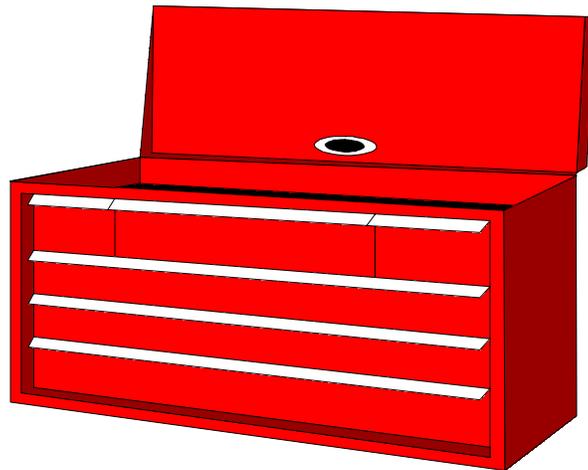


INDUSTRIAL MUSCULOSKELETAL INJURY REDUCTION PROGRAM

Common Industry Jobs (CIJs) Truck Driver 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

TRUCK DRIVER TOOL KIT

Table of Contents

OVERVIEW	6
Job Summary	6
Physical Demands	6
Mental Demands	6
Major Variations	7
Minor Variations	7
PHYSICAL DEMANDS ANALYSIS	8
PDA General Instructions	8
PDA Table of Contents	9
Task List	10
Job Profile	14
Work Organisation	15
➤ Task Description	15
Workstation Characteristics	17
➤ Dimensions & Layout	17
➤ Flooring, Displays and Seating	18
Equipment & Machinery Controls	19
Physical Demands	20
➤ Whole Body Physical Demands	20
➤ Body Postures	21
Manual Material Handling	24

➤ Hand Tools	25
Environmental Conditions	26
➤ Work Environment	26
➤ Location of Workstation	26
➤ Temperature	27
Personal Protective Equipment	27
Appendix A – Regional Map	28
RISK FACTOR IDENTIFICATION CHECKLIST	29
Job History	31
<i>Neck</i>	32
<i>Shoulder</i>	33
<i>Elbow</i>	35
<i>Wrist/Hand</i>	37
<i>Low Back or Hip/Thigh</i>	40
<i>Knee</i>	42
<i>Ankle/Foot</i>	43
Characteristics of Objects Being Handled	44
Environmental Conditions	44
Work Organisation	45
WORK MANUAL	46
Work Manual Table of Contents	48
Injury Education	49

➤	Body Parts at Risk	50
➤	Major Risk Identification	51
	<i>Neck/Shoulder</i>	52
	<i>Shoulder</i>	55
	<i>Elbow/Wrist</i>	57
	<i>Low Back</i>	60
➤	Summary of Body Parts at Risk	62
➤	Risk Factors by Body Part	64
	Injury Prevention	65
➤	Suggested Solutions	66
➤	Risk Control Key	67
➤	Workstation Design	68
	<i>Working Reaches</i>	68
	<i>Working Heights</i>	71
	<i>Seating</i>	73
	<i>Additional Workstation Design Options</i>	77
	<i>Additional Work Practices</i>	79
➤	Characteristics of Objects Being Handled	81
	<i>Size and Shape</i>	81
	<i>Container, Tool and Equipment Handles</i>	81
➤	Environmental Conditions	83
➤	Work Organisation	84
➤	Summary of Solutions	85

MSI SAFETY GUIDE

88

Neck/Shoulder

88

Shoulder

89

Elbow/Wrist

90

Low Back

91

*Truck Driver
Tool Kit*

Overview

Truck Driver

Job Summary

A Truck Driver is responsible for operating a truck to transport various loads to and from the sawmill, and to maintain the log yard and roads. A Truck Driver will perform a pre-trip inspection, load/unload a truck, drive a truck to transport loads to and/or from the mill, drive a truck to maintain roads and log yard, and perform truck maintenance duties. Refer to the Physical Demands Analysis for more detail.

Physical Demands

The physical demands of the Truck Driver may include:

- a) Forceful exertions of the shoulder
- b) Repetitive movements of the neck, shoulder, and elbow
- c) Awkward postures of the neck and elbow
- d) Static postures of the neck/shoulder and low back
- e) Prolonged sitting
- f) Climbing in and out of truck cab, and on to trailer or box

Mental Demands

A Truck Driver requires sustained alertness to drive and manoeuvre the truck while loading, transporting, and unloading loads. Some Truck Drivers report mental fatigue after a shift of driving in poor weather conditions.

Major Variations

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

- 1) Different types of trucks may be used, depending on the loads being transported. For example:
 - a) A dump truck is used to transport yard waste to a landfill site.
 - b) A logging truck is used to transport loads of logs from the log yard to the mill in-feed area.
 - c) A transport truck with a flatbed trailer is used to transport loads of lumber from the mill.
- 2) The physical demands involved in unloading/loading trucks varies significantly from mill to mill depending on the sub-tasks involved. The following different sub-tasks were observed:
 - a) Operating a Front End Loader to load a dump truck with yard waste.
 - a) Strapping loads of lumber to a flatbed trailer.
 - b) Unhooking the trailer cable while a Wagner loads logs onto trailer.
 - c) Cutting cables from loads of logs with manual cutters.

Minor Variations

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

- 1) Driving distances vary between jobs, and between mills. Some mills may be centrally located for most driving tasks, while other mills may require longer drives for log and lumber deliveries, or for other driving tasks.

Physical Demands Analysis Truck Driver

PDA General Instructions: Truck Driver

The purpose of this PDA is to familiarise healthcare professionals with the physical demands of a Truck Driver. 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 Truck Driver(s) in the BC Sawmill Industry. However, the PDA requires completion by the healthcare professional, with input from the injured worker to highlight tasks that aggravate the injury or prevent the worker from returning to their job. The worker's supervisor may be contacted for further information or verification of tasks.

A PDA should be filled out for each individual worker following an injury. Subsequent changes in the work process may reduce the accuracy of any pre-existing physical demands assessments. The IMIRP Society accepts no responsibility for the use or misuse of this Physical Demands Analysis, or for the accuracy of the PDA as it applies to any specific workplace.

Disclaimer

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

PDA Table of Contents

Task List.....	10
Job Profile	14
Work Organisation.....	15
Task Description	15
Workstation Characteristics	17
Dimensions & Layout	17
Equipment & Machinery Controls.....	19
Physical Demands	20
Whole Body Physical Demands.....	20
Body Postures.....	21
Manual Material Handling.....	24
Hand Tools	25
Environmental Conditions	26
Work Environment.....	26
Location of Workstation	26
Temperature	27
Personal Protective Equipment	27
Appendix A – Regional Map	28

Physical Demands Analysis Truck Driver

Task List

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

Pre-trip inspection

A Truck Driver inspects the truck at the beginning of the shift to ensure that it is safe to drive. This task may include walking around the truck to check for fluid leakage, checking under the hood, and scanning the dash board for active warning lights when the engine is running.

Does this task occur at your mill?

Yes

No



Load and/or unload truck

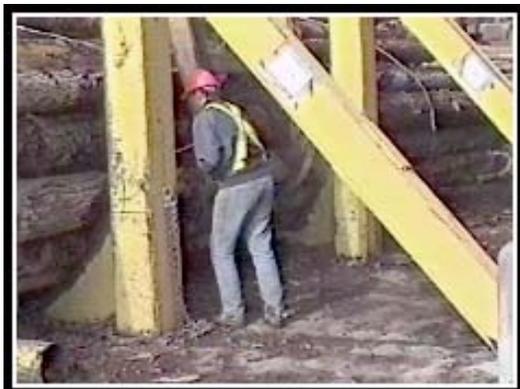
A Truck Driver may load and/or unload the truck or trailer. This task involves different physical demands depending on the type of load and/or truck. A Truck Driver may perform this task alone, or with another individual.

Does this task occur at your mill?

Yes No

Sub-tasks include:

- 1) **Strapping loads**
Strapping is done to secure loads, such as lumber, to a trailer.
- 2) **Unhooking trailer cable**
This task was observed for the inner mill logging truck during break-up.
- 3) **Cutting cables off loads of logs**
This task was observed for the inner mill logging truck.
- 4) **Loading dump truck using Front End Loader**
This task was observed during yard clean-up activities.



Drive truck to transport loads to and from the mill

A Truck Driver operates a truck to transport loads to and from the mill. Typical loads include materials for road maintenance and waste materials from the yard.

Does this task occur at your mill?

Yes No

Sub-tasks include:

1) Using steering wheel, controls, and levers



2) Operating foot pedals



3) Viewing in front of and around truck



Operate truck for road and yard maintenance

Road and yard maintenance may include sanding roads, clearing snow with a snow blade, and grading the log yard using an implement attached to the truck. Refer to sub-tasks and pictures for **Drive truck to transport loads to and from the mill.**

Does this task occur at your mill?

Yes No

Truck maintenance duties

These duties may include fuelling, washing, and greasing the truck, changing motor oil, and various Heavy Duty Mechanic tasks.

Does this task occur at your mill?

Yes No

Job Profile

Date: _____

Company Name: _____

Division: _____

Employee Name: _____

Supervisor: _____

Phone: _____

Fax: _____

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

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

Describe:

Length of shift _____ hours

Formal breaks

- Two 10 minute breaks
- One 30 minute lunch break
- Other: _____

Informal breaks

- Yes, length of break varies
- Yes, _____ minutes/shift

Work pace control

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

Job rotation

Describe:

Yes No

Work Organisation

Task Description

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

Task	Percent of Shift				Comments
	Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Pre-trip inspection</i>					<ul style="list-style-type: none"> • <i>Performed once a day before driving the truck</i> • <i>Cycle time approximately 5 minutes</i>
<p><i>Load and/or unload truck (or assist with this task)</i></p> <p><i>Sub-tasks include:</i></p> <ul style="list-style-type: none"> • <i>Strapping loads</i> • <i>Unhooking trailer cable</i> • <i>Cutting cables off loads (loads of logs)</i> • <i>Loading dump truck using Front End Loader</i> 					<ul style="list-style-type: none"> • <i>Number of loads to be loaded/unloaded per shift varies depending on type of load, whether assistance is given to help load/unload other vehicles, and driving distance (e.g., between mill and landfill site). Range observed was 5 to 60 loads (note: this may vary from number of loads transported)</i> • <i>Physical demands of sub-tasks vary greatly</i> • <i>Cycle time approximately 5 to 10 minutes</i>
<p><i>Drive truck to transport loads to and from the mill</i></p> <p><i>Sub-tasks include:</i></p> <ul style="list-style-type: none"> • <i>Using steering wheel, controls, and levers</i> • <i>Operating foot pedals</i> • <i>Viewing in front of and around truck</i> 					<ul style="list-style-type: none"> • <i>Loads include seedlings, logs, lumber, waste, and road/yard maintenance material</i> • <i>Cycle time varies depending on distance between driving destinations</i> • <i>Number of loads transported per shift varies depending on driving distances, observed values were 5 to 30 loads per 8 hour shift</i>

Task	Percent of Shift				Comments
	Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Operate truck for road and yard maintenance</i>					<ul style="list-style-type: none"> • <i>Sub-tasks include sanding roads, clearing snow with snow blade, and grading log yard using implement on truck</i> • <i>Amount of time spent on road and yard maintenance varies greatly between mills</i>
<i>Truck maintenance duties</i>					<ul style="list-style-type: none"> • <i>Duties may include the following sub-tasks: fuelling, washing, and greasing truck, changing motor oil, various Heavy Duty Mechanic tasks</i> • <i>Amount of truck maintenance for which the Truck Driver is responsible varies greatly between sawmills</i>
<i>Other:</i>					

Workstation Characteristics

Dimensions & Layout

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

Flooring, Displays and Seating

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

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

Equipment & Machinery Controls

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

Type of Control	Function	Comments
<i>Steering wheel</i>	<ul style="list-style-type: none"> • <i>Controls movement of vehicle – turns wheels of truck</i> 	<ul style="list-style-type: none"> • <i>Constantly used when driving</i>
<i>Levers</i>	<ul style="list-style-type: none"> • <i>Movement of bucket</i> • <i>Movement of snowplow</i> • <i>Control of tailgate/box</i> • <i>Gear shift</i> • <i>Fluid control</i> • <i>Hand brake for trailer</i> 	<ul style="list-style-type: none"> • <i>Used occasionally, as needed</i>
<i>Foot pedal</i>	<ul style="list-style-type: none"> • <i>Accelerator</i> • <i>Brake</i> • <i>Clutch</i> • <i>Parking brake</i> 	<ul style="list-style-type: none"> • <i>Right foot always on accelerator or brake pedal unless truck has cruise control</i> • <i>Left foot operates clutch for manual transmission</i> • <i>Foot pedal use greatest when driving in the city</i>
<i>Push/Pull button</i>	<ul style="list-style-type: none"> • <i>Emergency brake/parking brake</i> • <i>Trailer air supply</i> 	<ul style="list-style-type: none"> • <i>Used occasionally, as needed</i>
<i>Finger push button</i>	<ul style="list-style-type: none"> • <i>Brakes for cab</i> • <i>Cruise control</i> 	<ul style="list-style-type: none"> • <i>Used occasionally, as needed</i>
<i>Toggle switch</i>	<ul style="list-style-type: none"> • <i>Transmission (high or low gear)</i> • <i>Temperature controls</i> • <i>Lights</i> • <i>Engine compression</i> • <i>Air suspension</i> • <i>5th wheel slide</i> • <i>Inter-axle differential</i> • <i>Windshield wipers (turn dials also)</i> 	<ul style="list-style-type: none"> • <i>Used occasionally, as needed</i>
<i>Toggle with push button lock</i>	<ul style="list-style-type: none"> • <i>Hydraulic pump for hoist</i> • <i>Position of hoist and tailgate</i> 	<ul style="list-style-type: none"> • <i>Used occasionally, as needed</i>
<i>Other:</i>		
<i>Other:</i>		

Physical Demands

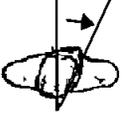
Whole Body Physical Demands

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

Physical Demands	Tasks or Activity	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Climbing</i>	<ul style="list-style-type: none"> <i>Climbing in and out of cab when loading and unloading truck</i> 		✓			<ul style="list-style-type: none"> <i>60 to 90 times per shift</i> <i>Steps to cab are 30 to 54 cm apart</i>
<i>Walking</i>						
<i>Sitting</i>						
<i>Standing</i>						
<i>Climbing</i>						
<i>Balancing</i>						
<i>Kneeling/ Crouching</i>						
<i>Other:</i>						

Body Postures

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

Body Posture	Task(s)	Percent of Shift				Comments
		Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Example: Neck Twisting</i>	<ul style="list-style-type: none"> Drive truck – viewing in front of and around truck 		✓			<ul style="list-style-type: none"> Shoulder checks are more frequent when driving around log yard and in town
Neck						
<i>Flexion</i> 						
<i>Extension</i> 						
<i>Twisting</i> 						
Shoulder						
<i>Flexion</i> 						
<i>Abduction/adduction</i> 						
<i>Extension</i> 						

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

Legend for Hand/Fingers

Handling	<i>grasping, turning, holding, etc.</i>			
Fingering	<i>picking, pinching, etc.</i>			
Gripping	<i>Power</i> 	<i>Pinch</i> 	<i>Hook</i> 	<i>Precision</i> 

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

Manual Material Handling

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

Activity	Task Description	Weight (kg)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
<i>Pushing</i>							
<i>Pulling</i>							
<i>Lifting</i>							
<i>Lowering</i>							
<i>Carrying</i>							

Hand Tools

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

Type of Tool	Task(s)	Weight (kg)	Percent of Shift				Comments
			Rarely 0 to 5%	Occasionally 6 to 33%	Frequently 34 to 66%	Constantly 67 to 100%	
✓ Various small hand tools (e.g., wrench)		< 1.0					
✓ Cable cutters		2.4					<ul style="list-style-type: none"> • Both hands used to cut cables • Force required is high • Up to 140 cables cut per shift
✓ Metal bar		2.8					<ul style="list-style-type: none"> • Used to tighten straps on loads
✓ Grease gun		2.0 to 2.4					

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 (<i>Indicate source</i>) <input type="checkbox"/> Seat <input type="checkbox"/> Floor <input type="checkbox"/> Tool <input type="checkbox"/> 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 A of the PDA.

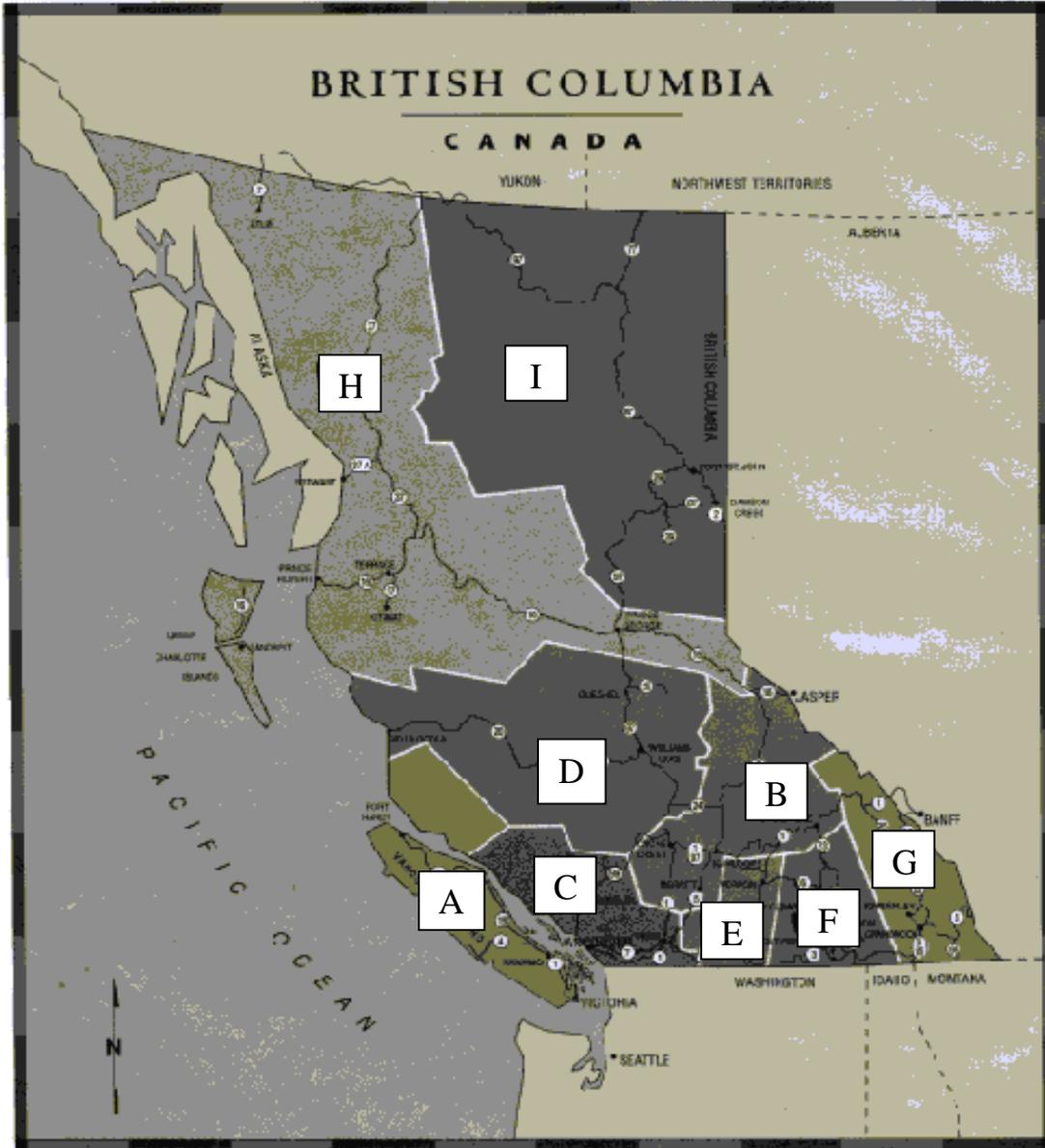
Region	Avg. Max July/Aug	Avg. Min Dec/Jan	Extreme Max.	Extreme Min.
<input type="checkbox"/> Vancouver Island	22.5 °C	-0.6 °C	36.1 °C	-18.8 °C
<input type="checkbox"/> Southwestern BC	22.9 °C	0.4 °C	35.6 °C	-18.3 °C
<input type="checkbox"/> Cariboo Chilcotin Coast	22.2 °C	-11.6 °C	36.4 °C	-42.5 °C
<input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

Personal Protective Equipment

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

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

Appendix A – Regional Map



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

Risk Factor Identification Checklist

Truck Driver

Purpose

The Risk Factor Identification Checklist for a Truck Driver 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 – Truck Driver

Management Representative _____

Worker Representative _____

Date _____

Risk Identification completed:

<input type="checkbox"/> Before implementation of solutions
<input type="checkbox"/> 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.

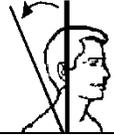
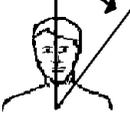
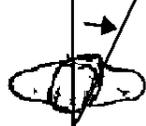
Static Postures: Static loading (sustained exertions) is physical effort (body postures) that is held, requiring muscle contraction for more than a short time.

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.

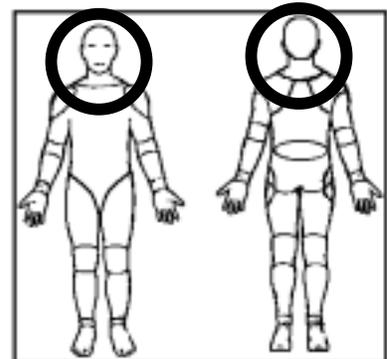
Vibration: **Vibration is oscillation of a tool or surface. Vibration can be transmitted through the arm or through the whole body.**

NECK

Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., looking side to side frequently)			S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., driving all day without other tasks)			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., arms in the same position for prolonged periods when using steering wheel, gear shift)			S O	
Awkward Posture				
Flexion			S O	
Extension			S O	
Lateral Bending			S O	
Rotation			S O	

Please indicate whether the following direct risk factors were identified at the **NECK**.

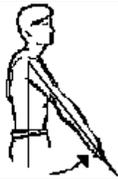
Direct Risk Factors	Repetition	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Static Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Awkward Posture	<input type="checkbox"/> Yes <input type="checkbox"/> No
In the Injury Statistics investigation, were there injury reports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



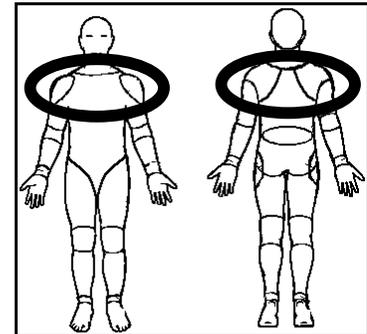
Body parts within the circled area will be classified as NECK issues.

SHOULDER

Force	N	Y	Comments:
Is forceful physical handling performed? Such as: Lifting		S O	
Lowering		S O	
Pushing		S O	
Pulling		S O	
Carrying		S O	
Repetition			
Are identical or similar motions performed over and over again? (e.g., shifting gears constantly when driving in the city)		S O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., driving all day without other tasks)		S O	
Static Posture			
Ask the worker: Do tasks require your shoulders to be maintained in a fixed or static posture? (e.g., when using steering wheel or gear shift)		S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., steering wheel)		S O	

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

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



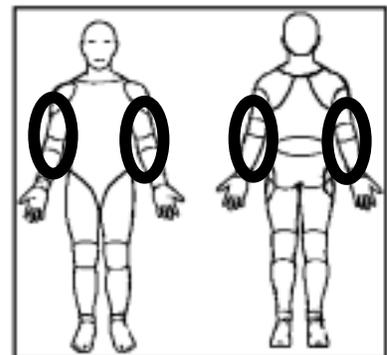
Body parts within the circled area will be classified as SHOULDER issues.

ELBOW

Force		N	Y	Comments:
Is forceful physical handling performed? Such as: 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., steering wheel, gear shift)			S	
			O	
Are objects handled in a pinch grip? (e.g., control switches)			S	
			O	
Are objects handled in a hook grip? (e.g., oil cans, tire rims)			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.			*	
			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., shifting gears)			S	
			O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., driving constantly without other tasks)			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., using steering wheel or gear shift)			S O	
Ask the worker: Do you apply constant pressure on controls/objects with your hand? (e.g., gear shift)			S O	
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., steering wheel)			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., controls that dig into the palm of the hand, arm rest in a poor location/position)			S O	
Vibration				
Ask the worker: Is vibration transmitted to your hand through a tool or piece of equipment? (e.g., through steering wheel)			S O	

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



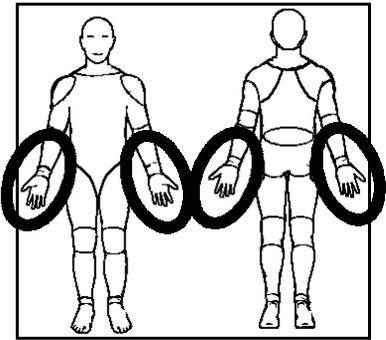
Body parts within the circled area will be classified as ELBOW issues.

WRIST/HAND

Force		N	Y	Comments:
Is forceful physical handling performed? Such as: Lifting			S	
			O	
Lowering			S	
			O	
Pushing			S	
			O	
Pulling			S	
			O	
Carrying			S	
			O	
Turning materials			S	
			O	
Are objects handled in a power grip? (e.g., steering wheel, gear shift)			S	
			O	
Are objects handled in a pinch grip? (e.g., control switches)			S	
			O	
Are objects handled in a hook grip? (e.g., oil cans, tire rims)			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., shifting gears)				S
				O
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., driving all day without other tasks)				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., using steering wheel, gear shift)			S O		
Ask the worker: Do you apply constant pressure on controls/objects with your hand? (e.g., gear shift)			S O		
Ask the worker: Do you hold parts, tools, or objects for long periods? (e.g., steering wheel)			S O		
Contact Stress					
Ask the worker: Do any objects, tools or parts of the workstation put pressure on any parts of your hand or arm, such as the backs or sides of fingers, palm or base of the hand, forearm? (e.g., controls in the cab that dig into the palm of the hand)			S O		
Ask the worker: Do you use your hand like a hammer for striking? (e.g., during vehicle maintenance tasks)			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? (e.g., steering wheel, hand tools)			S O		

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



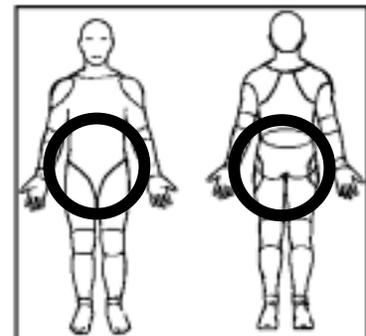
Body parts within the circled area will be classified as WRIST issues.

LOW BACK OR HIP/THIGH

Force	N	Y	Comments:
Is forceful physical handling performed? Such as: Lifting		S	
		O	
Lowering		S	
		O	
Pushing		S	
		O	
Pulling		S	
		O	
Carrying		S	
		O	
Repetition			
Are identical or similar motions performed over and over again? (e.g., shifting gears)		S	
		O	
Ask the worker: Do you spend a large percentage of the day performing one action or task? (e.g., driving all day without other tasks)		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., leaning forward while driving)		S	
		O	
Are workers required to sit or stand in a stationary position for long periods of time during the shift? (e.g., infrequent breaks while driving)		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., steering wheel, other controls)		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., sitting on a seat)			S O	

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

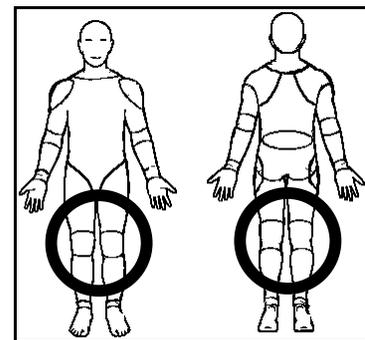


Body parts within the circled area will be classified as LOW BACK issues.

KNEE

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

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

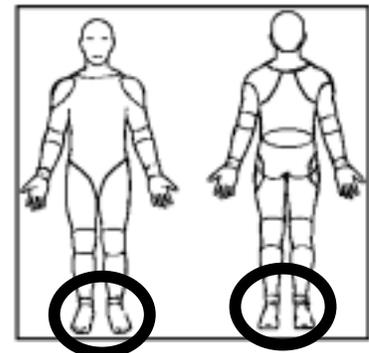


Body parts within the circled area will be classified as KNEE issues.

ANKLE/FOOT

Repetition		N	Y	Comments:
Are identical or similar motions performed over and over again? (e.g., using accelerator)			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., sitting on seat)			S O	

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



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

CHARACTERISTICS OF OBJECTS BEING HANDLED

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

ENVIRONMENTAL CONDITIONS

Temperature			
Ask the worker: Are your hands or arms exposed to cold from exhaust air, cold liquids or solids? (e.g., working outdoors)			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? (e.g., glare from direct sunlight)			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., from the truck or other mobile equipment)		S O	

WORK ORGANISATION

	N	Y	Comments:
Is the work externally-paced or controlled by a machine or the process?		S O	
Do peak workloads or sudden increases in pace occur with the tasks? (e.g., more driving required during a certain part of the day)		S O	
Ask the worker: Are there indications of excessive fatigue or pain, or symptoms of adverse health effects due to extended work days or overtime? (e.g., seasonal overtime)		S O	
Ask the worker: Are there indications of excessive fatigue or adverse health effects due to shiftwork? (e.g., winter road maintenance)		S O	
Ask the worker: Are rest periods or task variety insufficient to prevent the build-up of fatigue or the risk of adverse health effects? (e.g., continuous driving without other tasks)		S O	
Ask the worker: Are tasks in a job rotation program similar to one another, and therefore not providing a variation in movements? (e.g., Truck Driver rotating to the Front End Loader)		S O	

Work Manual

**Industrial
Musculoskeletal
Injury
Reduction
Program**



Truck Driver

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

Truck Driver

Disclaimer

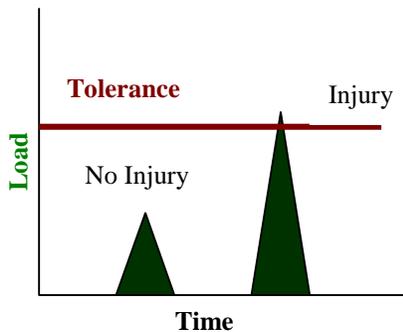
The BC sawmill IMIRP documents were developed by Advanced Ergonomics Inc. (AEI) based on analyses conducted in a number of voluntary, participating sawmills in British Columbia and should be considered applicable only to the BC sawmill industry. Modification to these documents may reduce their usefulness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

WM Table of Contents

INJURY EDUCATION.....	49
Body Parts at Risk	50
Major Risk Identification	51
Neck/Shoulder	52
Shoulder.....	55
Elbow/Wrist.....	57
Low Back	60
Summary of Body Parts at Risk	62
Risk Factors by Body Part.....	64
INJURY PREVENTION.....	65
Suggested Solutions.....	66
Risk Control Key	67
Workstation Design	68
Characteristics of Objects Being Handled.....	81
Environmental Conditions.....	83
Work Organisation	84
Summary of Solutions	85

Injury Education

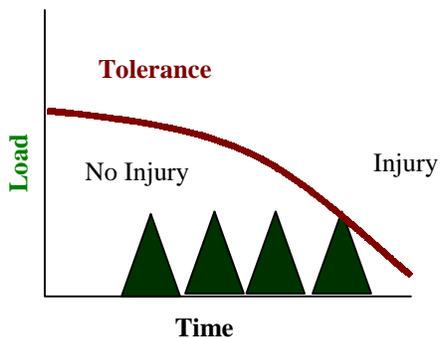
*Injuries occur when ...
Loads exceed tissue tolerances*



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.

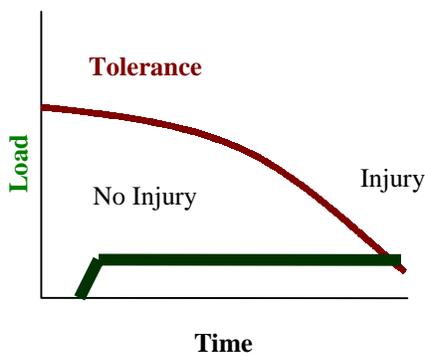
Example – a worker going over on their ankle and spraining it.



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 Truck Driver 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 Truck Driver. 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 Truck Driver position and found that the Back and Shoulder/Neck are the body parts of primary concern. Focussing on solutions that target these body areas will likely reduce the greatest risks associated with this job.

Back: Major risks include static postures from sitting while driving, as well as impact shock from driving on bumpy roads such as a logging yard or landfill site. Other tasks that may contribute to the risk of discomfort/injury include jumping down from the cab, and manual material handling (especially after prolonged sitting).

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

1. Maintain good driving postures (page 72)
2. Adjustable seating (page 73)
3. Adjust seat spring (page 74)
4. Seat maintenance (page 75)
5. Add a back support to bench seats (page 76)
6. Yard maintenance (page 77)
7. Hourly stretch breaks (page 79)
8. Job rotation and task rotation (page 84)

Neck/Shoulder: Major risks include repetitive and static postures of the neck/shoulders from operating steering wheel and other controls for prolonged durations. Other tasks that contribute to stress on these tissues include strapping loads, cutting cables off of loads, and frequent shoulder checks.

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

1. Control distance (page 69)
2. Extend frequently used switches (page 70)
3. Arm supports (page 71)
4. Maintain good driving postures (page 72)
5. Hourly stretch breaks (page 79)
6. Job rotation and task rotation (page 84)

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

NECK/SHOULDER

Direct Risk Factors: Awkward Posture Static Posture Repetition
--



A Truck Driver frequently works with their arms away from the body, loading the muscles of the neck and shoulder that support the arms.

Operating controls (e.g., steering wheel, gear shift) is the main task of concern.

Turning the neck while driving (e.g., shoulder checks) also contributes to loading of the neck muscles.

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

Awkward Posture

- 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 Posture

- When the arms are held away from the body for prolonged periods of time, the muscles of the neck and shoulder 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.

Repetition

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

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- The design of the truck cab requires some amount of forward reaching by the driver when operating the vehicle. The controls most frequently operated with the arms are the steering wheel and gearshift. If these controls are used for prolonged periods of time without adequate breaks, discomfort and/or injury can eventually result.

Working Heights

- Loading on the neck/shoulder is increased the higher the arms are raised. Improper height/tilt adjustment of the seat and steering wheel can cause the arms and shoulders to be raised higher than necessary.

Work Organisation

Task Variability

- When a Truck Driver does not have an opportunity to perform tasks other than driving, he/she may drive for long periods of time without adequate rest. This cumulative loading increases the fatigue in the tissues of the neck and shoulder.

Environmental Conditions

Weather and road/ground conditions

- Truck Drivers must drive in a variety of weather conditions, as well as on various roads and ground surfaces. Poor weather, bumpy/slippery roads, and uneven ground are some of the conditions that may increase loading on the neck/shoulder because the Truck Driver may grip the steering wheel and gear shift more forcefully. Tension in the neck/shoulder may also be increased due to having to control the vehicle more carefully, as well as possible stress due to driving in poor weather.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Neck/Shoulder, please see the column labelled “Neck/Shoulder” in the Summary of Solutions on pages 85 to 87.
- 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 Awkward Posture Repetition



A Truck Driver may exert high forces with the shoulder and upper body when tightening straps and cutting cables off loads.

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

- Several muscles stabilise the shoulder joint when objects are manipulated (e.g. pushed, pulled, lifted, etc.). The larger the force required, the greater the load on the muscles.
- If the force placed on these muscles exceeds the tissue tolerances, injury to the shoulder may occur.

Awkward Posture

- The muscles of the shoulder joint are activated when the arms are away from the body. The farther away the arms are from the body, the greater the load on these muscles.

Repetition

- If forceful movements involving the shoulder muscles are repeated, and recovery time is not adequate, the tissues may fatigue to the point of injury.

INDIRECT RISK FACTORS

Characteristics of Objects Being Handled

Container, Tool and Equipment Handles

- A metal bar may be used to tighten straps on loads. If the bar is too short, there may not be enough leverage to perform this task easily, which increases the force required to push down, therefore increasing the loading on the shoulder muscles
- Cable cutters are used to cut cables off of loads of logs. This may not be the appropriate tool for the job, since the design of the cutters requires high forces to be exerted by the shoulder muscles.

CONSEQUENCES

- When using the arms to manipulate objects (e.g., push, pull, lift, etc.), the muscles of the shoulder 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 of the shoulder muscles.
- 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 85 to 87.
- For exercises that can help to prevent *shoulder* injuries, see the ***Shoulder section of the Body Manual***.

ELBOW/WRIST

Direct Risk Factors:

Force
Awkward Posture
Repetition



A Truck Driver may grip the steering wheel and gearshift forcefully in poor driving conditions (e.g., slippery roads, driving over bumpy/uneven ground).



BACKGROUND INFORMATION

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

DIRECT RISK FACTORS

Force

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

Awkward Posture

- The position of the wrist 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, backward, or side to side) deviates from this position, and the forearm muscles have to work harder to maintain the grip. Consequently, gripping objects with the wrist bent increases the tension generated by muscles, and could lead to tissue fatigue at the tendon/bone connection.

Repetition

- Repeated gripping without adequate rest can slowly fatigue the tissues of the elbow and wrist to the point of injury.

INDIRECT RISK FACTORS

Workstation Design

Working Reaches

- If the gear shift is located too far from the driver's seat, the elbow may be placed in an awkward posture while shifting gears. This increases loading on the muscles of the elbow.

Environmental Conditions

Weather and road/ground conditions

- Truck Drivers must drive in a variety of weather conditions, as well as on various roads and ground surfaces. Poor weather, bumpy/slippery roads, and uneven ground are some of the conditions that may require a Truck Driver to grip the steering wheel and controls more forcefully.

Work Organisation

Task Variability

- When a Truck Driver does not have an opportunity to perform tasks other than driving, he/she grips the steering wheel and gear shift for longer periods of time. This increases loading on the tissues of the elbow and wrist.

CONSEQUENCES

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

SUGGESTED SOLUTIONS

- For specific solutions that may prevent injuries to the Elbow/Wrist, please see the column labelled “Elbow/Wrist” in the Summary of Solutions on pages 85 to 87.
- For exercises that can help to prevent *elbow* injuries, see the *Elbow section of the Body Manual*.

LOW BACK

Direct Risk Factors:
Awkward Posture
Static Posture
Vibration



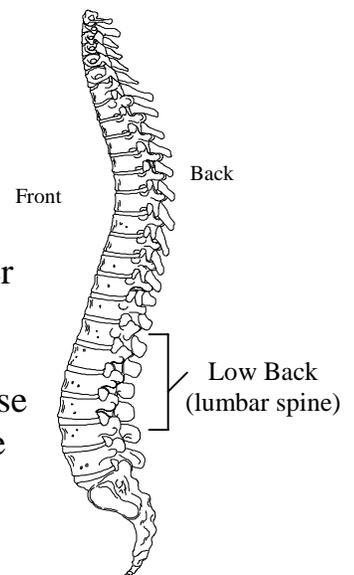
A Truck Driver sits for prolonged periods of time while driving.

Other risk factors that may contribute to discomfort or injury to the low back include driving over surfaces that cause vibration or impact shock, and jumping down from the cab.

Neutral Spine

BACKGROUND INFORMATION

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



DIRECT RISK FACTORS

Awkward and Static Posture

- Sitting increases the loading on the walls of the discs. If the duration of sitting is excessive, and the recovery is not adequate (e.g., spine not returned to neutral posture), the tissues may deform to the point of injury.

Vibration

- Whole body vibration is usually transmitted through the seat 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 sitting on a vibrating surface may contribute to the gradual weakening of the lumbar discs.

INDIRECT RISK FACTORS

Work Organisation

Task Variability

- When a Truck Driver does not have an opportunity to perform tasks other than driving, he/she tends to sit for longer periods of time. This increases loading on the tissues of the low back.

CONSEQUENCES

- Continually sitting may lead to muscle imbalances and postural changes that may lead to low back discomfort.
- Continually sitting 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 85 to 87.
- For exercises that can help to prevent *back* injuries, see the *Back section of the Body Manual*.

Summary of Body Parts at Risk

NECK/SHOULDER

- A Truck Driver frequently works with their arms away from the body, loading the muscles of the neck and shoulder that support the arms.
- Operating controls (e.g., steering wheel, gear shift) is the main task of concern.
- Turning the neck while driving (e.g., shoulder checks) also contributes to loading of the neck muscles.



SHOULDER

- A Truck Driver may exert high forces with the upper body when tightening straps and cutting cables off loads.



ELBOW/WRIST

- A Truck Driver may grip the steering wheel and gearshift forcefully in poor driving conditions (e.g., slippery roads, driving over bumpy/uneven ground).



LOW BACK

- A Truck Driver sits for prolonged periods of time while driving.
- Other risk factors that may contribute to discomfort or injury to the low back include driving over surfaces that cause vibration or impact shock, and jumping down from the cab.



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 Posture		✓	✓	✓			✓				
Static Posture		✓					✓				
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	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

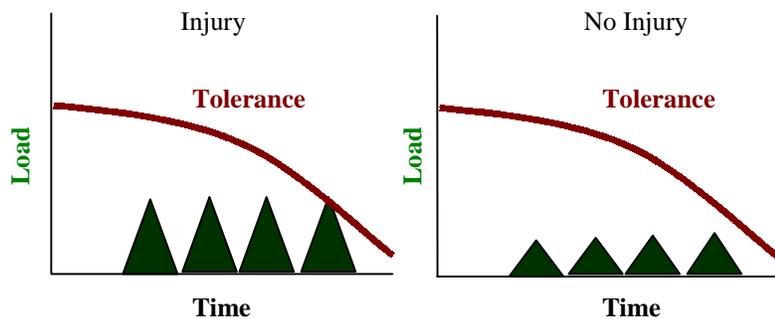
* Extended exposure to any risk factor can increase the likelihood of injury. For solutions designed to decrease the duration of exposure to any risk factor please refer to the Work Organisation section of the General Risk Factor Solutions Manual

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

- = Indicates that the risk factor was assessed and was not found to be a contributor to the body part problem.
- ◆ = Indicates that the risk factor assessed is commonly found in sawmills, and may need to be addressed at your mill. See the appropriate section of the General Risk Factor Solutions Manual for more information.
- ✓ = Indicates that the risk factor was assessed as a contributor to the body part problem. Please see the Summary of Solutions Table on pages 85 to 87 for specific problem/solution information. Additional information on some risk factors can be found in the General Risk Factor Solutions Manual.

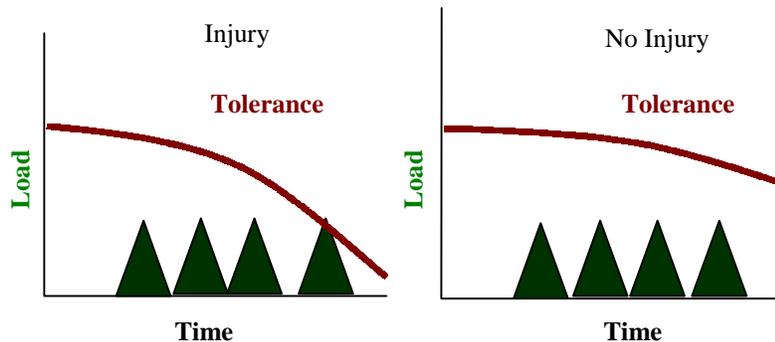
Injury Prevention

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



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

Example – using a torque multiplier wrench to loosen bolts.



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

Example – using maintenance exercises to strengthen tissues.

Suggested Solutions

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

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

The focus of the Injury Prevention section is on solutions developed following the ergonomic investigation of the Truck Driver 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

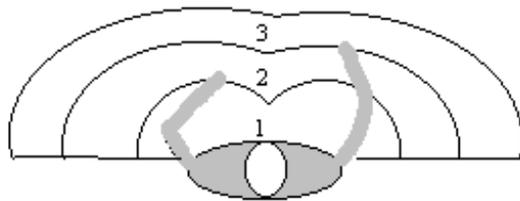
These are devices worn by a worker to reduce the risk of injury, including gloves, kneepads, hearing protection, and leather aprons.

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.

Control distance

E
WP

In order to reduce loading on the neck, shoulder, and low back keep controls close to the body by moving the seat forward on slide tracks and/or extending controls into safe reach envelopes. This adjustability is important to accommodate operators of different sizes. The following pictures illustrate how the adjustable seat mechanism can allow an operator to move closer to any controls.



Extended reach to steering wheel.



Steering wheel within safer reach envelope.

Tilt steering

WP

In order to reduce loading on the shoulder in vehicles with tilt steering, move the steering wheel closer to the body. This tilting brings the full circumference of the steering wheel closer to the operator.



Shoulder flexion to operate steering wheel.



Safer shoulder posture with tilt steering.

Extend frequently used switches

E

In order to reduce extended reaches for controls, extend toggle switches that are most frequently used. This extension will decrease loading on the shoulder while supporting the extended arm.



Research mobile equipment with operators

A

Operators can effectively identify potential challenges with awkward and static postures through an equipment trial period prior to purchasing. Most equipment dealers support such a trial period. Investigating mobile equipment with Truck Drivers will minimise the need to retrofit equipment.

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 Truck Driver, identify the body part of most concern. If the main concern is the:

Neck - minimise forward bending of the neck by increasing working height.

Shoulders - minimise elevation of the arms by lowering working height.

Low Back - minimise forward bending of the back by increasing working height.

For more specific guidelines on matching the working heights with the tasks performed please consult anthropometric tables or an ergonomist.

Arm supports

E

In order to reduce awkward and static postures of the neck/shoulder when operating controls, consider the height of the controls and arm supports. An operator's elbows and forearms should sit comfortably on the arm supports with the shoulders relaxed and the wrists free for using controls. Arm supports that are well-padded and height-adjustable, independent of the height of the seat, are preferred. The support provided by these arm supports reduces muscle tension and fatigue in the neck and shoulder.

WP

Truck Drivers should be encouraged to use the arm supports to relax the muscles in the neck/shoulder region when there is a break in the workload. Placing the elbows, forearms, and wrists on the arm supports while taking these microbreaks will allow working muscles to recover and repair.

Stepping down

WP

To significantly reduce loading on the back, avoid jumping down from equipment. After prolonged exposure to vibration in a static posture, the spine is more susceptible to an acute injury resulting from the impact of jumping down.

Ensure that you have secure foot and hand placement as you lower yourself off the machinery. Safe locations for hand and foot placement should be well-marked.

Climbing into cab

E
WP

Handholds should be low enough that operators do not have to jerk themselves upward, which can place large loads on the shoulders when they are in a flexed position.

Maintain good driving postures

E
WP

In order to reduce static loading on the right neck/shoulder muscles, avoid “resting” the hand on the gear shift. Instead, use the arm supports which, when properly adjusted, keep the shoulder in a more neutral position. Arm supports that are height-adjustable, independent of the seat, are ideal.

If the seat can adjust forward and backward, position yourself to allow for neutral or near-neutral postures of the shoulders. The steering wheel should also be adjusted at the proper height and/or tilt. The ideal adjustment will allow the shoulders to be relaxed and the elbows to be close to the body while driving straight (it is not necessary to maintain neutral shoulder postures while turning the steering wheel). This position will minimise loading on the neck/shoulder muscles.

When purchasing a new truck, look for the ability to adjust the seat (height and tilt), steering wheel (height and tilt), and armrests (height).

SEATING

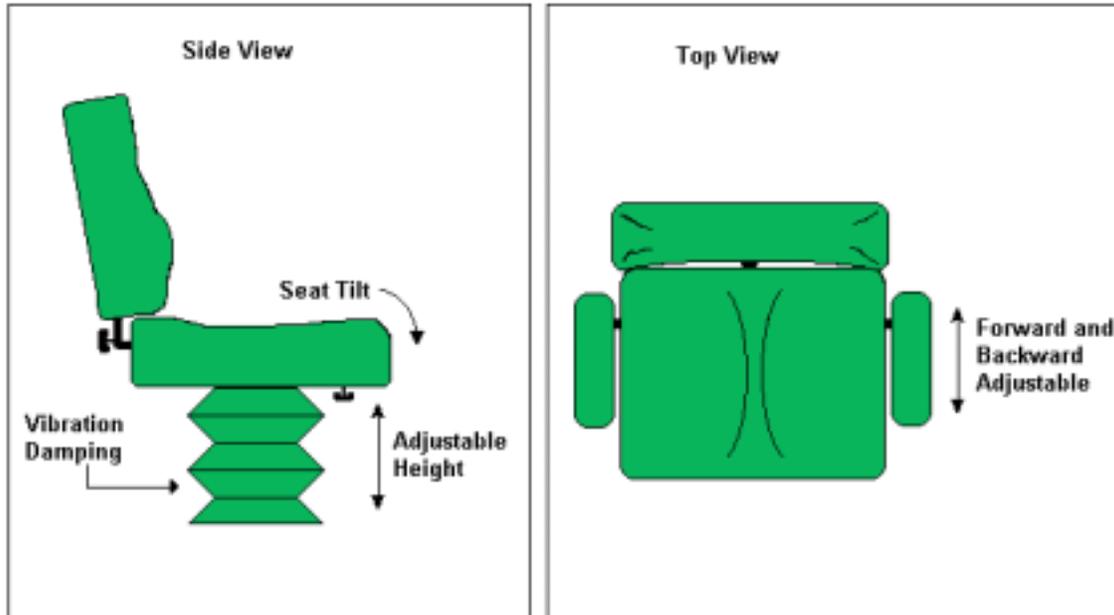
Many Truck Drivers are required to sit when driving from one location to another to transport loads. Sitting for long periods of time increases the load on the spine, which stresses the ligaments and discs of the low back. The load is increased when the Truck Driver does not maintain a neutral spine (see Injury Education for the Low Back on page 60).

Lumbar support

E To improve the posture of the low back, install seats with good lumbar support. Seats that wrap around the low back and encourage proper posture, helping to maintain the curve of the lower back, have good lumbar support.

Adjustable seating

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



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

Vary body posture

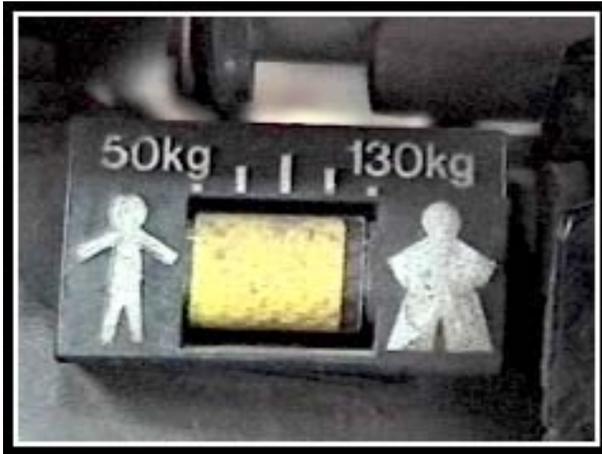
WP

In order to reduce awkward and static postures in the low back, encourage the Truck Driver to get up from the seated posture throughout the day. This change of position reduced the load on the spine, allows the discs to equalise, and allows ligaments to regain their stiffness after being stretched out from sitting.

Adjust seat spring

WP

In order to reduce vibration transmitted to the low back, operators should adjust seat spring to an appropriate level.



Many trucks have air ride seats. If the seats are too stiff more vibration may be transmitted from the seat to the back. If the seats are not stiff enough, bottoming out will increase impact loading to the spine.

Seat belts

WP

In order to improve the posture of the low back, encourage the operator to use a seat belt.



Safety regulations state that vehicle operators have to wear a seat belt. These seat belts can also be useful in helping to maintain lumbar curve by holding the low back against the seat and avoiding slouching.

Seat maintenance

E
A
WP

Vehicle seats and supports are the only layer of protection between an operator and the whole-body vibration transmitted from mobile equipment. In many cases, the seat also provides the only suspension between the user and the vibration and impact from rough terrain. For these reasons, seats need to be properly maintained to help prevent injuries.

Seat maintenance should begin when a new piece of mobile equipment is being ordered. Many equipment manufacturers offer a selection of seats. Use the information on the previous page to select a seat that satisfies your ergonomic criteria. Where possible, have the intended operators try several different seat styles before deciding on a seat design. If the manufacturer does not offer seats of suitable quality, it might be necessary to order a custom seat. Remember: heavy equipment manufacturers do not specialise in ergonomic seat design. Good quality seats may require separate ordering and installation.

Any new seat should come with a clear set of instructions for adjustment and use. Photocopy a set of these instructions for each operator, and laminate another copy for prominent storage in the vehicle cab. Make sure all operators are familiar with the purpose and use of all seat features.

Regular seat maintenance

Regular vehicle seat maintenance should follow a schedule based on duration of use, similar to engine maintenance. At the prescribed time, all components of the seat should be inspected for wear, and damaged parts should be replaced. This inspection should include seat suspension, seat cushioning, seat covering, and arm supports. Seats should be replaced when they are too worn, or when they can no longer be repaired to safe working levels. Seats, like work boots, have a lifespan limited by their daily exposure to vibration, shock impact, and continuous load bearing.

Daily inspection of seat

Seat users should also be responsible for ongoing maintenance. A short daily inspection of the vehicle seat could identify wear or damage before it becomes a major problem. Keeping the seat and cab as clean as possible and regularly using all adjustments on the chair can also help to minimise uneven wear and prevent damage.

Add a back support to bench seats

E

Bench seats should be avoided for Truck Drivers who drive for the majority of the shift because they tend to be non-adjustable and less supportive than individual seats. However, if a truck does have a bench seat, a purchased back support may improve posture by providing some lumbar support.



Truck with a bench seat.



One example of a backrest which may provide additional support while driving.

ADDITIONAL WORKSTATION DESIGN OPTIONS

Yard maintenance

A In order to reduce loading on the back from whole body vibration, maintain the yard and repair potholes.

Equipment maintenance

A In order to reduce loading on the back from whole body vibration from jerky movements, maintain the machine properly and allow the machine to warm-up first.

Tire maintenance

E
A In order to reduce loading on the back from whole body vibration:

- Ensure tires are inflated properly
- Look at the type of tread on the tires - knobby tires may increase vibration when Truck Drivers are driving on harder surfaces
- Install radial instead of ply tires for better control and less vibration

Control truck speed

WP In order to reduce loading on the back from whole body vibration caused by excessive bouncing, control the speed of the truck when driving over rough ground.

Windshield wipers

E

To improve visibility and reduce awkward and static neck/shoulder postures, install and maintain windshield wipers on both the front and back windows, if present. This should be a clearly outlined job duty for either the Truck Driver or the Heavy Duty Mechanic.



Window cleaning

A

To improve visibility and reduce awkward neck postures, clean windows regularly. Hinged window caging can be opened to make cleaning more convenient.

ADDITIONAL WORK PRACTICES

Hourly stretch breaks

WP

In order to improve the body's tolerance for work, encourage Truck Drivers to take stretch breaks every hour. Stretches should be done with the vehicle off and safely parked. Make sure that the ground is flat and dry for personal safety. Suggested stretches are listed below.



To help relax back muscles, stretch the low back by hanging off the equipment. Place feet at 45 degrees and bend the knees, keeping the low back straight. This will stretch one side of the back. Alternate sides.



To improve the posture of the low back when driving, stretch the back of the legs by putting one foot on the bucket. Keep the back straight and bend at the hips. Stretch each leg for 30 seconds after each hour of work.



To help relax neck muscles, stretch the neck for 30 seconds each side after every hour of driving. Reach for the ground or hold onto equipment and turn head slightly to the side. Stretch by lowering the head. Avoid overstretching.

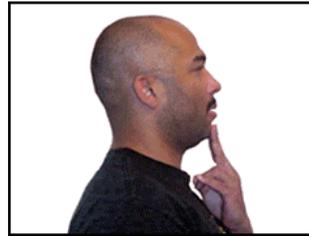


To reduce loading on the neck from poor posture, perform the wall exercise 4 times for 15 seconds after every hour of driving. Re-align the spine by placing the feet out from the wall, and flattening the low back against the wall. Bend the elbows to 90 degrees, with the hands and wrists above shoulder height. Press the forearms back against the wall. Keep chin tucked in.

When time permits these stretches would complement the suggested hourly stretches.

Chin Tuck

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.



Shoulder Stretch

Gently pull elbow towards opposite shoulder, keeping both shoulders relaxed. You should feel a mild stretch in the back of the shoulder. Hold for 5 seconds. Repeat with the other arm.



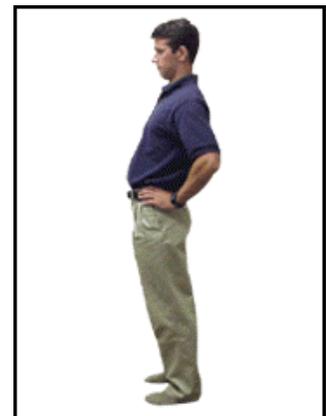
Wrist Flexor and Extensor Stretch

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.



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.



Characteristics of Objects Being Handled

SIZE AND SHAPE

Lever controls

E

In order to minimise contact stress on the hands controls should have cylindrical rather than ball shaped handles. This would allow for a more even distribution of contact with the lever. Grips should be made of a material that allows for good contact and is not slippery (e.g., bike handle foam coverings). Regardless of the shape of the lever control, the wrist should remain in a neutral position as often as possible.



Contoured lever grips are preferred to reduce contact stress and promote neutral wrist postures.



Hard lever handles can lead to contact stress.

CONTAINER, TOOL AND EQUIPMENT HANDLES

Maintain neutral postures

WP



In order to reduce awkward postures of the wrist maintain a neutral posture (straight wrist) whenever possible while operating lever controls.

Padding for levers

E

To minimise the force to the elbow/wrist, provide some padding to the area to be gripped by the operator.

Lengthen bar for tightening straps on loads

E

When tightening straps on loads, Truck Drivers have been observed to jump and put all of their body weight into the task. If high forces are required to push down on the metal bar used to tighten straps on loads, try using a longer bar. This change will decrease the force required by increasing leverage. Telescoping bars can still provide additional leverage, while compacting for easier storage, as well as use in confined spaces (e.g., beside a building). As with any telescoping tool, locking mechanisms must be effective to prevent any risk of accidental closure.

Use hand-held grinder to cut cables off loads

E

The tissues of the shoulder and upper body are at risk due to the high forces required to cut cables off of loads of logs. The frequency of this task may also contribute to the risk. Some Truck Drivers cut up to 120 cables per shift. To significantly reduce the force on the upper body from cutting cables off of loads of logs, use a hand-held grinder instead of manual cutters. Proper PPE must be worn.

Environmental Conditions

Flood lighting

E

To improve task visibility at night, install high-power floodlights on the front and back of the vehicle to ensure adequate lighting when performing work outside or in the bed of the truck. External floodlights on frequent work areas (e.g., log yard, gravel depot) can also improve visibility.



Winter clothing

PPE

In order to reduce loading on the wrists from overgripping, Truck Drivers should be encouraged to wear proper winter clothing, including well-insulated gloves, when working in cold temperatures.

Reduce glare

PPE

To minimise awkward neck postures due to glare, operators may wear sunglasses, or windows can be treated to filter sunlight.

Work Organisation

Job rotation and task rotation

A

Truck drivers would benefit from job rotation throughout the work day, to distribute work more evenly between different body areas. This is especially true if they drive for almost 100% of the shift. When planning a rotation schedule, it is important to choose jobs with different physical demands. For example, if the first job requires sitting, the next should require standing or walking. If this is not possible, it would also be somewhat beneficial to rotate with other Mobile Equipment Operators. Even though all of these jobs require sitting in a cab for long periods, the demands of the upper body may vary significantly.

Some jobs have task rotation, which is also beneficial, since changes in physical demands are built into the regular job schedule. For example, an Inner Mill Logging Truck Driver does not rotate jobs, but gets breaks from sitting and driving because the job is carried out in the following order:

- Drive to log yard to load truck (1 minute)
- Unhook trailer and wait outside truck while the Wagner loads the trailer (5 minutes)
- Drive to mill infeed area (1 minute)
- Wait for Wagner to unload trailer, cut cables off of loads (6 minutes)

IMPORTANT NOTE: Tasks done between periods of driving should not include strenuous lifting or pulling, particularly lifting objects off of the ground or floor. After prolonged sitting, the tissues of the low back are not in the ideal condition for lifting, as the soft tissues are stretched and the discs are compressed. These conditions significantly increase the risk of injury to the low back. Ideally, lifting should be done after tasks that require standing and walking, allowing the tissues of the back to return to neutral states.

Please refer to the General Risk Factor Solutions Manual for solutions regarding Environmental and 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
Control distance	69		A S	A				A S				
Tilt steering	69		A S	A								
Extend frequently used switches	70		A S	A								
Research mobile equipment with operators	70		A S	A	A			A S				
Arm supports	71		A S									
Stepping down	72							V				
Climbing into cab	72			F								
Maintain good driving postures	72		A S	A				A S				
Lumbar support	73							A				
Adjustable seating	73		A S	A				A S				
Vary body posture	74		R A S	R A	R A			A S				
Adjust seat spring	74							V				
Seat belts	74							A				

Direct Risk Factors

F = Force

S = Static Posture

R = Repetition

C = Contact Stress

A = Awkward Posture

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
Seat maintenance	75		A S					A S V				
Add a back support to bench seats	76							A S				
Yard maintenance	77							V				
Equipment maintenance	77							V				
Tire maintenance	77							V				
Control truck speed	77							V				
Windshield wipers	78		A S									
Window cleaning	78		A S									
Hourly stretch breaks	79		A S	R S	R A			S				
Lever controls	81				A							
Maintain neutral postures	81				F A							
Padding for levers	82				F A							

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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
Lengthen bar for tightening straps on loads	82			F A								
Use hand-held grinder to cut cables off loads	82			F A								
Flood lighting	83		A S					A S				
Winter clothing	83				F							
Reduce glare	83		A S									
Job rotation and task rotation	84		R A S	F R A	F R A			A S V				
Heat Exposure	♦	indirectly reduces risk of injury to the body										
Cold Exposure	♦	indirectly reduces risk of injury to the body										
Lighting	♦	indirectly reduces risk of injury to the body										
Noise	♦	indirectly reduces risk of injury to the body										
Vibration	♦	directly reduces risk of injury to the back and wrist										
Rest breaks	♦	indirectly reduces risk of injury to the body										
Job Rotation	♦	indirectly reduces risk of injury to the body										
Task Rotation	♦	indirectly reduces risk of injury to the body										
Work Pace	♦	indirectly reduces risk of injury to the body										
Scheduling	♦	indirectly reduces risk of injury to the body										

Direct Risk Factors

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♦ = See General Risk Factor Solutions Manual

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Shoulder</p> <p>A Truck Driver may exert high forces with the shoulder and upper body when tightening straps and cutting cables off loads.</p>	<p>Force</p> <p>Awkward Postures</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Several muscles stabilise the shoulder joint when objects are manipulated (e.g., pushed, pulled, lifted, etc.). The larger the force required, the greater the load on the muscles. • If the force placed on these muscles exceeds the tissue tolerances, injury to the shoulder may occur. • The muscles of the shoulder joint are activated when the arms are away from the body. The farther away the arms are from the body, the greater the load on these muscles. • If forceful movements involving the shoulder muscles are repeated, and recovery time is not adequate, the tissues may fatigue to the point of injury. 	<ul style="list-style-type: none"> • Take more frequent breaks to stretch when driving in poor weather conditions or on uneven roads/surfaces (e.g. 3 to 5 minutes per hour). In these conditions, more stress is generally placed on the tissues of the upper body to steer/control the vehicle and change gears. • For exercises that can help prevent Shoulder injuries, <i>see the Shoulder section in the Body Manual.</i>

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Elbow/Wrist</p> <p>A Truck Driver may grip the steering wheel and gear shift forcefully in poor driving conditions (e.g. slippery roads, bumpy/uneven roads), loading the elbow and wrist.</p>	<p>Force</p> <p>Awkward Posture</p> <p>Repetition</p>	<ul style="list-style-type: none"> • Gripping an object requires activation of the forearm muscles, which generates tension at the tendon/bone connection of the elbow. The harder that an object must be gripped, the greater the load on the tendon/bone connection. • The position of the wrist 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, backward, or side to side) 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. • Repeated gripping without adequate rest can slowly fatigue the tissues of the elbow and wrist to the point of injury. 	<ul style="list-style-type: none"> • Take more frequent breaks to stretch when driving in poor weather conditions or on uneven roads/surfaces (e.g. 3 to 5 minutes per hour). In these conditions, more stress is placed on the tissues of the upper body to steer/control the vehicle and change gears. • Maintain neutral wrist postures when operating controls. • Release the hand from the controls whenever it is possible. • Sit back and use armrests when there is a break in the workflow. • Protect the base of the hand - try to keep minimise contact stress in this area. • Operators should be encouraged to wear proper winter clothing, including well-insulated gloves, to reduce over-gripping. • For exercises that can help prevent <i>Elbow</i> and <i>Wrist</i> injuries, <i>see the Elbow and Wrist sections in the Body Manual</i>.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Low Back</p> <p>A Truck Driver sits for prolonged periods of time while driving.</p> <p>Other risk factors that may contribute to discomfort or injury to the low back include: driving over surfaces that cause vibration or impact shock, jumping down from cab.</p>	<p>Awkward Posture</p> <p>Static Posture</p> <p>Vibration</p>	<ul style="list-style-type: none"> • Sitting increases the loading on the walls of the discs. If the duration of sitting is excessive, and the recovery is not adequate (e.g., spine not returned to neutral posture), the tissues may deform to the point of injury. • Whole body vibration is usually transmitted through the seat 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 sitting on a vibrating surface may contribute to the gradual weakening of the lumbar discs. 	<ul style="list-style-type: none"> • Remember to wear your seatbelt, both for safety and as a reminder to improve posture. • Control truck speed to reduce bouncing, and exposure to whole body vibration. • In order to reduce loading on the back from whole body vibration, ensure tires are properly inflated and maintained. • Know how to adjust your seat, including the suspension. • Identify wear and damage of your seat before it becomes a major problem. • When getting out of the cab, climb down instead of jumping down. Jumping down from the cab, particularly after a long period of driving, can cause injury because the prolonged seated posture has already stressed the tissues of the low back.

CHECK IF THIS APPLIES	ACTIVITY OF RISK	DIRECT RISK FACTOR(S)	POTENTIAL HAZARDS	SUGGESTED SOLUTIONS
	<p>Low Back (continued)</p>			<ul style="list-style-type: none"> • Get up from the seated posture throughout the day, and stretch when possible. This alleviates the load on the spine, allows the discs to equalise, and allows ligaments to regain their stiffness after being stretched out from sitting. • To help relax back muscles, stretch the low back while hanging onto the equipment. Place feet at 45 degrees and bend the knees, keeping the low back straight. This will stretch one side of the back. Alternate sides. • To improve driving posture, stretch the back of the legs. Put one foot on a raised surface. Keep the back straight and bend at the hips. Stretch each leg for 30 seconds. • For more exercises that can help prevent Back injuries, <i>see the Back section of the Body Manual.</i>