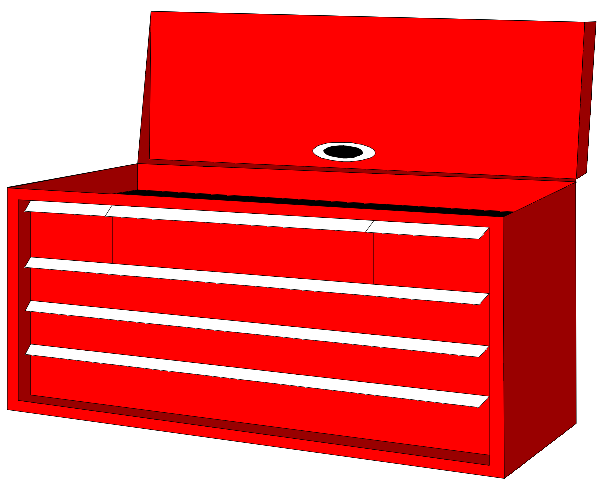
Industrial Musculoskeletal Injury Reduction Program

Common Industry Jobs (CIJs)

Fingerjoint Feeder Tool Kit



IMIRP **program coordinated by:**

Council of Forest Industries

Industrial Wood & Allied Workers of Canada

Advanced Ergonomics Inc.

In cooperation with the Workers' Compensation Board of British Columbia

FINGERJOINT FEEDER TOOL KIT
Table of Contents

Overview
Fingerjoint Feeder

Job Summary

A Fingerjoint Feeder is responsible for maintaining a constant flow of blocks of wood to the Fingerjoint machine. A Fingerjoint Feeder manually transfers blocks of wood to lugs feeding into the Fingerjoint machine, inspects blocks for defects, discards waste lumber into bins or conveyors, and controls the infeed conveyor with a foot pedal. A Fingerjoint Feeder may also have to control the operation of the Fingerjoint machine, manually unjam the infeed conveyor, and manually unjam the Fingerjointer machine. Refer to the Physical Demands Analysis for more detail.

Physical Demands

The physical demands of the Fingerjoint Feeder may include:

a) Forceful exertions of the elbow/wrist
b) Repetitive and static postures of the neck
c) Frequent forward and lateral reaching involving repetitive movements of the shoulders, elbows, and wrists
d) Repetitive ankle movements
e) Awkward postures of the neck, wrist, shoulders, and back
f) Balancing while operating a foot pedal
g) Continuous standing on a vibrating surface
h) Pulling blocks off the conveyor
i) Frequent turning and/or lifting of blocks on conveyor

Mental Demands

A Fingerjoint Feeder may have to make a judgement for every block. Rapid decision making is involved when deciding whether or not to pull waste blocks, and whether blocks are properly oriented to feed into the Fingerjoint machine. Quick response time is also required when clearing cross-ups or jam-ups. This job requires sustained alertness, constant visual inspection and continuous decision making.

Major Variations

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

1) A Fingerjoint Feeder may rotate jobs with other workers in the Fingerjoint mill.

2) Unjamming lumber:
   a) With a pike pole or picaroon
   b) With a shaker table

Minor Variations

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

1) Discarding waste lumber:
   a) To the rear
   b) To the front
   c) To the side

2) A Fingerjoint Feeder may have to monitor and control the Fingerjointer machine as well.

Physical Demands Analysis
Fingerjoint Feeder

PDA General Instructions: Fingerjoint Feeder

The purpose of this PDA is to familiarise healthcare professionals with the physical demands of a Fingerjoint Feeder. This PDA can be used to gather information about an individual's job and to assist in developing a rehabilitation and return-to-work plan. It is not intended for use in claims adjudication.

Where applicable, common industry job data (e.g., hand tools, tasks) have been included in the tables of this document. The information reported was collected from a sample of Fingerjoint Feeders in the BC Sawmill Industry. However, the PDA requires completion by the healthcare professional, with input from the injured worker to highlight tasks that aggravate the injury or prevent the worker from returning to their job. The worker's supervisor may be contacted for further information or verification of tasks.

A PDA should be filled out for each individual worker following an injury. Subsequent changes in the work process may reduce the accuracy of any pre-existing physical demands assessments.

PDA Table of Contents

Physical Demands Analysis
Fingerjoint Feeder

Task List

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

Feed Fingerjointer lugs

A Fingerjoint Feeder manually transfers blocks of wood to lugs feeding into the Fingerjoint machine.

Does this task occur at your mill?

☐ Yes ☐ No

Inspect boards

A Fingerjoint Feeder inspects boards for defects.

Does this task occur at your mill?

☐ Yes ☐ No

Discard waste lumber

A Fingerjoint Feeder discards waste lumber into bins or conveyors.

Does this task occur at your mill?

☐ Yes ☐ No

Control infeed conveyor

A Fingerjoint Feeder controls the infeed conveyor with a foot pedal.

Does this task occur at your mill?

☐ Yes ☐ No

Control fingerjointer

A Fingerjoint Feeder controls the operation of the Fingerjointer.

Does this task occur at your mill?

☐ Yes ☐ No

Unjam blocks

A Fingerjoint Feeder manually unjams infeed conveyor.

Does this task occur at your mill?

☐ Yes ☐ No

Unjam fingerjointer

A Fingerjoint Feeder manually unjams fingerjointer.

Does this task occur at your mill?

☐ Yes ☐ No

Job Profile

Date: ______________________________

Company Name: ____________________ Division: ______________________

Employee Name: ____________________ Supervisor: ____________________

Phone: ____________________________ Fax: __________________________

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

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

Describe:

____

____

____

Length of shift	___________________ hours
Formal breaks	☐ Two 10 minute breaks ☐ One 30 minute lunch break ☐ Other: ____________________________________
Informal breaks	☐ Yes, length of break varies ☐ Yes, _____________ minutes/shift
Work pace control	☐ Self-paced ☐ Time pressure (e.g., completing a task during the 30 minute lunch break) ☐ Other: ____________________________________
Job rotation ☐ Yes ☐ No	Describe: ____ ____ ____ ____

Work Organisation

Task Description

The table below contains a list of tasks performed by a Fingerjoint Feeder. Use the left column to check off (✓) tasks that are present. Estimate the *Percent of Shift* each task is performed and place a check mark (✓) in the appropriate column. The *Comments* section may be used to include information related to duration, frequency, and cycle times. Additional tasks can also be included under *Other*.

	Task	**Percent of Shift**				**Comments**
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
	Feed fingerjointer lugs					
	Inspect boards					
	Discard waste lumber					
	Control infeed conveyor					• *With foot pedal*
	Controlling fingerjointer					• *With finger push button*
	Unjam blocks					
	Unjam fingerjointer					
	Other:					

Workstation Characteristics

Dimensions & Layout

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

Flooring, Displays & Seating

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

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

Equipment & Machinery Controls

The table below contains a list of the types of controls used by a Fingerjoint Feeder. Use the left column to check off (✓) controls that are present at the work site. Highlight controls that may aggravate the injury, or which the worker finds difficult to use. The *Comments* section may be used to include any additional information. Additional controls can be included under *Other*.

Type of Control		Function	Comments
	Foot pedal	• *Controls infeed conveyor*	• *10 to 20 times per minute* • *1 to 4 pedals*
	Finger push button	• *Controls infeed conveyor*	• *10 to 20 times per minute*
	Finger push button	• *Controls Fingerjointer*	• *Rarely*
	Other:		

Physical Demands

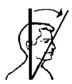
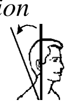
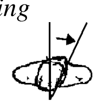
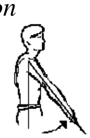
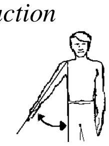
Whole Body Physical Demands

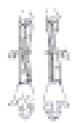
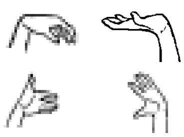
Identify each of the physical demands required by a Fingerjoint Feeder and list the corresponding tasks in the second column. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information related to duration, frequency, and cycle times.

Physical Demands	Tasks or Activity	Percent of Shift: Rarely 0 to 5%	Percent of Shift: Occasionally 6 to 33%	Percent of Shift: Frequently 34 to 66%	Percent of Shift: Constantly 67 to 100%	Comments
Example: Standing	• *Feed Fingerjointer lugs*				✓	
Walking						
Sitting						
Standing						
Climbing						
Balancing						
Kneeling/ Crouching						
Other:						

Body Postures

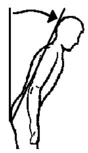
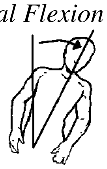
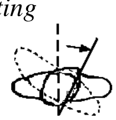
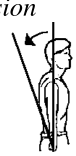
The table below outlines the body postures that may be adopted throughout the shift by a Fingerjoint Feeder, related to tasks. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information describing posture duration, frequency, cycle times, and hand used.

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Example: Shoulder abduction	• *Discard waste wood*			✓		• *5 to 10 times per minute*
Neck						
Flexion 						
Extension 						
Twisting 						
Shoulder						
Flexion 						
Abduction/ adduction 						
Extension 						

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Forearm						
Rotation 						
Wrist						
Wrist Movements 						
Hand/Fingers						
**Handling*						
**Fingering*						
**Gripping*						

Legend for Hand/Fingers

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

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Back						
Flexion 						
Lateral Flexion 						
Twisting 						
Extension 						

Manual Material Handling

The table below contains a list of general manual material handling activities performed by a Fingerjoint Feeder. Indicate tasks that require one or more of these activities, and fill in the weight of the objects, or the force required, for each action. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information related to duration, frequency, cycle times, and characteristics of objects handled. If necessary, please refer to Appendix A to calculate the weight of the wood being handled.

Activity	Task Description	Weight (kg)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
Pushing	• *Discard waste blocks to the front*	*See weight of wood equation*					
Pulling	• *Transfer blocks from infeed conveyor to lugs*						
Pulling	• *Pull blocks from load stacks*						
Pulling	• *Discard waste blocks to the rear or side*						
Lifting	• *Lift blocks of wood in order to inspect them*						
Lowering	• *Lower blocks into carriages*						
Carrying	• *Carry blocks from load stacks to carriages*						

Hand Tools

Indicate the hand tools used by a Fingerjoint Feeder by placing a check mark (✓) in the far left column. Determine the weight of the hand tool and enter it in the appropriate column. Check off (✓) the estimated *Percent of Shift,* and use the *Comments* section to include information related to duration, frequency, cycle times, and characteristics of objects handled.

	Type of Tool	Task(s)	Weight (kg)	Percent of Shift: Rarely 0 to 5%	Percent of Shift: Occasionally 6 to 33%	Percent of Shift: Frequently 34 to 66%	Percent of Shift: Constantly 67 to 100%	Comments
	Band cutters	• *Remove bands from incoming loads*						
	Pike pole	• *Unjam lumber*						
	Picaroon	• *Unjam lumber*						
	Other:							

Environmental Conditions

Work Environment

The table below contains a list of environmental conditions that may be of concern. If any of these factors aggravate the injury, describe in the *Comments* section.

Factor	Comments
Vibration *(Indicate source)* ☐ Seat ☐ Floor ☐ Tool ☐ Other: ________________	
Noise level	
Lighting level	
Other:	

Location of Workstation

The table below contains a list of potential work environments. Indicate with a check mark (✓) in the left column which of the work environments apply to the specific workstation. For example, the workstation may be inside a building with both a local fan and heater, exposed to the outside by a doorway that is always open. In this situation, 'Inside exposed', 'Heater present', and 'Fan present' would all be checked.

	Work Environment
	Outside uncovered
	Outside covered
	Inside enclosed
	Inside exposed
	Heater present
	Fan present

Temperature

The table below contains a list of the geographical regions of British Columbia. Indicate the appropriate region with a check mark (✓) in the left column. Refer to the regional map in Appendix B of the PDA.

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

Personal Protective Equipment

The table below contains a list of the personal protective equipment (PPE). For the Fingerjoint Feeder at your mill, indicate with a check mark (✓) which of the PPE items are required.

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

Appendix A – Weight of Wood Equation

1. Type of Wood Handled

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

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

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

2. Size of Wood*

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

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

* Conservative estimates of actual wood dimensions

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

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

3. Length of Wood

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

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

4. Weight of Wood Equation*

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

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

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

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

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

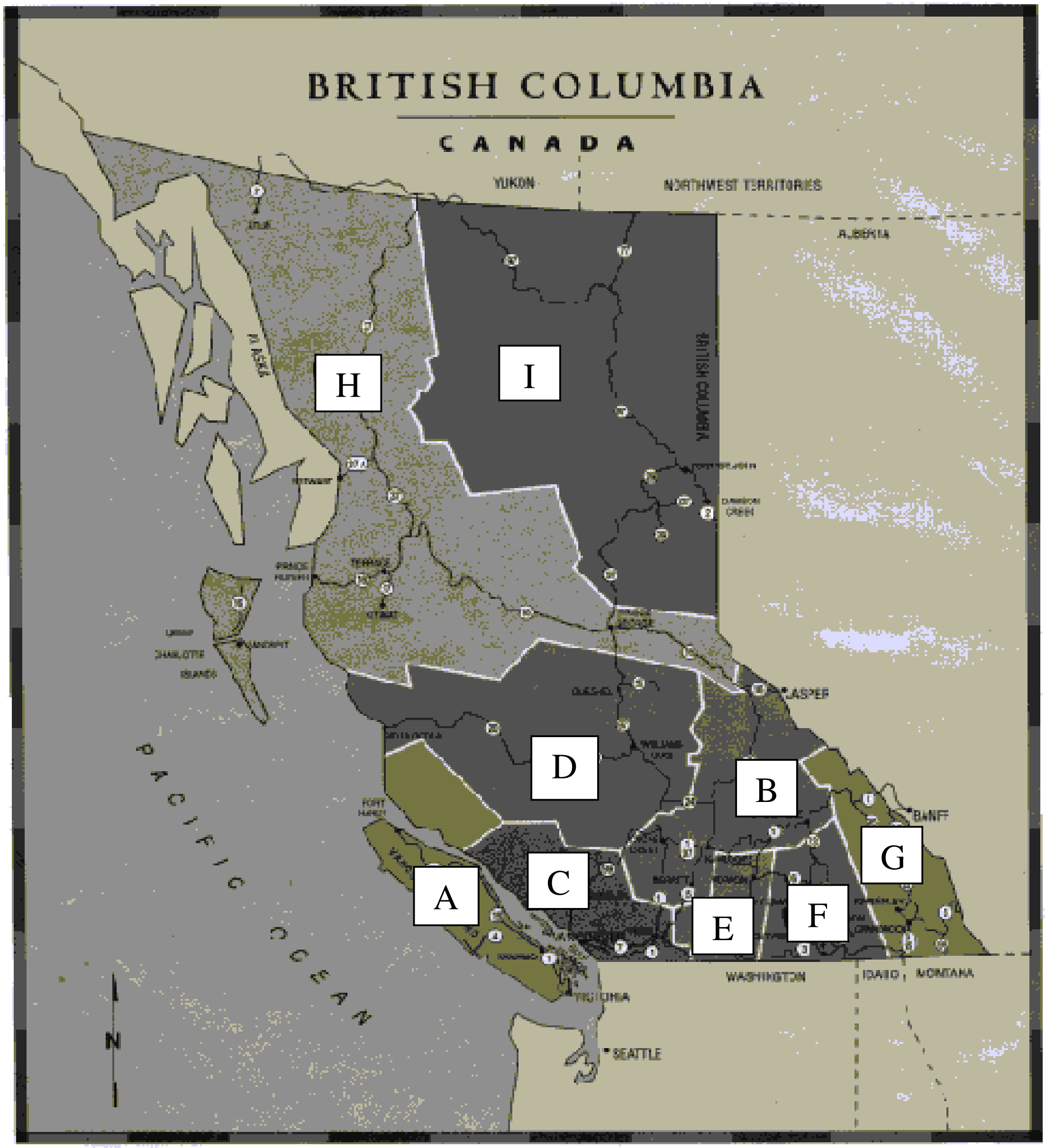
For the lightest species handled, enter the lb./board foot value, the multiple for the smallest size of wood, and the shortest length of this wood. Multiply these values together to determine the weight of the board in pounds.

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

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

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

Appendix B – Regional Map



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

Risk Factor Identification Checklist
Fingerjoint Feeder

Purpose

The Risk Factor Identification Checklist for a Fingerjoint Feeder is used to **identify** potential ergonomic risk factors. Keep in mind that the purpose of this checklist is only to **identify** potential ergonomic risk factors, **not** to assess them.

The checklist can be used as part of your ergonomic intervention process, when workers express concerns about their work environment, during regular workplace inspections and observations, or when conducting an accident or injury investigation. Ideally, management and worker representatives who have completed the IMIRP Occupational Health & Safety Committee and Supervisor Ergonomic Training Session should complete this checklist. Try to view different workers in the same occupation when completing the checklist. Some specific examples are given to help answer the questions.

Instructions

General

Except for the first two questions, all remaining questions will require an answer with an implied frequency. For appropriate questions indicate with a check mark (✓) whether the answer to the question is 'No' or 'Yes'. This way you will have a record indicating that all risk factors have been considered in the identification process.

If you indicate 'No', please continue to the next question. If the question refers to a situation which does not exist (e.g., there is no seating available), please indicate 'No' in the appropriate box and continue to the next question.

If your answer is 'Yes', please check the appropriate box and then circle the frequency ('S' for 'Sometimes' or 'O' for 'Often'). If you answer 'Yes – Sometimes', then this risk factor **may be** a potential area of concern. If you answer 'Yes – Often' then there is an increased likelihood that this risk factor **is** an issue. Each mill will be responsible for defining what 'Sometimes' and 'Often' will mean to them. It is important that all people who complete the checklist are consistent in how they determine if a risk factor occurs 'Sometimes' or 'Often'. Use the 'Comments' section to indicate specific tasks, or to make other notes about the direct risk factors.

Since ergonomic risk factors frequently occur in combinations, you may find similar questions in different sections. Answering all questions will ensure that the situations that involve combinations of ergonomic risk factors are identified. It is very important to recognise all risk factors that occur in the work area.

Please note that for some of the questions it will be beneficial to ask the worker for their input. Please take the opportunity to include the operator in the risk factor identification process as much as possible. Videotaping the job of interest and reviewing the checklist in a quiet area with the worker may allow for more discussion.

Summary Tables
At the end of each body part section, summarise your findings in the table provided. If any of the direct risk factor sections contain a 'Yes', indicate 'Yes' in the appropriate section of the summary table. Answer the questions referring to injury statistics and discomfort survey findings. If there are only 'No' answers in a direct risk factor section, indicate 'No' in the summary table for that section. Use the summary information to determine how you will use the Work Manual.

Risk Factor Identification Checklist – Fingerjoint Feeder

Management Representative ________________

Worker Representative ________________

Date ________________

Risk Identification completed:

☐ Before implementation of solutions

☐ After implementation of solutions

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

Definitions

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

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

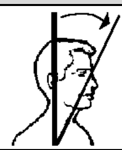
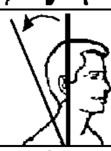
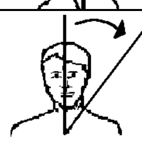
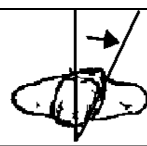
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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

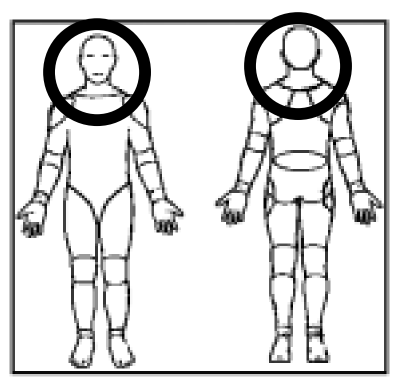
Awkward Postures: Awkward postures occur when there is a deviation from a power working posture. Some examples of awkward postures typically include reaching behind, twisting, working overhead, and forward or backward bending.

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

NECK

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

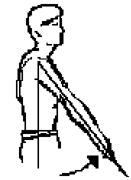
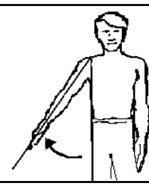
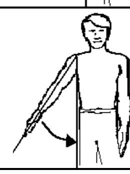
Please indicate whether the following direct risk factors were identified at the **NECK**.		
Direct Risk Factors	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Neck or Head/Eye or Upper Back? (see Worksheet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



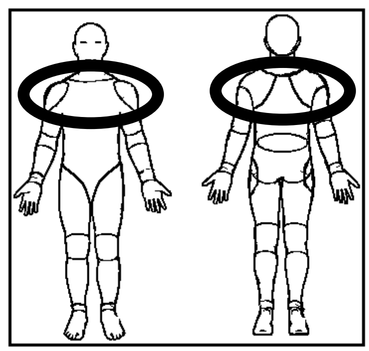
Body parts within the circled area will be classified as NECK issues.

SHOULDER

Force	N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting			S O	
Lowering			S O	
Pushing			S O	
Pulling			S O	
Carrying			S O	
Repetition				
Are identical or similar motions performed over and over again? (e.g., reaching forward to pull blocks to the workstation)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task?			S O	
Static Posture				
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., holding the arms away from the body when working with blocks of wood)			S O	
Ask the worker: Do you hold tools or objects for long periods?			S O	

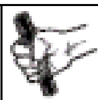
Awkward Posture		N	Y		Comments:
Flexion				S O	
Extension				S O	
Abduction				S O	
Adduction				S O	

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



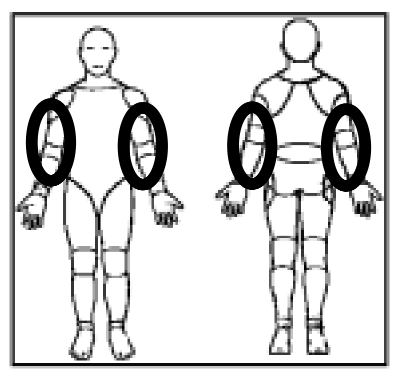
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

Force	N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting			S O	
Lowering			S O	
Pushing			S O	
Pulling			S O	
Carrying			S O	
Turning materials			S O	
Are objects handled in a power grip? (e.g., pike poles, picaroons) 			S O	
Are objects handled in a pinch grip? (e.g., blocks of wood) 			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., gripping blocks of wood)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task?			S O	

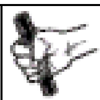
Static Posture	N	Y		Comments:
Ask the worker: Do tasks require your hand and arm to be maintained in a fixed or static posture? (e.g., holding blocks of wood)			S O	
Ask the worker: Do you apply constant pressure on controls/objects with your hand?			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods?			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., metal edges of workstation digging into palm of hand or elbow)			S O	
Vibration				
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment?			S O	

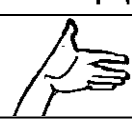
Please indicate whether the following direct risk factors were identified at the **ELBOW**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there injury reports for the Elbow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



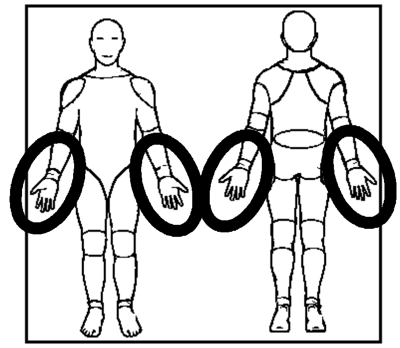
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

Force		N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting				S O	
Lowering				S O	
Pushing				S O	
Pulling				S O	
Carrying				S O	
Turning materials				S O	
Are objects handled in a power grip? (e.g., blocks of wood)				S O	
Are objects handled in a pinch grip? (e.g., blocks of wood)				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., gripping blocks of wood)				S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task?				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? (e.g., holding blocks of wood)				S O	
Ask the worker: Do you apply constant pressure on controls/objects with your hand?				S O	
Ask the worker: Do you hold tools or objects for long periods?				S O	
Contact Stress					
Ask the worker: Do **<u>any</u>** objects, tools or parts of the workstation put pressure on **<u>any</u>** parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm? (e.g., metal edges of workstation digging into palm of hand or elbow)				S O	
Ask the worker: Do you use your hand like a hammer for striking?				S O	
Awkward Posture					
Flexion				S O	
Extension				S O	
Ulnar Deviation				S O	
Radial Deviation				S O	
Vibration					
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment?				S O	

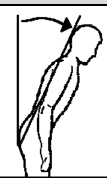
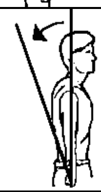
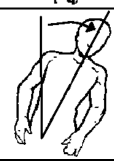
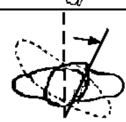
Please indicate whether the following direct risk factors were identified at the **WRIST/HAND**.		
Direct Risk Factors	Force	☐Yes ☐No
	Repetition	☐Yes ☐No
	Static Posture	☐Yes ☐No
	Contact Stress	☐Yes ☐No
	Awkward Posture	☐Yes ☐No
	Vibration	☐Yes ☐No
In the **Injury Statistics** investigation, were there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



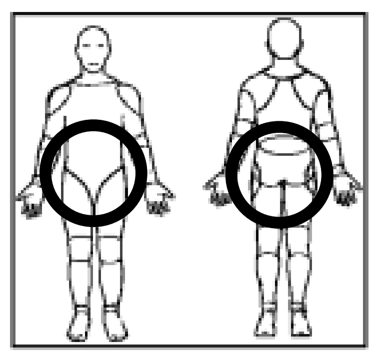
Body parts within the circled area will be classified as WRIST issues.

LOW BACK OR HIP/THIGH

Force	N	Y		Comments:
Is forceful physical handling performed? Such as: Lifting			S O	
Lowering			S O	
Pushing			S O	
Pulling			S O	
Carrying			S O	
Repetition				
Are identical or similar motions performed over and over again?			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., bending forward to pull blocks of wood from conveyor)			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., holding a bent forward or twisted posture to position blocks into lugs)			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., conveyors that dig into the hip or thigh)			S O	

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

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

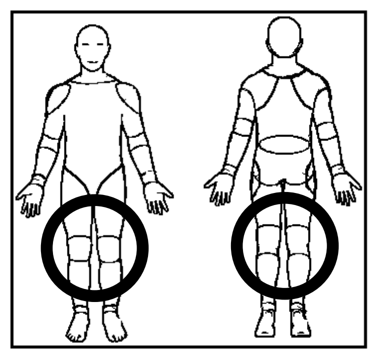


Body parts within the circled area will be classified as LOW BACK issues.

KNEE

Repetition	N	Y		Comments:
Are identical or similar motions performed over and over again? (e.g., climbing stairs, crouching)			S O	
Static Posture				
Ask the worker: Do tasks require you to maintain your knee(s) in a fixed or static posture?			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)? (e.g., kneeling on a catwalk)			S O	
Awkward Posture				
Extreme Flexion 			S O	

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

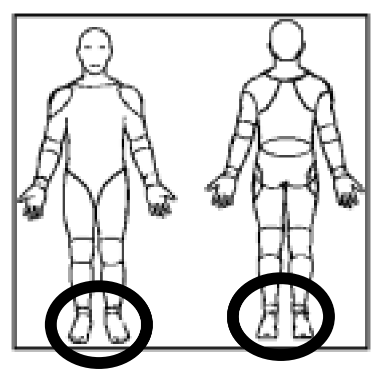


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

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

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



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

CHARACTERISTICS OF OBJECTS BEING HANDLED

	N	Y		Comments:
Are there problems handling a load due to its size or shape? (e.g., large blocks of wood)			S O	
Are there problems handling a load due to its fragile, unbalanced, or non-rigid conditions?			S O	
Ask the worker: Do you experience situations where mechanical aids or equipment are not readily available to assist with manipulating an object? (e.g., hoists)			S O	
Are handles for tools and equipment inappropriate in terms of size or shape? (e.g., pike poles, picaroons)			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? (e.g., air hoses, clanging of conveyor chains)			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	

Injury Education Injury Prevention

Work Manual

Industrial
Musculoskeletal
Injury
Reduction
Program

Fingerjoint Feeder

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

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

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

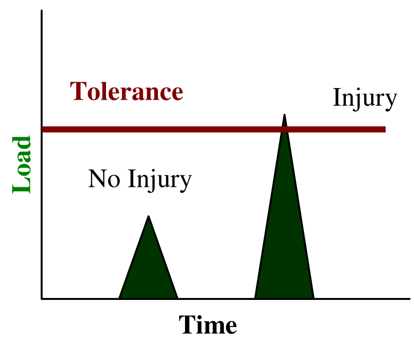
Work Manual

Fingerjoint Feeder

WM Table of Contents

Injury Education

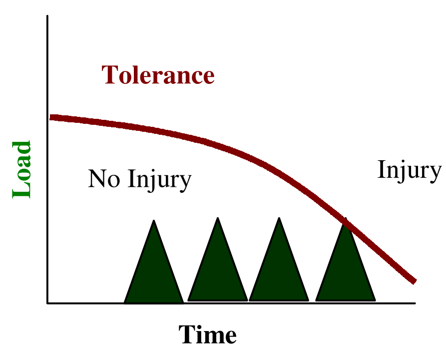
Injuries occur when …
Loads exceed tissue tolerances



Excessive Force

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

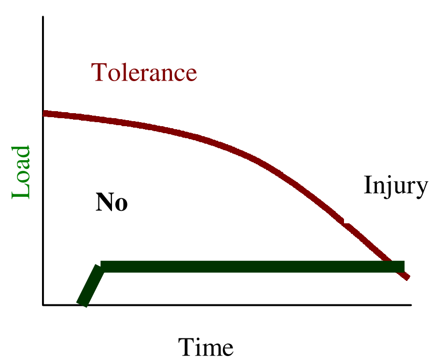
Example – a worker going over on their ankle and spraining it.



Excessive Repetition

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

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



Excessive Duration

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

Example – a Grader developing neck tension.

Body Parts at Risk

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

After all of the appropriate information is collected during the investigation of the Fingerjoint Feeder job (i.e., injury statistics, discomfort surveys, results from the Identification Checklist), the next steps are to:

1. Match the body parts of concern from your investigation to those described in this section of the Work Manual.

2. Note the direct risk factors associated with each body part of concern.

3. Read the information on the page and try to understand why a body part, in combination with each of the direct risk factors, is of concern.

4. Discover which indirect risk factors are associated with a particular body part problem and the headings under which they are found in the Injury Prevention section of the Work Manual.

5. Note the consequences of the direct risk factor relative to a body part.

6. Note where the potential solutions can be found within the Injury Prevention section of the Work Manual. In addition, for many of the body parts, a reference may be provided to refer to specific sections of the Body Manual.

At the end of the Body Parts at Risk Section, there is a summary page of all the body parts of concern for the Fingerjoint Feeder. In addition, a reference table, with a summary of the direct and indirect risk factors by body part, is provided.

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

Major Risk Identification

IMIRP ergonomists have assessed the Fingerjoint Feeder position and found that the neck/shoulder, elbow/wrist, and low back are the body parts of major concern while performing their duties. Focussing on solutions that target the areas of major concern will likely reduce the greatest risks associated with this job.

Neck/Shoulder: Major risks include awkward postures, static postures, and repetition with the shoulder and/or neck while looking down to inspect lumber, reaching to take lumber off conveyor or load stack, guiding blocks into lugs, and discarding lumber to the front, side, and back. Workstation design and working in a cold environment may contribute to the risk of discomfort or injury.

The following solutions are targeted at reducing the risk of injury to the neck and/or shoulder:

1. Angled rollers (page 86)
2. Gravity-assisted rollers/conveyors (page 86)
3. Reduce reaching (page 86)
4. Reduce jam-ups (page 87)
5. Use smooth motions
6. Maximum height of loads (page 88)
7. Maintenance of rollers (page 88)
8. Sit/stand stool (page 89)
9. Stretches (page 93)
10. Lightweight, sharp tools (page 95)
11. Pike pole use (page 95)
12. Job rotation (page 98)

Elbow/Wrist: Major risks include repetition, awkward posture, and force with the wrist and/or elbow while gripping lumber. The type of gloves worn and working in a cold environment may contribute to the risk of discomfort or injury.

The following solutions are targeted at reducing the risk of injury to the elbow and/or wrist:

1. Maintenance of rollers (page 88)
2. Stretches (page 93)
3. Alternating hands (page 95)
4. Avoid rapid forearm rotation (page 95)
5. Avoid over-gripping (page 95)
6. Neutral wrist position (page 95)
7. Modify tool handle friction (page 97)
8. Sticky palm gloves (page 97)
9. Job rotation (page 98)

Low Back: Major risks include awkward postures, repetition, and force with the low back while bending or twisting the low back when pulling lumber off the transfer deck or guiding the blocks into the lugs, and standing continuously. Vibration and working in a cold environment may contribute to the risk of discomfort or injury.

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

1. Angled rollers (page 86)
2. Reduce reaching (page 86)
3. Reduce jam-ups (page 87)
4. Wait for lumber (page 87)
5. Scissors lift (page 88)
6. Maintenance of rollers (page 88)
7. Braced postures (page 89)
8. Sit/stand stool (page 89)
9. Anti-fatigue matting (page 90)
10. Anti-fatigue insoles (page 90)
11. Stretches (page 93)
12. Lightweight, sharp tools (page 95)
13. Pike pole use (page 95)
14. Job rotation (page 98)

For additional stretching and strengthening exercises that would benefit a Fingerjoint Feeder, refer to the Neck, Shoulder, Elbow, Wrist, and Back sections of the Body Manual.

NECK

Direct Risk Factors:
Awkward Postures
Static Postures

A Fingerjoint Feeder must hold the head forward in order to sort and straighten blocks.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Awkward Postures

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

Static Postures

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

Indirect Risk Factors

Workstation Design

Working Heights

- Loading on the neck muscles is increased because the height of the work area results in the head being held in a forward bent position when sorting and straightening blocks.

Consequences

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

Suggested Solutions

- For specific solutions that may prevent injuries to the Neck, please see the column labelled "Neck" in the Summary of Solutions on pages 99 to 101.
- For exercises that can help to prevent ***neck*** injuries, see the ***Neck section of the Body Manual.***

NECK/SHOULDER

Direct Risk Factors:
Repetition
Awkward Postures
Static Postures

A Fingerjoint Feeder frequently works with the arms away from the body in order to pull blocks from the conveyor and to guide blocks into lugs entering the Fingerjointer.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Repetition

- When the arms are repeatedly lifted, 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.

Static Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

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

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 99 to 101.
- For exercises that can help to prevent ***neck*** and ***shoulder*** injuries, see the ***Neck*** and ***Shoulder sections of the Body Manual.***

NECK/SHOULDER

Direct Risk Factors:
Force
Repetition
Awkward Postures

A Fingerjoint Feeder may work with the arms away from the body in order to discard waste blocks.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

- The rotator cuff stabilises the shoulder joint when objects are pushed or thrown. The heavier the object, or the larger the force required, the greater the load on the rotator cuff.
- The speed of movement also affects the amount of force required. The faster the object is pushed or thrown, the greater the amount of force required.
- If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur.

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Long or awkward reaches to waste bins or conveyors can lead to awkward arm postures and increased tissue fatigue.

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 99 to 101.
- For exercises that can help to prevent ***neck*** and ***shoulder*** injuries, see the ***Neck*** and ***Shoulder sections of the Body Manual.***

SHOULDER

Direct Risk Factors:
Force
Repetition
Awkward Postures

A Fingerjoint Feeder may reach forward and to the side in order to pull lumber to the workstation.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

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

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- Loading on the shoulder muscles is increased because the orientation of the worker, with respect to the infeed, requires the operator to lean sideways in order to advance lumber.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Shoulder, please see the column labelled "Shoulder" in the Summary of Solutions on pages 99 to 101.
- For exercises that can help to prevent ***shoulder*** injuries, see the ***Shoulder section of the Body Manual.***

ELBOW/WRIST

Direct Risk Factors:
Force
Repetition
Awkward Postures

A Fingerjoint Feeder must grip lumber in order to transfer it to the fingerjointer.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

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

Repetition

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

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.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Size and Shape

- Pulling larger pieces of lumber requires higher forearm force to handle the extra load. This high force can lead to added strain at the elbow.

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 99 to 101.
- For exercises that can help to prevent ***elbow*** injuries, see the ***Elbow section of the Body Manual.***

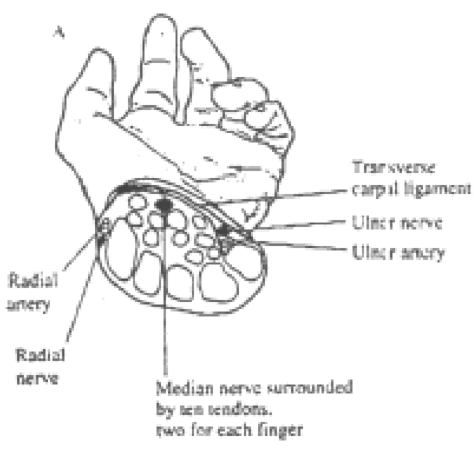
WRIST

Direct Risk Factors:
Force
Repetition
Awkward Postures

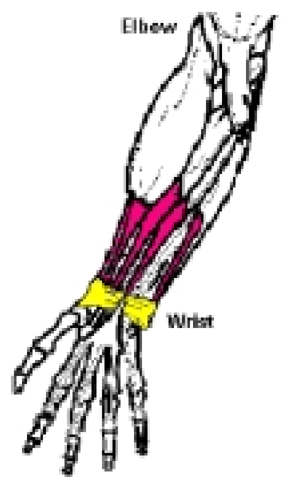
A Fingerjoint Feeder may grip pieces with the wrist bent in order to sort and straighten blocks.

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.

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Loading on the tissues of the wrist is increased if the height of the conveyor is not appropriate for the Fingerjoint Feeder.

Characteristics of Objects Being Handled

Size and Shape

- Loading on the tissues of the wrist is increased when gripping lumber with a pinch grip. Loading is also increased when the wrist is in a bent posture (up, down, or to the sides). Larger pieces of lumber require larger pinch grip spans, which further increases the amount of loading on the tissues of the hand and 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 99 to 101.
- For exercises that can help to prevent wrist injuries, see the ***Wrist section of the Body Manual.***

LOW BACK

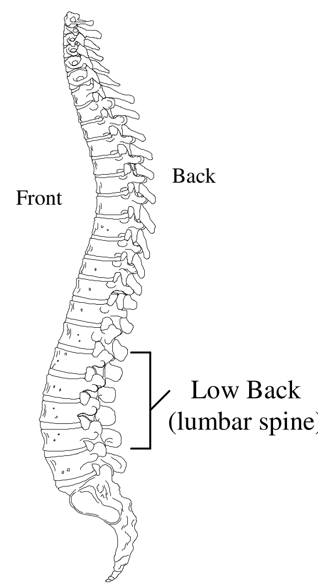
Direct Risk Factors:
Force
Repetition
Awkward Postures

A Fingerjoint Feeder may bend forward and to the side in order to pull blocks from the transfer deck and to unjam blocks.

BACKGROUND INFORMATION

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

Neutral Spine



DIRECT RISK FACTORS

Force

- Pulling on lumber requires back muscles to stabilise the spine. The greater the pull, the greater the tension developed in the muscles.
- If the force placed on the back muscles exceeds the tissue tolerances, injury may occur.

Repetition

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

Awkward Postures

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- The width of the conveyor and height of the operator affect the amount of forward lean required.

Working Heights

- The heights of the conveyor or transfer deck and the operator affect the amount of forward lean required.

Additional Workstation Design Options

- Loading on the low back muscles is increased because the orientation of the worker, with respect to the infeed, requires the operator to lean sideways in order to advance lumber.

CONSEQUENCES

- Repeatedly bending forward or to the side may lead to damage in the disc walls.
- Signs and symptoms may include muscle spasm and sharp or radiating pain in the back and/or lower extremities.

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Back, please see the column labelled "Back" in the Summary of Solutions on pages 99 to 101.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

LOW BACK

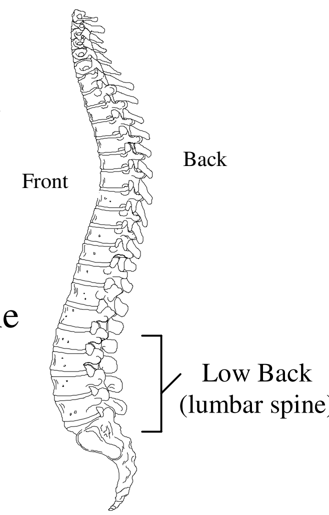
Direct Risk Factors:
Repetition
Awkward Postures
Static Postures

A Fingerjoint Feeder may hold a forward bent and twisted posture in order to position blocks in lugs for the Fingerjointer.

BACKGROUND INFORMATION

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

Neutral Spine



DIRECT RISK FACTORS

Repetition

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

Awkward Postures

- Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases pressure on the walls of discs.
- When the back is twisted to one side, low back and abdominal muscles on that side become tense and can cause unnatural loading in the structures of the spine.

Static Postures

- Holding the upper body forward or to the side increases loading on the tissues that support the load. If duration is excessive, and recovery is not adequate (e.g., spine not returned to neutral posture), tissues may deform to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- The width of the conveyor and height of the operator affect the amount of forward lean required.

Working Heights

- The heights of the conveyor or transfer deck and the operator affect the amount of forward lean required.

CONSEQUENCES

- Repeatedly bending forward or to the side may lead to damage in the disc walls.
- Signs and symptoms may include muscle spasm and sharp or radiating pain in the back and/or lower extremities.

SUGGESTED SOLUTIONS

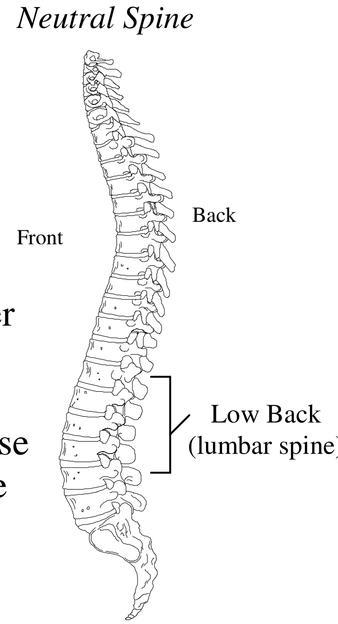
- For specific solutions that may prevent injuries to the Back, please see the column labelled "Back" in the Summary of Solutions on pages 99 to 101.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

LOW BACK

Direct Risk Factors:
Vibration

A Fingerjoint Feeder continually stands on a vibrating surface.

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. Sitting will cause the pelvis to rotate out of a neutral posture, as the lumbar spine will flatten.

DIRECT RISK FACTORS

Vibration

- Whole body vibration is usually transmitted through the floor into the low back. Exposure to whole body vibration introduces a unique mechanical stress to the structures of the spine that can significantly increase the loading on the low back. Prolonged standing while on a vibrating surface may contribute to the gradual weakening of the lumbar discs.

INDIRECT RISK FACTORS

Workstation Design

Floor Surfaces

- Hard floor surfaces contribute to low back discomfort.

Environmental Conditions

Vibration

- Exposure to whole body vibration introduces a unique mechanical stress to the structures of the spine that can significantly increase the loading on the low back. Prolonged standing on a vibrating surface may contribute to the gradual weakening of the lumbar discs.

Work Organisation

Task Variability

- Loading to the low back is increased if the Fingerjoint Feeder does not have the opportunity to rotate to positions that do not require standing on a vibrating surface.

CONSEQUENCES

- Continually standing on a vibrating surface may lead to deformation in the disc walls and accelerated degeneration of the tissues.
- Signs and symptoms 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 99 to 101.
- For exercises that can help to prevent ***back*** injuries, see the ***Back section of the Body Manual.***

HIP

Direct Risk Factors:
Force
Static Postures

A Fingerjoint Feeder must balance most of their weight on one leg while standing to operate a foot pedal control.

BACKGROUND INFORMATION

- The hip is designed for stability, as a result of the architecture of the bones. Muscles also contribute to the stability of the hip joint. Range of motion in the hip joint is primarily determined by the flexibility of muscles and soft tissues in this region.

DIRECT RISK FACTORS

Force

- Balancing on one leg requires the muscles surrounding the hip bearing weight to contract and stabilise the weight of the whole body. This imbalance leads to an increased force being placed on the load-bearing hip.

Static Postures

- Balancing on one leg for prolonged periods requires the muscles surrounding the hip bearing the load to remain tense. With no time allowed for recovery, the constant state of tension in the hip muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, tissues may fatigue to the point of injury.

Indirect Risk Factors

Workstation Design

Working Heights

- The height of the foot pedals can increase the amount of weight that must be supported by the opposite leg.

Consequences

- Repeated balancing on one side of the body can lead to muscle imbalance at the hip. This muscle imbalance may lead to excessive loading, which may cause degenerative changes in the hip, and possibly the knee and low back.
- Signs and symptoms include pain in the area around the hip joint and stiffness to one side. Muscle weakness in the affected side may also be noticed.

Suggested Solutions

- For specific solutions that may prevent injuries to the Hip, please see the column labelled "Hip" in the Summary of Solutions on pages 99 to 101.

ANKLE

Direct Risk Factors:
Repetition
Awkward Postures

A Fingerjoint Feeder frequently activates foot pedals in order to operate the infeed conveyor.

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

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, small tears in the muscle on the front of the shin may progress to a more significant problem.

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, loading is also increased.

INDIRECT RISK FACTORS

Workstation Design

Working Heights

- Foot pedals of greater height require larger ankle movements, increasing the 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 99 to 101.

FOOT

Direct Risk Factors:
Static Postures
Vibration

A Fingerjoint Feeder may stand on a hard, vibrating surface while sorting and straightening blocks.

BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Static Postures

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

Vibration (whole body)

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

INDIRECT RISK FACTORS

Workstation Design

Seating

- The absence of appropriate seating at a workstation can force a Fingerjoint Feeder to use a standing work posture all shift, increasing the loads on the feet.

Floor Surfaces

- Floors that are too hard can increase the vibration transmission to the feet. Uneven flooring can also cause discomfort in the feet with static standing.

Environmental Conditions

Vibration

- Vibration occurs because the workstation is in direct contact with machines, transfer chains, and conveyors around the workstation. In combination with standing posture, this transmitted vibration puts the operator at a greater risk for injury.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Foot, please see the column labelled "Foot" in the Summary of Solutions on pages 99 to 101.
- For exercises that can help to prevent ***foot*** injuries, see the ***Foot section of the Body Manual.***

Summary of Body Parts at Risk

NECK

- A Fingerjoint Feeder must hold the head forward in order to sort and straighten blocks.

NECK/SHOULDER

- A Fingerjoint Feeder may work with the arms away from the body in order to discard waste blocks.

- A Fingerjoint Feeder frequently works with the arms away from the body in order to pull blocks from the conveyor and to guide blocks into lugs entering the Fingerjointer.

SHOULDER

- A Fingerjoint Feeder may reach forward and to the side in order to pull lumber to the workstation.

ELBOW/WRIST

- A Fingerjoint Feeder may grip pieces with the wrist bent in order to sort and straighten blocks.

WRIST

- A Fingerjoint Feeder may grip pieces with the wrist bent in order to sort and straighten blocks.

LOW BACK

- A Fingerjoint Feeder may bend forward and to the side in order to pull blocks from the transfer deck and to unjam blocks.

- A Fingerjoint Feeder may hold a forward bent and twisted posture in order to position blocks in lugs for the Fingerjointer.

LOW BACK

- A Fingerjoint Feeder continually stands on a vibrating surface.

HIP

- A Fingerjoint Feeder must balance most of their weight on one leg while standing to operate a foot pedal control.

ANKLE

- A Fingerjoint Feeder frequently activates foot pedals in order to operate the infeed conveyor.

FOOT

- A Fingerjoint Feeder may stand on a hard, vibrating surface while sorting and straightening blocks.

Risk Factors by Body Part

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

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

** Extended exposure to <u>any</u> risk factor can increase the likelihood of injury. For solutions designed to decrease the duration of exposure to any risk factor please refer to the Work Organisation section of the General Risk Factor Solutions Manual*
*** Vibration is categorised under both direct and indirect risk factors. Vibration can directly increase the likelihood of injury to the back and wrist as well as indirectly (environmental conditions) promote injuries in other parts of the body.*

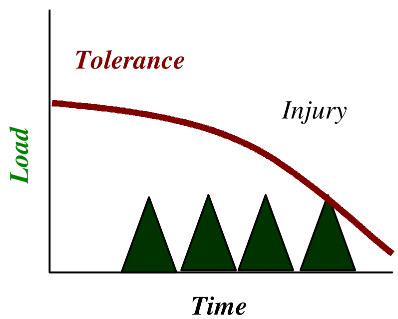
[ ] = Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.

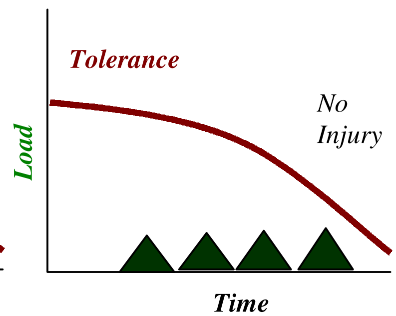
[♦] = Indicates that the risk factor assessed is commonly found in sawmills, and may need to be addressed at your mill. See the appropriate section of the General Risk Factor Solutions Manual for more information.

[✓] = Indicates that the risk factor was assessed as a contributor to the body part problem. Please see the Summary of Solutions Table on pages 99 to 101 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

Injury Prevention

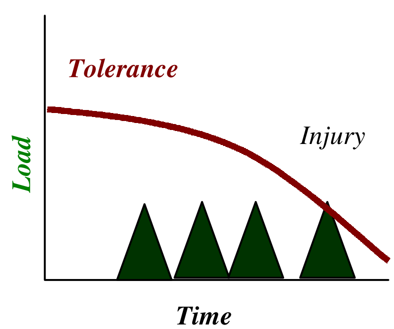
Injuries are prevented by …
Decreasing loads and increasing tissue tolerances

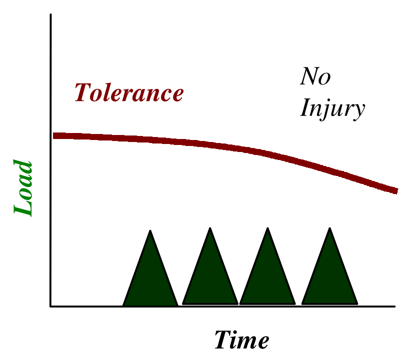




Injuries may be avoided by decreasing the size of the loads on the tissue.

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

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

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

Risk Control Key

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

E	**ENGINEERING CONTROLS**

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

A	**ADMINISTRATIVE CONTROLS**

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

WP	**WORK PRACTICE CONTROLS**

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

PPE	**PERSONAL PROTECTIVE EQUIPMENT**

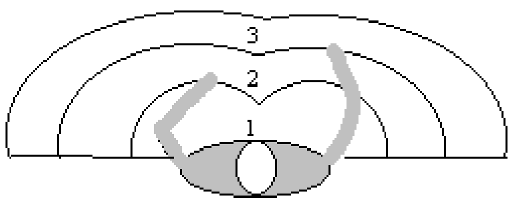
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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

Workstation Design

WORKING REACHES

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



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

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

Angled rollers

E

In order to reduce forward reaching and decrease awkward postures of the shoulders and low back, angle rollers downward so that blocks come closer to the worker.

Gravity-assisted rollers/conveyors

E

In order to reduce force, awkward postures, and repetition of the shoulders while rejecting waste pieces, gravity-assisted rollers or conveyors should be used to transfer the lumber to the waste bins.

Reduce reaching

E
WP

In order to reduce lateral reaching and decrease awkward postures of the shoulders and low back, the worker should be positioned perpendicular to the incoming lumber. This solution is intended only for workstations that have the incoming lumber flowing perpendicular to the outgoing lumber.

Reduce jam-ups

E — In order to reduce jam-ups and awkward reaching postures of the shoulders and low back, a shaker table could be used.

E — In order to reduce jam-ups, and awkward reaching postures of the shoulder and low back, infeed speed could be set to match the operator’s speed.

Use smooth motions

WP — In order to reduce the amount of force on the shoulder when discarding lumber, avoid any sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body.

Wait for lumber

WP — In order to reduce reaching distances and awkward postures of the shoulder and low back when transferring blocks to the workstation, wait for the block to come off the infeed conveyor instead of reaching to grasp it.

WORKING HEIGHTS

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

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

To determine the appropriate work height specific for the Fingerjoint Feeder, identify the body part of most concern. If the main concern is the:

Neck - minimise forward bending of the neck by increasing working height.
Shoulders - minimise elevation of the arms by lowering working height.
Wrists – minimise wrist extension (backward bending) by increasing 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.

Maximum height of loads

WP

In order to decrease awkward shoulder postures and reduce required force, the height of incoming loads should not exceed shoulder level.

Scissors lift

E

In order to decrease awkward trunk postures and reduce required force, the height of incoming loads should be maintained above knuckle height. This setup can be accomplished by using a device such as a scissors lift placed beneath the loading platform.

Maintenance of rollers

A
WP

To minimise force on the shoulder, wrist, and low back when pulling lumber off rollers, rollers should be well maintained and free of debris that may restrict movement.

Braced postures

WP

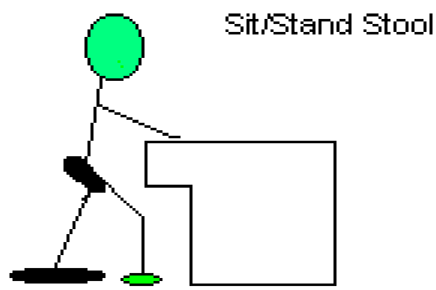
To reduce the load on the low back, a Fingerjoint Feeder should use the safety rail or guard to brace the lower body. When reaching forward, bracing the lower body against the safety rail or guard reduces the amount of muscle activity in the low back. The safety rail or guard should be padded to avoid excessive contact stress. The Fingerjoint Feeder should try to use a free arm to support the upper body when possible.

SEATING

Sit/stand stool

E
WP

In order to minimise awkward postures of the neck and low back, and fatigue in the low back and lower extremities due to continual standing, 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.



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 minimise blood pooling in the feet and legs, and associated discomfort. In addition, anti-fatigue matting may also aid in damping vibration levels.

Anti-fatigue matting is a practical solution when a worker spends a majority of their time in one area, and the matting does not hinder the safety of the worker or the performance of the task.

Anti-fatigue insoles

WP PPE

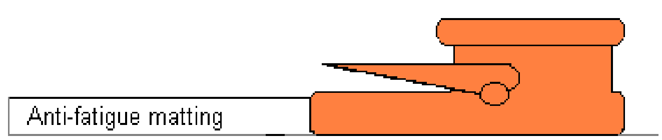
If a worker must stand in several different areas for long periods of time, it may be more practical to use anti-fatigue insoles in work boots to provide cushioning. The cushioned surface of the insole can absorb repeated impact from walking on metal catwalks, and may aid in damping vibration while standing in one spot.

FOOT PEDALS

Recessed foot pedals

E

In order to minimise awkward postures of the ankle and to decrease the amount of weight supported by the opposite leg, 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.



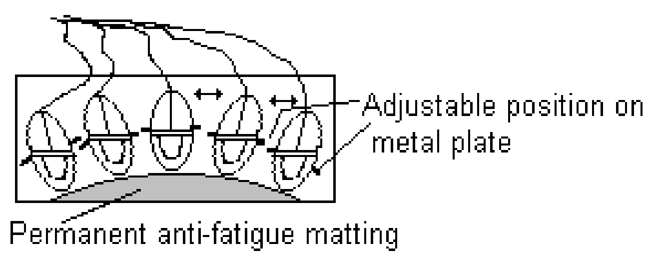
Moveable foot pedals

E WP

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.



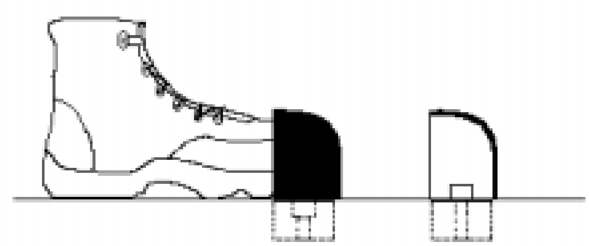
2) Providing several positions on the floor where clips or nails may be used to secure foot pedals. If this option is considered, make sure each possible position is highly visible to all operators, to prevent tripping or injuries.

3) Providing a physical link (e.g., a metal bar) between two foot pedals with the same function. This solution will allow the Fingerjoint Feeder to alternate feet throughout the day, thereby equally distributing the load which is placed on the supporting leg (thus reducing duration of force at the hip joint).

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.



Alternate toe-heel activation

WP

In order to decrease repetitive and awkward postures, alternate using the toe of the foot and the heel of the foot to activate the foot pedals. This will use more muscles of the leg, increasing circulation in this area.

Appropriate footwear

PPE

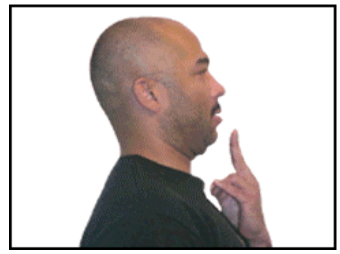
In order to ensure healthy foot alignment, purchase appropriate footwear. See the guidelines for footwear in the Body Manual for the Foot.

Additional Work Practices

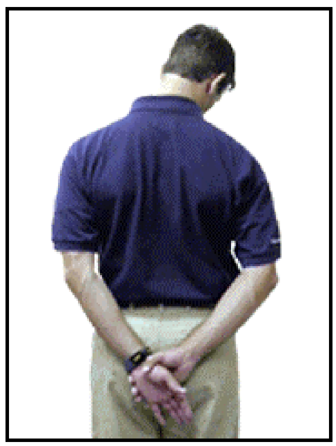
Stretches

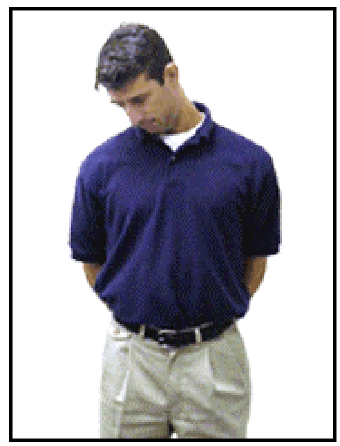
WP In order to minimise awkward and static posture of the neck, shoulder, wrist and low back, stretch these body parts throughout the day to enhance tissue tolerance for those muscle groups. See additional stretches in the Body Manual.

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

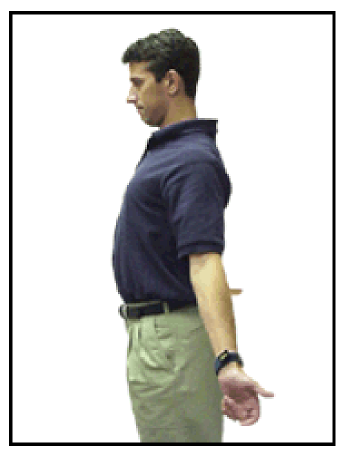


Neck Stretch
Turn the head slightly to one side and reach for the ground with the ground behind you with the opposite arm. Hold for 10 seconds. Repeat 3 times on each side.

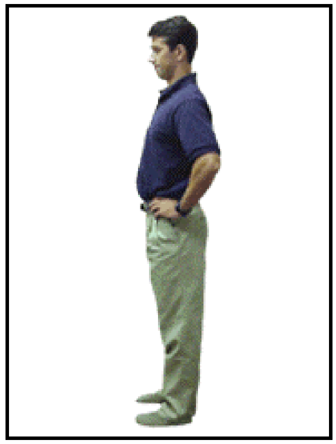


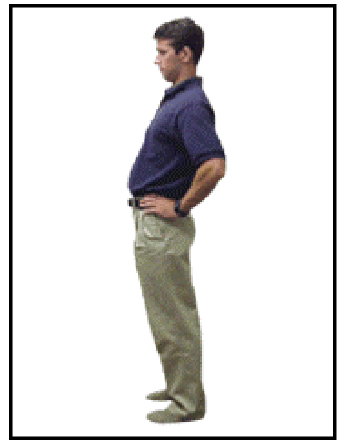


Upper Back & Chest Stretch
Place the hands together in front of the body and push them outwards. Bring the arms behind the body and squeeze the shoulder blades together while pressing the shoulders down and keeping the chin tucked in. Repeat 5 times.

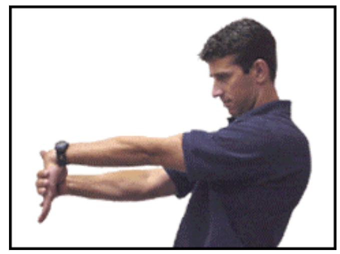


Back Extension
Start by standing in an upright position (the back is in neutral posture). Lean backwards slightly, pushing the hips gently forward. Hold for 5 seconds. Repeat 3 times.





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



Characteristics of Objects Being Handled

LOAD CONDITION AND WEIGHT DISTRIBUTION

Alternating hands

WP

Alternating hands to turn the lumber will decrease the load taken on by one hand individually. The one-handed technique should only be used when handling smaller lumber. By using both hands evenly to turn lumber, the risk of injury to the shoulder, elbow, and wrist is reduced.

Avoid rapid forearm rotation

WP

Avoid rapid forearm rotation when handling lumber to reduce force at the elbow and wrist.

Avoid over-gripping

WP

To reduce force at the wrist and elbow, avoid over-gripping lumber. Use only as much force as necessary.

Lightweight, sharp tools

A
WP

In order to decrease the force required to unjam lumber, ensure that the tools used to manipulate the wood (e.g., pike poles, picaroons) are lightweight and sharp.

Neutral wrist position

WP

To reduce awkward wrist postures, keep the wrists in a neutral position when handling lumber.

Pike pole use

WP

In order to reduce loading on the shoulder and back when handling lumber on the end of pike poles, pick the appropriate pike pole for the job. The pike pole should be longer than the distance from the operator to the object to be retrieved. This extra distance will prevent the pike pole from striking the operator if the pike pole detaches from the object, and will also give the operator some extra grip length if the pike pole pulls away from the operator. Two hands should be used when handling the pike pole. Once the sharp end of the pike pole is stuck in the lumber, only pull on it twice before removing it from the wood. Repeat this process until the lumber is uncrossed or the jam is cleared. Also, keep the body in a strong posture by keeping arms close to the body, with elbows bent and wrists straight.

Power positions

WP

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

Manual material handling

WP

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

- Use the entire body, especially the large muscle groups of the lower body, to perform a movement.
- To reduce loading on the soft tissues of the back, lift heavy objects with a neutral back posture while maintaining the 3-point curve (the natural "S" shaped curve of the back – see the Injury Education section for more information). Do not use pelvic tilt to position the trunk for lifting.
- Do not twist while holding or moving a load. This places the back in a weaker posture that can lead to injury. If some twisting is unavoidable, try to alternate sides throughout the day to balance the stress evenly over both sides of the body.
- When possible, balance loads being carried on each side of the body. This minimises loading on the soft tissues of the back and hips.
- When lifting, carrying, or holding objects, keep them as close to the body as possible. The farther the load is away from the body, the more stress it puts on the back and shoulders.
- When pulling or pushing objects, do not use rapid or jerky movements. These types of movements will increase the amount of force acting on the shoulder and low back.

CONTAINER, TOOL AND EQUIPMENT HANDLES

Modify tool handle friction

E

In order to reduce the force required to grip hand tools, increase the friction between the tool handles and the operator's glove. Due to the smooth, slippery surface of metal or wooden tool handles (e.g., pike pole, picaroon) a Fingerjoint Feeder must use a higher grip force in order to maintain control of the tool. This can put the elbow, and possibly the wrist and hand, at risk of injury. Wrapping 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 Fingerjoint Feeder's glove, and thus decrease the grip forces required.

Sticky palm gloves

PPE

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

Environmental Conditions

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

Work Organisation

Job rotation

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

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

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	**Page**	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Angled rollers	**86**			**A**				**A**				
Gravity-assisted rollers/conveyors	**86**		**F** **A** **R**									
Reduce reaching	**86**			**A**				**A**				
Reduce jam-ups	**87**			**A**				**A**				
Use smooth motions	**87**			**F**								
Wait for lumber	**87**			**A**				**A**				
Maximum height of loads	**88**			**F** **A**								
Scissors lift	**88**							**F** **A**				
Maintenance of rollers	**88**			**F**		**F**		**F**				
Braced postures	**89**							**F**				
Sit/stand stool	**89**	**A**						**A** **S**				**S**
Anti-fatigue matting	**90**							**V**				**S** **V**
Anti-fatigue insoles	**90**							**V**				**S** **V**

Direct Risk Factors

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

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

Summary of Solutions

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

		Injury Prevention Potential										
SOLUTIONS	**Page**	Neck	Neck/ Shoulder	Shoulder	Elbow/ Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Recessed foot pedals	**90**										**A**	
Moveable foot pedals	**91**								**F**		**A**	
Foot push buttons	**92**										**A**	
Alternate toe-heel activation	**92**										**A** **R**	
Appropriate footwear	**92**										**A**	**V**
Stretches	**93**	directly reduces risk of injury to the body										
Alternating hands	**95**			**R**	**R**	**R**						
Avoid rapid forearm rotation	**95**				**F**	**F**						
Avoid over-gripping	**95**				**F**	**F**						
Lightweight, sharp tools	**95**			**F**				**F**				
Neutral wrist position	**95**					**A**						

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Summary of Solutions

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		Injury Prevention Potential										
SOLUTIONS	**Page**	Neck	Neck/ Shoulder	Shoulder	Elbow/Wrist	Wrist	Wrist/ Hand	Low Back	Hip	Knee	Ankle	Foot
Pike pole use	**95**			**F**				**F**				
Power positions	**96**							**F** **A**				
Manual material handling	**96**							**F** **A**				
Modify tool handle friction	**97**				**F**	**F**						
Sticky palm gloves	**97**				**F**	**F**						
Job rotation	**98 ◆**	indirectly reduces risk of injury to the body										
Heat Exposure	◆	indirectly reduces risk of injury to the body										
Cold Exposure	◆	indirectly reduces risk of injury to the body										
Lighting	◆	indirectly reduces risk of injury to the body										
Noise	◆	indirectly reduces risk of injury to the body										
Vibration	◆	directly reduces risk of injury to the back and wrist										
Rest breaks	◆	indirectly reduces risk of injury to the body										
Task Rotation	◆	indirectly reduces risk of injury to the body										
Work Pace	◆	indirectly reduces risk of injury to the body										
Scheduling	◆	indirectly reduces risk of injury to the body										

Direct Risk Factors

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

FINGERJOINT FEEDER MSI SAFETY GUIDE

OBJECTIVE:

To identify ergonomic risks involved in the Fingerjoint Feeder job and reduce the potential for musculoskeletal injuries.
More detailed information about risk reducing recommendations can be found in the Work Manual for the Fingerjoint Feeder.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck A Fingerjoint Feeder must hold the head forward in order to sort and straighten blocks.	**Awkward Postures** **Static Postures**	• Neck muscles must support the weight of the head while in a forward position. The more the neck is bent, the greater the load on the muscles and tendons. • When the neck is held still in a forward position, the muscles of the neck must remain tense to support the weight of the head. With no time allowed for recovery, the constant state of tension in the neck muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, the tissues may fatigue to the point of injury.	• Try to keep the head in an upright position while viewing the lumber. • Use the eyes and the neck (not just the neck) to view the lumber. • When the neck is flexed, try to keep the chin tucked in. • Use a sit/stand stool to bring the head closer to the height of the work. • To reduce the loading on neck muscles, avoid wearing ear muffs. Use ear plugs, or custom fitted ear pieces if more protection is needed, to reduce loading on the neck. • For exercises that can help prevent ***Neck*** injuries, ***see the Neck section of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck/Shoulder A Fingerjoint Feeder frequently works with the arms away from the body in order to pull blocks from the conveyor and to guide blocks into lugs entering the Fingerjointer.	**Repetition** **Awkward Postures** **Static Postures**	• 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. • Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on the muscles and tendons. • When the arms are repeatedly held away from the body, the muscles of the neck and shoulder must remain tense to support the weight. If the duration of constant tension is excessive, and recovery is not adequate, the tissues may fatigue to the point of injury.	• Avoid sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body. • For exercises that can help prevent ***Neck/Shoulder*** injuries, ***see the Neck and Shoulder sections of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Neck/Shoulder A Fingerjoint Feeder may work with the arms away from the body in order to discard waste blocks.	**Force**	• The rotator cuff stabilises the shoulder joint when objects are pushed or thrown. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. • The speed of movement also affects the amount of force required. The faster the object is pushed or thrown, the greater the amount of force required. • If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur.	• Avoid sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body. • For exercises that can help prevent ***Neck/Shoulder*** injuries, ***see the Neck and Shoulder sections of the Body Manual***.
		Repetition	• When the arms are repeatedly lifted, muscles of the neck and shoulder are subjected to repeated stress with little or no time for recovery. If repetitive stress is excessive, and recovery is not adequate, tissues may fatigue to the point of injury.	
		Awkward Postures	• Neck and shoulder muscles must support the weight of the arms when they are away from the body. The farther away the arms are from the body, the greater the load on muscles and tendons.	

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Shoulder A Fingerjoint Feeder may reach forward and to the side in order to pull lumber to the workstation.	**Force** **Repetition** **Awkward Postures**	• The rotator cuff stabilises the shoulder joint when objects are pulled. The heavier the object, or the larger the force required, the greater the load on the rotator cuff. • If the force placed on the rotator cuff exceeds the tissue tolerances, injury may occur. • The rotator cuff stabilises the shoulder joint when the arms are away from the body. The farther away the arms are from the body, the greater the load on the rotator cuff. • When the arms are repeatedly raised, the rotator cuff is subjected to repeated stress with little time for recovery. If the repetitive stress is excessive, and recovery is not adequate, tissues may fatigue to the point of injury.	• When possible, wait for the board to come off the infeed conveyor instead of reaching to grasp it. • Try to keep the arms as close to the body as possible when handling lumber. • Avoid sudden forceful movements of the arms. Use smooth motions while keeping the arms close to the body. • For exercises that can help prevent ***Shoulder*** injuries, ***see the Shoulder section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Elbow/Wrist A Fingerjoint Feeder must grip lumber in order to transfer it to the fingerjointer.	**Force** **Repetition** **Awkward Postures**	• Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection. • Repeated stress to the elbow without adequate rest could slowly fatigue tissues to the point of injury. • 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.	• For exercises that can help prevent ***Elbow/Wrist*** injuries, ***see the Elbow and Wrist section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Wrist A Fingerjoint Feeder may grip pieces with the wrist bent in order to sort and straighten blocks.	**Force** **Repetition** **Awkward Postures**	• 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. • Repeated gripping and/or repeated bending of the wrist causes stress to the tendon sheaths. If the repetitive stress is excessive, and recovery is not adequate, tendon sheaths may fatigue to the point of injury. • As the wrist is bent, the tendon sheaths rub up against the walls of the carpal tunnel. The further the wrist is bent, the more friction experienced in the tendon sheaths.	• Avoid over-gripping the lumber; use only as much force as is necessary. • To reduce grip force requirements, wear thinner gloves with less stiffness and a high friction surface (e.g. rubber). • Grip with both hands to reduce grip force requirements. • Keep wrists in a natural (straight) wrist position. • Avoid forearm rotation with a forceful grip. • Alternate gripping between hands. • For exercises that can help prevent ***Wrist*** injuries, ***see the Wrist section of the Body Manual.***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Fingerjoint Feeder may bend forward and to the side in order to pull blocks from the transfer deck and to unjam blocks.	**Force**	• Pulling on lumber requires back muscles to stabilise the spine. The greater the pull, the greater the tension developed in the muscles. • If the force placed on the back muscles exceeds the tissue tolerances, injury may occur.	• When possible, wait for the board to come off the infeed conveyor instead of reaching to grasp it. • When stooping down, bend with the hips and knees, not with the back.
		Repetition	• Repeated forward or side bending or twisting can gradually fatigue the structures of the low back. If the repetitive stress is excessive, and recovery is not adequate, disc walls may fatigue to the point of injury.	• If possible, pull lumber off conveyor or stack on both sides (left and right) of your body during the day to balance the stress on your back. • Try to keep the back in a neutral position (ears, shoulders, and hips aligned).
		Awkward Postures	• Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases loading on the spine and increases pressure on the walls of discs.	• When lifting, hold object close to the body and do not twist the torso. • For exercises that can help prevent ***Back*** injuries, ***see the Back section of the Body Manual***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Fingerjoint Feeder may hold a forward bent and twisted posture in order to position blocks in lugs for the Fingerjointer.	**Repetition**	• Repeated forward or side bending or twisting can gradually fatigue the structures of the low back. If repetitive stress is excessive, and recovery is not adequate, disc walls may fatigue to the point of injury.	• Try to position blocks with the back in a neutral position (shoulders aligned with hips). • If twisting is unavoidable, try to alternate sides throughout the day, if possible, to balance the stress evenly over both sides of the body. • For exercises that can help prevent ***Back*** injuries*,* ***see the Back section of the Body Manual****.*
		Awkward Postures	• Back muscles must support the weight of the upper body when leaning forward or to the side. Increased bending of the back increases the loading on the spine and increases pressure on the walls of discs. • When the back is twisted to one side, low back and abdominal muscles on that side become tense and can cause unnatural loading in the structures of the spine.	
		Static Posture	• Holding the upper body forward or to the side increases loading on the tissues that support the load. If duration is excessive, and recovery is not adequate (e.g., spine not returned to neutral posture), tissues may deform to the point of injury.	

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Low Back A Fingerjoint Feeder continually stands on a vibrating surface.	**Vibration**	• Whole body vibration is usually transmitted through the floor into the low back. Exposure to whole body vibration introduces a unique mechanical stress to the structures of the spine that can significantly increase the loading on the low back. Prolonged standing while on a vibrating surface may contribute to the gradual weakening of the lumbar discs.	• Anti-fatigue insoles can help to dampen the vibration and thereby reduce the stress on the low back. • For exercises that can help prevent ***Back*** injuries, ***see the Back section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Hip A Fingerjoint Feeder must balance most of their weight on one leg while standing to operate a foot pedal control.	**Force** **Static Postures**	• Balancing on one leg requires the muscles surrounding the hip bearing weight to contract and stabilise the weight of the whole body. This imbalance leads to an increased force being placed on the load-bearing hip. • Balancing on one leg for prolonged periods requires the muscles surrounding the hip bearing the load to remain tense. With no time allowed for recovery, the constant state of tension in the hip muscles may cause fatigue. If the constant stress is sufficient, and recovery is not adequate, tissues may fatigue to the point of injury.	• Alternate the leg that bears the majority of the body weight on a regular basis. • Stretch to alleviate the strain in the hips – perform the hip extensor stretch in the ***Back section of the Body Manual***

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Ankle A Fingerjoint Feeder frequently activates foot pedals in order to operate the infeed conveyor.	**Repetition** **Awkward Posture**	• 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, small tears in the muscle on the front of the shin may progress to a more significant problem. • 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, loading is also increased.	• Stretch the ankles before and during work to make sure the muscles and ligaments are loose. • If possible, alternate using the right and left foot throughout the day to balance the stress on the muscles of the lower leg and foot. • Alternate using the toe of the foot and the heel of the foot to activate the foot pedals. This will use more muscles of the leg, thereby increasing circulation and minimising fatigue in this area. • For exercises that can help prevent ***Ankle/Foot*** injuries, ***see the Foot section of the Body Manual***.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POT ENTIAL HAZARDS	SUGGESTED SOLUTIONS
	Foot A Fingerjoint Feeder may stand on a hard, vibrating surface while sorting and straightening blocks.	**Static Postures** **Vibration**	• While standing, the weight of the body loads the plantar fascia. If the duration of standing is excessive, and recovery is not adequate, the fascia may deform to the point of injury. • Vibrating floors can increase loading on the foot. Factors like vibration level and vibration frequency increase the amount of loading on the foot, and could lead to irritation. The longer the Fingerjoint Feeder is exposed to vibration, the greater the risk of injury.	• In order to minimise fatigue in the lower extremities, anti-fatigue insoles should be used. • For exercises that can help prevent ***Foot*** injuries, ***see the Foot section of the Body Manual***.