> <i>Unscrambler</i> <input type="checkbox"/> <i>Infeed chains</i> <input type="checkbox"/> <i>Outfeed chains</i> <input type="checkbox"/> <i>Hold back</i>	<i>2-12 times/min</i>	
<input type="checkbox"/>	<i>Push buttons</i>	Stop/start: <input type="checkbox"/> <i>Unscrambler</i> <input type="checkbox"/> <i>Infeed chain</i> <input type="checkbox"/> <i>Outfeed chains</i> <input type="checkbox"/> <i>Askew reset</i> <input type="checkbox"/> <i>Trim/slach override</i>	<i>3-6 times per hour</i>	
<input type="checkbox"/>	<i>Toggle switch</i>	<input type="checkbox"/> <i>Speed of lumber flow</i> <input type="checkbox"/> <i>Controlling singulator</i> <input type="checkbox"/> <i>Operate lasers</i>	<i>0-5 times/hour</i>	
<input type="checkbox"/>	<i>Buttons and levers</i>	<input type="checkbox"/> <i>For lock out procedures</i>	<i>5-10 times/shift</i>	
<input type="checkbox"/>	<i>Touch buttons</i>	<input type="checkbox"/> <i>Scanner operation</i>	<i>3-6 times/hour</i>	
<input type="checkbox"/>	<i>Rotary switch</i>	Stop/start: <input type="checkbox"/> <i>Singulator</i> <input type="checkbox"/> <i>Outfeed chains</i> <input type="checkbox"/> <i>Drop out gate</i>	<i>4 times/shift</i>	
<input type="checkbox"/>	<i>Joystick</i>	<input type="checkbox"/> <i>Lumber straightener</i>	<i>3-5 times/hours</i>	
<input type="checkbox"/>	<i>Computer</i>	<input type="checkbox"/> <i>Reset computer</i>	<i>4 times per shift</i>	

Physical Demands

Whole Body Physical Demands

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

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

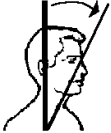

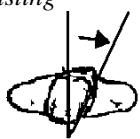
Physical Demands	Tasks or Activity	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Walking	<ul style="list-style-type: none"> Walking along boards to straighten lumber Resetting sorter scanner clearing cross-ups 		✓	✓		<ul style="list-style-type: none"> Most walking is done back and forth within a 2 to 5 metre length of conveyor.
Sitting	<ul style="list-style-type: none"> Using sit/stand stool and monitoring infeed to autotrimmer Singulating boards (only if marker is available) 	✓		✓		<ul style="list-style-type: none"> Percent of shift depends on workstation layout (i.e. whether or not seating is available) and operator preference.
Standing	<ul style="list-style-type: none"> Monitoring infeed to autotrimmer Singulating boards Clearing jam-ups or straightening lumber Using foot pedals 			✓	✓	<ul style="list-style-type: none"> As above, percent of shift depends on operator preference. However, where seating is inadequate for the task or unavailable, operators are required to stand while on duty.
Climbing (stairs)						Not Applicable
Climbing (other)						Not Applicable
Balancing	<ul style="list-style-type: none"> Using foot pedal controls 	✓		✓		<ul style="list-style-type: none"> Frequency depends on configuration of foot pedal controls and control panel
Kneeling/ Crouching	<ul style="list-style-type: none"> Climbing onto and around lumber deck when clearing cross-ups or jam-ups 	✓				
Other:						


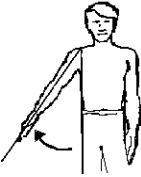

Body Postures

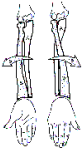




The table below outlines the body postures held or repeated throughout the shift by an Auto Trimmer.


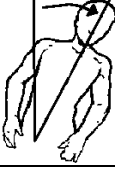

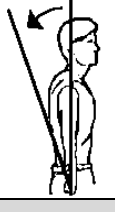
For each of the postures identified, indicate whether it occurs by placing a check mark (✓) in the far left column.

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

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Neck						
Flexion 	<ul style="list-style-type: none"> Viewing logs or lumber on conveyor Straightening and pulling lumber 	✓	✓			<ul style="list-style-type: none"> Posture held for less than 2 seconds at a time Frequency: 0 to 15 times per minute
Extension 						Not Applicable
Twisting 	<ul style="list-style-type: none"> Monitoring infeed to trim saw Looking at monitors 		✓			<ul style="list-style-type: none"> Varies depending on location of monitors

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Shoulder						
Flexion 	<ul style="list-style-type: none"> • Straightening and or flipping lumber • clearing cross-ups or jam-ups 		✓			<ul style="list-style-type: none"> • Posture held for less than 3 to 60 seconds when handling lumber • Lumber is handled an average of 1 to 5 times per minute
Abduction 	<ul style="list-style-type: none"> • Using a control panel located beside the operator • clearing cross-ups or jam-ups 	✓	✓			<ul style="list-style-type: none"> • Occurs more frequently if worker uses control panels more than fool pedals
Extension 	<ul style="list-style-type: none"> • Pulling waste lumber off of conveyor • Clearing cross-ups or jam-ups 	✓	✓			<ul style="list-style-type: none"> • Posture held for less than 5 seconds at a time • May occur more frequently if drop chute for waste lumber is behind operator

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Forearm						
Rotation 	<ul style="list-style-type: none"> Straightening and/or flipping boards 		✓			<ul style="list-style-type: none"> Posture held for less than 3 seconds at a time
Wrist						
Flexion 	<ul style="list-style-type: none"> Straightening and/or flipping boards Clearing cross-ups or jam-ups 		✓			<ul style="list-style-type: none"> Posture held for less than 2 seconds at a time
Extension 	<ul style="list-style-type: none"> Straightening and/or flipping boards Guiding lumber into lugs 		✓			<ul style="list-style-type: none"> Posture held for less than 2 seconds at a time when straightening or flipping lumber Posture held for less than 30 seconds when guiding lumber into lugs
Ulnar Deviation 	<ul style="list-style-type: none"> Straightening and/or flipping boards Clearing cross-ups or jam-ups Using pike pole and picaroon 		✓			<ul style="list-style-type: none"> Posture held for 2 to 10 seconds at a time Frequency of 1 to 10 times per hour
Radial Deviation 						Not Applicable





Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back						
Flexion 	<ul style="list-style-type: none"> Straightening and/or flipping boards Clearing cross-ups or jam-ups 		✓	✓		<ul style="list-style-type: none"> Posture is held for 2 to 60 seconds at a time More frequent back flexion is required if operator has to bend over foot pedals to handle lumber
Lateral Flexion 						Not Applicable
Twisting 	<ul style="list-style-type: none"> Reaching for control panel Clearing cross-ups or jam-ups 	✓				<ul style="list-style-type: none"> Posture is held for less than 2 seconds at a time
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 an Auto Trimmer.

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

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

Type	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Power</i> 	<ul style="list-style-type: none"> Using pike pole or picaroon to clear cross-ups or jam ups Using air hose to clean workstation 		✓			<ul style="list-style-type: none"> Pike poles and picaroons are held for up to 5 minutes at once; frequency of use is 1 to 20 times per hour
<i>Pinch</i> 	<ul style="list-style-type: none"> Straightening and/or flipping lumber (lifting, lowering, and pulling) 		✓	✓		<ul style="list-style-type: none"> Pinch grip is generally held for less than 5 seconds at a time At mills where an Trim Spotter is also available, the Auto Trimmer handles lumber less frequently
<i>Hook</i> 						<i>Not Applicable</i>
<i>Precision</i> 						<i>Not Applicable</i>
<i>Other:</i>						

Manual Material Handling

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

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 Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<ul style="list-style-type: none"> Pushing and pulling lumber to straighten 	See weight of wood equation		✓	✓		<ul style="list-style-type: none"> Lumber is pushed and pulled at the height of the conveyor One or both hands are used At mills where an Trim Spotter is also available, the Auto Trimmer handles lumber less frequently
<ul style="list-style-type: none"> Pushing and pulling with pike pole or picaroon to clear cross-ups or jam-ups 	See weight of wood equation		✓			<ul style="list-style-type: none"> Frequency of task is 1 to 20 times per hour One or both hands are used At mills where an Trim Spotter is also available, the Auto Trimmer handles lumber less frequently
<ul style="list-style-type: none"> Lifting lumber to straighten or flip 	See weight of wood equation		✓	✓		<ul style="list-style-type: none"> Lumber is lifted at the height of the conveyor One or both hands are used At mills where an Trim Spotter is also available, the Auto Trimmer handles lumber less frequently
<ul style="list-style-type: none"> Carrying pike pole 	1.1 – 2.5	✓	✓			<ul style="list-style-type: none"> Generally one hand is used

Hand Tools

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

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

Type of Tool	Task(s)	Weight of Tool (kg)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Pike pole</i>	<ul style="list-style-type: none"> Clearing cross-ups or jam-ups 	1.1 - 2.5		✓			<ul style="list-style-type: none"> Used for up to 3 minutes at a time Frequency of use is 1 to 20 times per hour
<i>Picaroon</i>	<ul style="list-style-type: none"> Clearing cross-ups or jam-ups 	<1	✓				<ul style="list-style-type: none"> Used for up to 1 minute at a time Frequency of use is 0 to 5 times per day
<i>Air hose</i>	<ul style="list-style-type: none"> Cleaning workstation 	1.3 - 2.0	✓				<ul style="list-style-type: none"> Used for up to 3 minutes at a time Frequency of use is 0 to 3 times per day
<i>Skill saw</i>	<ul style="list-style-type: none"> Cutting waste lumber 	balanced (N/A)	✓				
<i>Other:</i>							

Environmental Conditions

Work Environment

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

Factor	
Vibration <input type="checkbox"/> Yes <i>(Check one)</i> <input type="checkbox"/> No	<input type="checkbox"/> Whole body <input type="checkbox"/> Seat <input type="checkbox"/> Floor <input type="checkbox"/> Hand transmitted <input type="checkbox"/> Tool <input type="checkbox"/> Other: _____

Noise level	<i>Range found: 90 to 95 dB</i> <i>Mill specific:</i>
Lighting level	<i>Range found: 150-2500 lux (over conveyor)</i> <i>Mill specific:</i>
Other:	

Location of Workstation

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

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

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

Work Environment	
<input type="checkbox"/>	Outside uncovered
<input type="checkbox"/>	Outside covered
<input type="checkbox"/>	Inside enclosed
<input type="checkbox"/>	Inside exposed
<input type="checkbox"/>	Heater present
<input type="checkbox"/>	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.
<input type="checkbox"/> Vancouver Island	22.5 °C	-0.6 °C	36.1 °C	-18.8 °C
<input type="checkbox"/> Southwestern BC	22.9 °C	0.4 °C	35.6 °C	-18.3 °C
<input type="checkbox"/> Cariboo Chilcotin Coast	22.2 °C	-11.6 °C	36.4 °C	-42.5 °C
<input type="checkbox"/> High Country	26.3 °C	-9.9 °C	39.6 °C	-39.7 °C
<input type="checkbox"/> Okanagan Similkameen	26.5 °C	-8.4 °C	36.0 °C	-36.3 °C
<input type="checkbox"/> Kootenay Country	26.2 °C	-6.7 °C	38.5 °C	-32.0 °C
<input type="checkbox"/> British Columbia Rockies	24.7 °C	-12.3 °C	37.5 °C	-42.2 °C
<input type="checkbox"/> North by Northwest	19.5 °C	-11.7 °C	32.9 °C	-38.1 °C
<input type="checkbox"/> Peace River Alaska Highway	20.0 °C	-20.2 °C	34.6 °C	-47.7 °C

Personal Protective Equipment

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

For the Auto Trimmer 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.

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

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

3. Length of Wood

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

Length of Wood			
6 foot	12 foot	18 foot	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

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

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

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

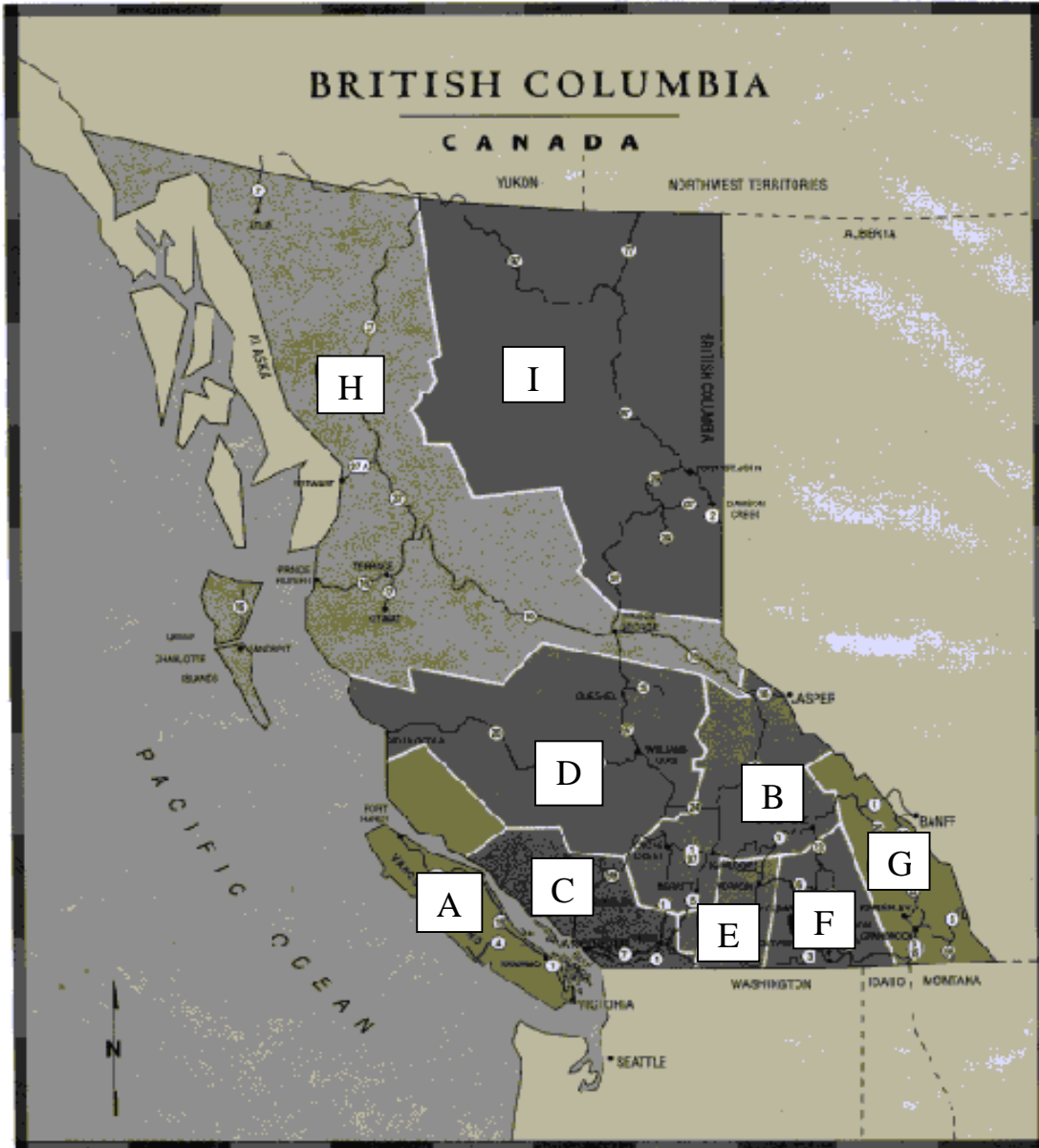
For the lightest species handled, enter the lb./board foot value, the multiple for the smallest size of wood, and the shortest length of this wood. Multiply these values together to determine the weight of the board in pounds.

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

Type of Wood Handled (lb./ board foot) <i>From Section 1</i>	x	Multiple (size of wood) <i>From Section 2</i>	x	Length of Wood <i>From Section 3</i>	=	Weight of the Board in pounds	Divide by 2.2 to calculate value in kilograms
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

Auto Trimmer

Purpose

The Risk Factor Identification Checklist for an Auto Trimmer 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 – Auto Trimmer

Management Representative _____

Risk Identification completed:

Worker Representative _____

Before implementation of solutions

Date _____

After implementation of solutions

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

Definitions

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

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

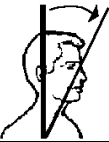
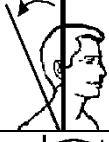
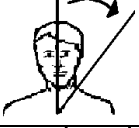
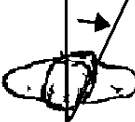
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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

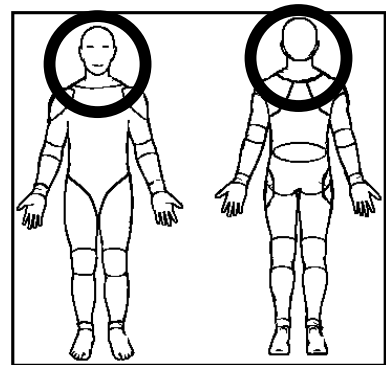
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

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

NECK

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



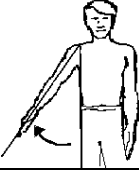
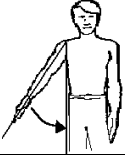
Please indicate whether the following direct risk factors were identified at the NECK.		
Direct Risk Factors	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input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



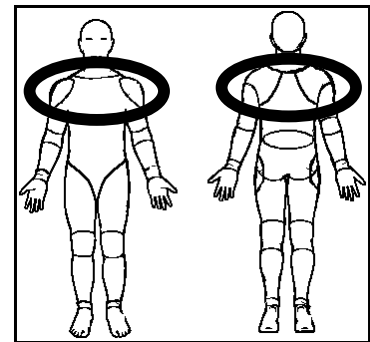
Body parts within the circled area will be classified as NECK issues.

SHOULDER

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




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

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



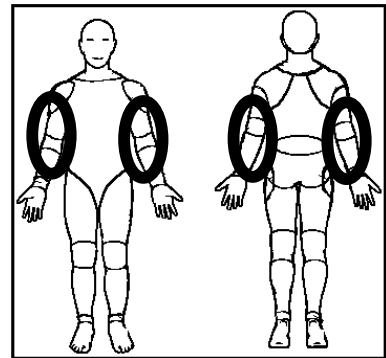
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

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




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





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



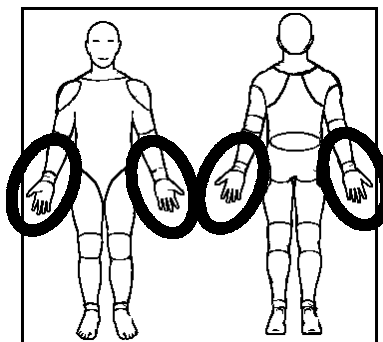
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

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

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





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



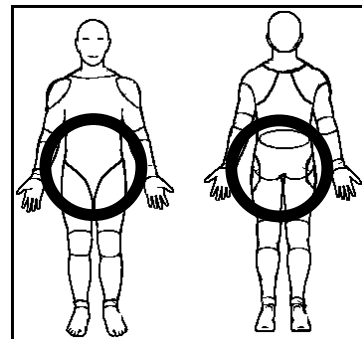
Body parts within the circled area will be classified as WRIST issues.

LOW BACK OR HIP/THIGH

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


Awkward Posture		N	Y	Comments:
Flexion			<input type="radio"/> S <input type="radio"/> O	
Extension			<input type="radio"/> S <input type="radio"/> O	
Lateral Bending			<input type="radio"/> S <input type="radio"/> O	
Twisting			<input type="radio"/> S <input type="radio"/> 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)			<input type="radio"/> S <input type="radio"/> O	

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

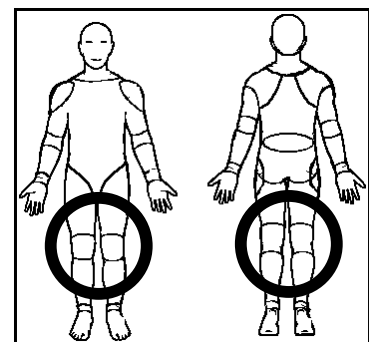


Body parts within the circled area will be classified as LOW BACK issues.

KNEE



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

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

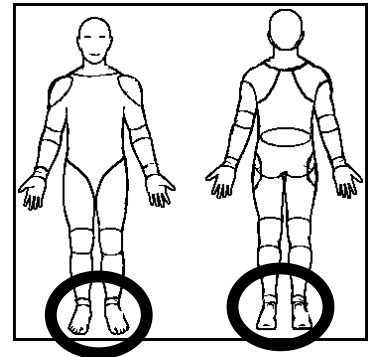


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

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

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



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

CHARACTERISTICS OF OBJECTS BEING HANDLED

	N	Y	Comments:
Are there problems handling a load due to its size or shape?			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?			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**



Auto Trimmer

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

Auto Trimmer

Disclaimer

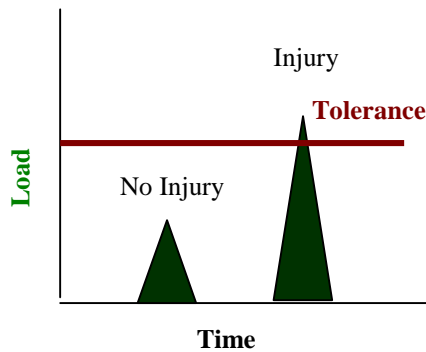
The BC sawmill IMIRP documents were developed by Advanced Ergonomics Inc. (AEI) based on analyses conducted in a number of voluntary, participating sawmills in British Columbia and should be considered applicable only to the BC sawmill industry. Modification to these documents may reduce their usefulness 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

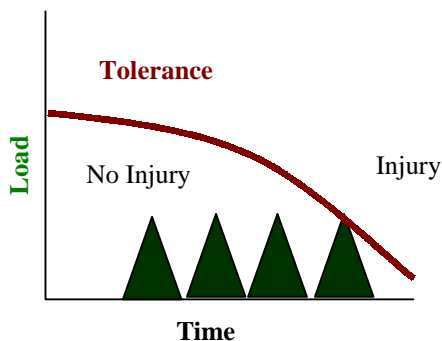
*Injuries occur when ...
Loads exceed tissue tolerances*



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.

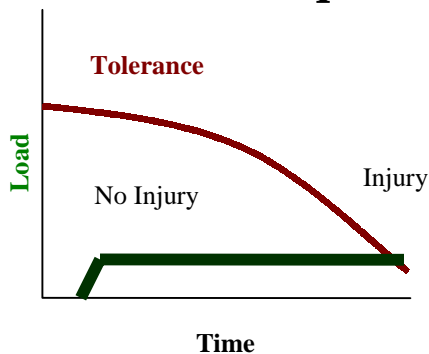
Example – a worker going over on their ankle and spraining it.



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 Auto Trimmer 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 Auto Trimmer. In addition, a reference table, with a summary of the direct and indirect risk factors by body part, is provided.

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

NECK

Direct Risk Factors:
Awkward Postures
Repetition



An Auto Trimmer must repeatedly look to the side in order to view incoming lumber.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Awkward Postures

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

Repetition

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

INDIRECT RISK FACTORS

Work Organisation

Task Variability

- Workers who do not rotate to other tasks or jobs do not have time to recover from exposure to repeated neck twisting.

Work Rate

- The neck movement of the Auto Trimmer is repetitive because the rapid work pace requires workers to frequently look towards the infeed chains, to respond quickly to cross-ups.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

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

NECK/SHOULDER

Direct Risk Factors:
Repetition
Awkward Postures



An Auto Trimmer frequently works with the arms away from the body in order to straighten lumber, pull waste wood off of the conveyor, and to use the control panel.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Awkward shoulder postures can occur if an Auto Trimmer is prevented, by foot pedals or control panels, from getting close to the transfer chains while pulling lumber or straightening cross-ups.

Working Heights

- The height of transfer chains and control panels can lead to awkward shoulder postures, and potential injuries, for Auto Trimmers.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

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

ELBOW/WRIST

Direct Risk Factors:

Force
Awkward Postures
Repetition



An Auto Trimmer must grip lumber in order to turn boards and pull pieces.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

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

Awkward Postures

- The width of an object affects how much muscle tension needs to be generated. There is an optimal grip width where the forearm muscles work efficiently. Outside this width, muscles have to work harder to generate equivalent tension. Consequently, objects that are too large (e.g., large cuts of wood) or too small (e.g., narrow tool handles) could increase the tension generated by muscles, and lead to tissue fatigue at the tendon/bone connection.
- The position of the wrist also affects how much muscle tension needs to be generated. There is an optimal wrist position where the forearm muscles work efficiently. This occurs when the wrist is in its natural relaxed (neutral) position. Bending the wrist forward or backward deviates from this position, and the forearm muscles have to work harder to maintain the grip. Consequently, gripping objects with the wrist bent increases the tension generated by muscles, and could lead to tissue fatigue at the tendon/bone connection.

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- For some workers, muscles of the upper body, particularly at the shoulder and elbow joints, may be stressed if the conveyor is too high. If the conveyor is at hip level, workers can co-ordinate the larger muscle groups in the legs to help handle and move lumber. At higher chain heights, only the muscles in the upper body are available for pulling and turning pieces.

Characteristics of Objects Being Handled

Size and Shape

- Handling larger cuts of wood requires more grip force, and also puts the hand in an extended grip position. Both of these conditions increase the risk of injury to the elbow and wrist tissues.

Container, Tool, and Equipment Handles

- Using pike poles or picaroons can lead to forceful gripping and awkward wrist postures to maintain control, especially if the handles are slippery or worn.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

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

WRIST

Direct Risk Factors:

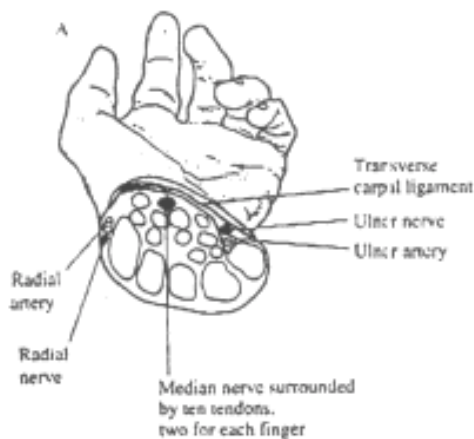
Force
Awkward Postures
Repetition



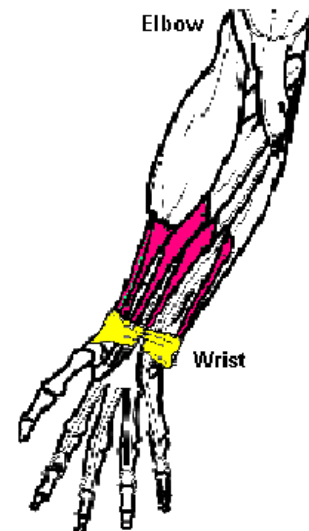
An Auto Trimmer must grip lumber with the wrists bent in order to turn and pull pieces.

BACKGROUND INFORMATION

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



The Carpal Tunnel



DIRECT RISK FACTORS

Force

- Gripping an object requires activation of the forearm muscles, which generates tension in the tendons and tendon sheaths running through the wrist. The harder an object is gripped, the greater the tension in the tendons. As tension increases, the pressure within the carpal tunnel may also increase.

Awkward Postures

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

Repetition

- Repeated bending of the wrist and gripping causes stress to the tendon sheaths. If the repetitive stress is excessive, and recovery is not adequate, the tendon sheaths may fatigue to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Handling larger cuts of wood requires more grip force, and also puts the hand in an extended grip position. Both of these conditions increase the risk of injury to the elbow and wrist tissues.

Environmental Conditions

Cold Temperatures

- Exposure to cold temperatures, in combination with the previously discussed risk factors, can increase the chance of injuries to the wrist.

CONSEQUENCES

- Repeatedly gripping objects with the wrist bent may lead to irritation and damage in the tendon sheaths.
- Signs and symptoms include pain, tenderness, and inflammation in the wrist area.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Wrist, please see the column labelled “Wrist” in the Summary of Solutions on pages 81 & 82.

LOW BACK

Direct Risk Factors:

Force
Awkward Postures
Repetition

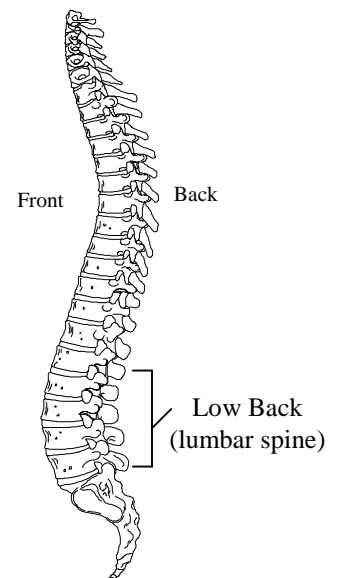


An Auto Trimmer must bend forward in order to straighten lumber and pull rejects.

Neutral Spine

BACKGROUND INFORMATION

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



DIRECT RISK FACTORS

Force

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

Awkward Postures

- Back muscles must support the weight of the upper body when leaning forward. 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 and lifting 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

- Back postures become more extreme when a worker has to reach further forward to a conveyor. These extreme postures, in combination with the force of pulling and turning lumber, increase the risk of back injury.

Working Heights

- Forceful (and sometimes repeated) pulling with a bent back occurs when Auto Trimmers pull waste wood off of the conveyor, or reach forward to clear cross ups on the conveyor. The back is bent more if the working height is too low, and also if the worker has to reach further toward or over the conveyor.

Floor Surfaces

- Flooring that is uneven, too hard, or too soft can lead to increased back discomfort.

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 81 & 82.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual***.

ANKLE

Direct Risk Factors:
Awkward Postures
Repetition



An Auto Trimmer frequently activates foot pedals in order to operate infeed chains or conveyors.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Awkward Postures

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

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- The height of foot pedals can increase the degree of awkward ankle and foot postures adopted by an Auto Trimmer. Operating pedals over these larger ranges of motion can lead to an increased risk of injury.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Ankle, please see the column labelled “Ankle” in the Summary of Solutions on pages 81 & 82.

Summary of Body Parts at Risk

NECK

- An Auto Trimmer must repeatedly look to the side in order to view incoming lumber.



NECK/SHOULDER

- An Auto Trimmer frequently works with the arms away from the body in order to straighten lumber, pull waste wood off of the conveyor, and to use the control panel.



ELBOW/WRIST

- An Auto Trimmer must grip lumber in order to turn boards and pull pieces.



WRIST

- An Auto Trimmer must grip lumber with the wrists bent in order to turn and pull pieces.



LOW BACK

- An Auto Trimmer must bend forward in order to straighten lumber and pull rejects.



ANKLE

- An Auto Trimmer frequently activates foot pedals on order to operate infeed chains or conveyors.



Risk Factors by Body Part

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

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

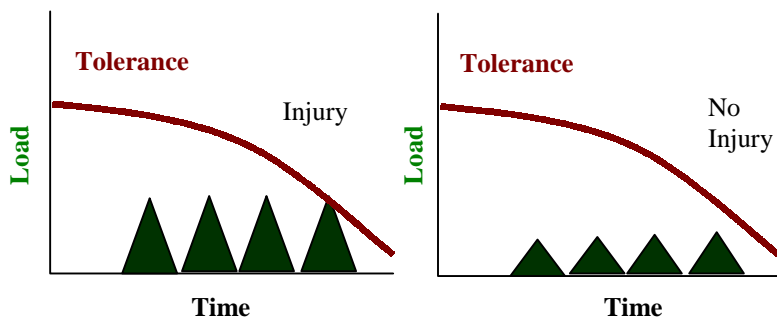
* Vibration is categorised under both direct and indirect risk factors. Vibration can directly increase the likelihood of injury to the back and wrist as well as indirectly (environmental conditions) promote injuries in other parts of the body.

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

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

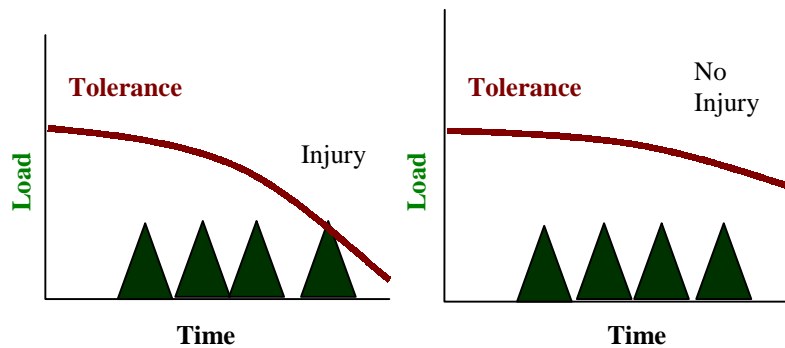
Injury Prevention

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



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

Example – using a torque multiplier wrench to loosen bolts.



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

Example – using maintenance exercises to strengthen tissues.

Suggested Solutions

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

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

The focus of the Injury Prevention section is on solutions developed following the ergonomic investigation of the Auto Trimmer 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

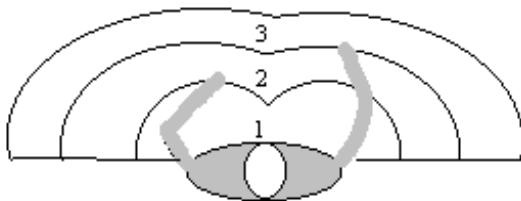
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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.

Location of foot pedals

E WP	Workers should arrange foot pedals to the side of their standing area or just under the transfer table, so that manual handling of lumber can be done as close to the body as possible. Handling materials closer to the body reduces awkward postures and forces in the back and shoulders.
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WORKING HEIGHTS

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

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

To determine the appropriate height specific for the Auto Trimmer workstation, 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.

Location of infeed conveyor

E WP	Locating the infeed conveyor at approximately hip height would allow the Auto Trimmer to use muscles of the upper and lower body together when handling lumber. This reduces the forces necessary in the upper body, reducing the risk of injury.
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Platform

E	If more than one worker uses the Trim Saw workstation, individual (portable) platforms may be built to allow each individual to work at a comfortable height. A more permanent solution would be a height adjustable (e.g., pneumatic, mechanical) platform for workers to stand on, which would also allow each operator to work at his/her preferred height. In either case, the platform should be large enough to allow the Auto Trimmer to walk the length of the conveyor normally.
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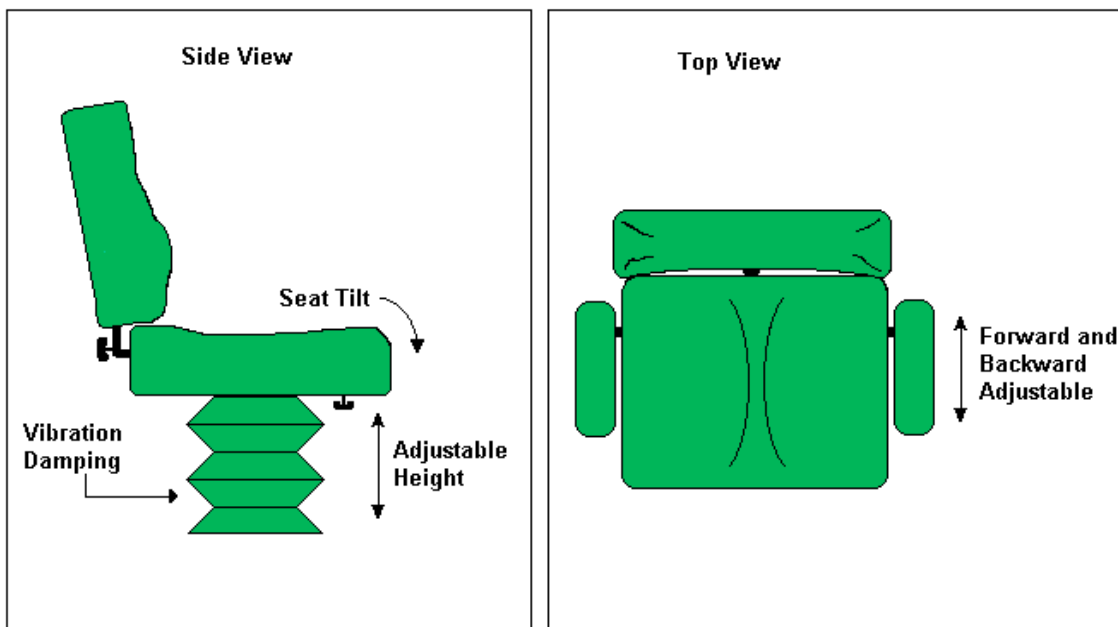
Location of control panel

E	Control panels that are too high can cause awkward shoulder postures, which is of particular concern when controls are used repeatedly. Lowering the panel to below shoulder height and tilting it at an angle will allow the controls to be used with the shoulder in neutral posture. Panels with adjustable height and angle will suit multiple operators.
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SEATING

Many Auto Trimmers sit, at least occasionally, during their shift. Sitting for long periods of time increases the load on the spine, which stresses the ligaments and discs of the low back. The load is increased when the Auto Trimmer does not maintain a neutral spine (see Injury Education for the Low Back on page 11).

- E In order to minimise awkward and static postures of the low back, seating should have several adjustable features (see list below) to accommodate various operators, and allow for continual postural adjustments.



- ★ Seating should have adjustable lumbar support
- ★ Seats should be adjustable forward/backward and up/down
- ★ Seats should have seat pans which tilt forward and backward
- ★ Seats should be air-ride, or have vibration damping cushions
- ★ Seats should be covered with a breathable, non-slip material

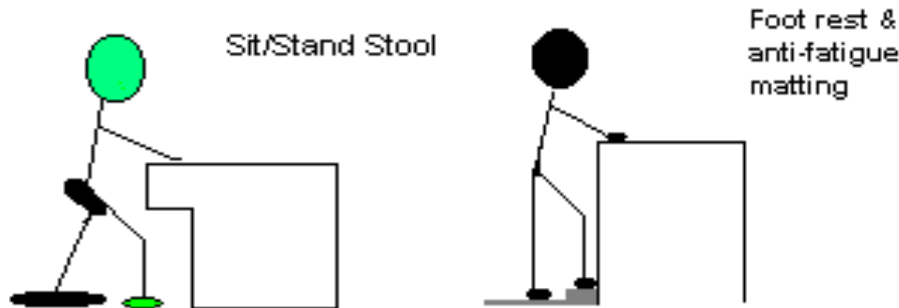
- WP In order to reduce awkward postures in the low back, the lumbar support in the chair should be adjusted to maintain the curve in the low back while sitting.

- WP In order to reduce awkward and static postures in the low back, encourage Auto Trimmers to get up from the seated posture throughout the day. This alleviates the load on the spine, allows the discs to equalise, and allows ligaments to regain their stiffness after being stretched out from sitting.

Sit/stand stool

E
WP

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



FLOOR SURFACES

Anti-fatigue matting

E

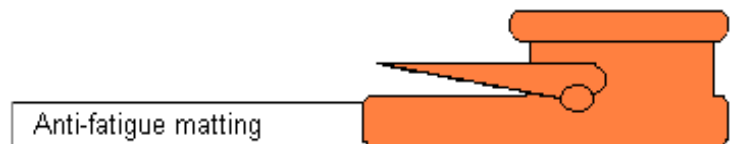
In order to minimise fatigue in the lower extremities, anti-fatigue matting can be installed. The use of anti-fatigue matting in the work area will help to increase comfort and reduce muscle fatigue. The cushioned surface encourages continuous micro-movements of the feet, which minimises blood pooling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

Foot pedals

Recessed foot pedals

E

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



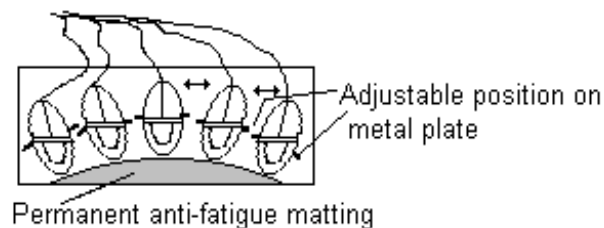
Movable foot pedals

E

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

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

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



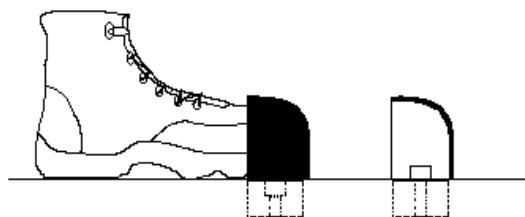
- 2) Providing several positions on the floor where clips or nails may be used to secure foot pedals. If this option is considered, make sure each possible position is highly visible to all operators, to prevent tripping or injuries.
- 3) Providing a physical link (e.g., a metal bar) between two foot pedals with the same function. This solution is most appropriate where a worker may move to manipulate lumber but still needs to operate the foot pedals.



Foot push buttons

E

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



Characteristics of Objects Being Handled

CONTAINER, TOOL AND EQUIPMENT HANDLES

Wrap tools

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

Proper gloves

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

Environmental Conditions

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

Work Organisation

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

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	Page	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Working Reaches	73		A	A				A				
Location of foot pedals	73		A	A				A				
Working Heights	74		A	A				A				
Location of infeed conveyor	74		A	A				A				
Platform	74	A	A		A			A				
Location of control panel	74		A									
Seating	75							A S				
Sit/stand stool	76							A S				
Anti-fatigue matting	76							S			S	S
Foot pedals	77										A R	
Wrap tools	79				F A	F A						
Proper gloves	79				F A	F A						

Direct Risk Factors

F = Force

S = Static Postures

R = Repetition

C = Contact Stress

A = Awkward Postures

V = Vibration

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	Page	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/Hand	Low Back	Hip	Knee	Ankle	Foot
Heat Exposure	♦	indirectly reduces risk of injury to the body										
Cold Exposure	♦	indirectly reduces risk of injury to the body										
Lighting	♦	indirectly reduces risk of injury to the body										
Noise	♦	indirectly reduces risk of injury to the body										
Vibration	♦	directly reduces risk of injury to the back and wrist										
Rest breaks	♦	indirectly reduces risk of injury to the body										
Job Rotation	♦	indirectly reduces risk of injury to the body										
Task Rotation	♦	indirectly reduces risk of injury to the body										
Work Pace	♦	indirectly reduces risk of injury to the body										
Scheduling	♦	indirectly reduces risk of injury to the body										

Direct Risk Factors

F = Force

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♦ = See General Risk Factor Solutions Manual

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Neck/Shoulder</p> <p>An Auto Trimmer frequently works with the arms away from the body in order to straighten lumber, pull waste wood off of the conveyor, and to use the control panel.</p>	<p>Repetition</p> <p>Awkward Postures</p>	<ul style="list-style-type: none"> • When the arms are repeatedly lifted, the muscles of the neck and shoulder are subjected to repeated stress with little or no time for recovery. If the stress is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury. • Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on the muscles and tendons. 	<ul style="list-style-type: none"> • Try to keep the arms as close to the body as possible. • When turning boards, use one piece of lumber as a pivot point for the piece of lumber that needs to be turned. • When possible, wait for the board to come off the infeed belt instead of reaching forward to grasp it. • For exercises that can help prevent <i>neck</i> and <i>shoulder</i> injuries, <i>see the neck and shoulder sections of the Body Manual.</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Elbow/Wrist</p> <p>An Auto Trimmer must grip lumber in order to turn boards and pull pieces.</p>	<p>Force</p> <p>Awkward Postures</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection. • The width of an object affects how much muscle tension needs to be generated. Using either an overly large or a small grip requires more muscle force, and can lead to tissue fatigue at the tendon/bone connection. • The position of the wrist also affects how much muscle tension needs to be generated. Gripping objects with the wrist bent increases the tension generated by muscles. • Repeated stress to the elbow without adequate rest could fatigue tissues to the point of injury. 	<ul style="list-style-type: none"> • Use only as much gripping force as is necessary. • Maintain a straight wrist position. • Whenever possible, try using both hands. • For exercises that can help prevent <i>elbow</i> injuries, <i>see the elbow section of the Body Manual</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Wrist</p> <p>An Auto Trimmer must grip lumber with the wrists bent in order to turn and pull pieces.</p>	<p>Force</p> <p>Awkward Postures</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Gripping an object requires activation of the forearm muscles, which generates tension in the tendons and tendon sheaths running through the wrist. The harder an object is gripped, the greater the tension in the tendons, and the pressure in the carpal tunnel. • As the wrist is bent, the tendon sheaths will rub up against the walls of the carpal tunnel. The further the wrist is bent, the more friction experienced in the tendon sheaths. • Repeated bending of the wrist and gripping causes stress to the tendon sheaths. If the repetitive stress is excessive, and recovery is not adequate, the tendon sheaths may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Use only as much gripping force as is necessary. • Maintain a straight wrist position. • Whenever possible, try using both hands. • For exercises that can help prevent <i>wrist</i> injuries, <i>see the wrist section of the Body Manual</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	ERGONOMIC RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Low Back</p> <p>An Auto Trimmer must bend forward in order to straighten lumber and pull rejects.</p>	<p>Force</p> <p>Awkward Postures</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Lifting increases the loading on the spine. Weight held in the hands is transmitted to the low back. The greater the weight, the greater the loading on the structures of the low back. • Back muscles must support the weight of the upper body when leaning forward. Increased bending of the back increases the loading on the spine and increases the pressure on the walls of the discs. • Repeated forward bending and lifting can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, the disc walls may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Try to keep the back in a neutral position (ears, shoulders, and hips aligned). • Position foot pedals in the working area so that you don't have to bend over them to reach lumber on the conveyer. • When lifting, hold object close to the body and do not twist the torso. • Handle lumber while in a standing position. • When turning lumber, center the lumber in front of the body, to achieve better leverage. • Avoid handling lumber with the torso bent or twisted. • Use a longer pike pole to avoid leaning forward when pulling lumber. • For exercises that can help prevent <i>back</i> injuries, <i>see the back section of the Body Manual</i>

