



JOB DEMANDS ANALYSIS

Company: City of Burnaby

Location: Works Yard

Job Title: Truck Driver 2/3 Single Axle or Tandem **Classification:** Regular Duty

Purpose of Activities

The Truck Driver 2/3 drives a Five-Ton Single Axle or Tandem Truck for the purpose of hauling clean fill to and debris from a work site. During a prolonged snowfall, the Truck Driver 2/3 is also responsible for sanding and plowing designated streets (main roads, hills and bus routes). The Truck Driver 2/3 will also assist the work crew with labouring duties at the work site as his time allows.

Tools and Equipment

The Truck Driver 2/3 will use the following tools and equipment to perform his duties:

1. Clothing – Steel Toe boots, ear protection, safety vest
2. Single Axle or Tandem Truck with a dump box
3. Small hand tools (hammer, shovel, etc.)

Usual Methods

The Truck Driver 2/3 will perform a pre-trip vehicle inspection every morning. This will include greasing the truck, checking and topping up fluid levels, checking brakes, tire pressure and ensuring all lights are in working order. The truck is then used to haul material to and from a work site in the following manner:

Loading

1. Drive to loading location (work site, asphalt plant, top soil or salt storage, etc.)
2. Maneuver the truck into position (under Hopper, next to Front End Loader or beside Backhoe/Excavator). Check mirrors to watch for hand signals and verbal communication from crew when backing the truck.
3. Wait for the truck to be loaded with material.
4. Drive to dump location.

Usual Methods (Continued)

Unloading

1. Maneuver truck into position for dumping. Check area for overhead wires or other obstructions.



2. Reach down with right hand to activate dump box control to raise dump box.
3. Raise dump box to dump contents. Note: In some cases the box is raised just enough so that the material can be released from the dump box to a wheel barrow through the control gate (upper extremity push/pull with hip assist) at the back of the dump box. A Labourer will usually work the wheelbarrow and the Truck Driver may but not always operate the control gate.
4. Repeat step 3 until the contents of the dump box has been dumped.
5. Lower the dump box.
6. Drive to loading location.

Sander/Plow Application

1. Drive to Works Yard.
2. Back the truck into the Sander storage rack.
3. Climb out of the truck and up to the rack. Secure chains on end gate of dump box, remove the end gate pins and lift end gate off truck with hoist. Set end gate in storage rack.
4. Back the truck under Sander. Lower the Sander to the dump box with hoist and unhook chains from hoist. Secure the Sander to dump box with chains or straps. Couple hydraulic hose lines from Sander to the truck.
5. Drive to plow storage area and pull the truck up to plow attachments.
6. Climb down from the truck, walk to the front of the truck. Insert the pins from the Plow to the truck. Make all of the hydraulic connections as required.
7. Climb back into the truck.
8. Drive the Truck operating the Plow and Sander on the designated routes. The Plow and Sander are operated from the truck cab with hand controls (right hand).
9. Return to the Works Yard and detach the Plow and return the Sander to the storage rack.

The presence of ** indicates non-value added tasks. These are tasks that do not contribute to the stated purpose of the work.

Administrative Issues

The Truck Driver 2/3 works an eight hour day, Monday to Friday from 0700 to 1530 with a ten-minute rest period in the morning, a 30-minute lunch break and a ten-minute rest period in the afternoon. The Truck Driver 2/3 will occasionally work overtime. The trucks in use are equipped with either and air ride or spring suspension driver's seat, power steering, a ten speed split shift gear box and air brakes.

Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Sit to drive and operate the Truck, sander and plow
- Climb two steps approximately one metre high to get in and out of the Truck and Truck box
- Crouch, kneel, bend and stoop to grease and perform pre-trip Inspection on Truck every morning
- Reach below right shoulder to operate dump box, sander and plow controls
- Drive the Truck in traffic between Works Yard and work site



Worker Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job.

7. Sitting posture (neutral spine, shoulders, elbows slightly open, hips above knees are the desired postures)
8. Take frequent rest breaks from sitting and static grip forces required to operate the Truck

Accommodative Considerations

1. Class 3 or 5 license with air brake endorsement is required to drive Single Axle or Tandem Truck.
2. People with injuries to the spine, in any region, may have difficulty with the static and dynamic movements required drive and operate the truck(s).
3. People with shoulder injuries such as rotator cuff tendonitis, bursitis and instability may have difficulty with dynamic and static loading and reaching activities required to drive and operate the truck(s).
4. People with nerve compression injuries in the upper extremities may have difficulty with shifting gears and steering the vehicle.
5. Post-whiplash and other neck problems may have difficulty with this position.
6. People with hip and lower extremity injuries may have difficulty climbing in and out of the truck cab (two steps to one metre from the ground).

Prepared By: Jeffrey J. McGinn, Kinesiologist

February 15, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy systems will provide the major source of energy for the Truck Driver 2/3. This position is primarily sedentary with low level energy expenditure while operating the truck and performing light labouring duties around the work site. It is not likely that the anaerobic energy system will be required to provide energy for the Truck Driver 2/3.

Structural Stresses

Spine – the sedentary nature of this work can place significant passive loads on the spinal structures. Prolonged sitting increases disc compression forces alone. It is not unusual to have people adopt a flexed spine posture while sitting. This sitting posture (flexed spine) requires no activity from the torso musculature, but increases asymmetrical disc compression, passive stretch on the posterior ligaments and disc fibres. This forward flexed posture can contribute to disc integrity problems over time as well as contributing to deconditioning of the torso support musculature.

Shoulders and Neck – due to the static positions required and the frequent reaching for the steering wheel and gear shift, the muscles in the rotator cuff of the shoulder (especially right) and the upper trapezius and scalene muscles of the neck, maintain significant and often constant static load. Resting the left elbow on the driver's side window will have the same negative effect as described above. Also, if the Truck Driver 2/3 is too low in his seat with respect to the steering wheel, gear shift and driver's side window, the load on the neck and shoulders is increased as the arms must be lifted and held in a static position to steer the truck and shift gears. Constant use of the trucks side mirrors, specifically when loading or unloading the dump box, will increase the static tension in the upper trapezius and scalene muscles as well.

Shoulders and Upper Extremity– Serious risk of injury to the shoulders, elbows and hands will result from poor sitting posture and an improperly adjusted seat. The Upper Extremities are primarily used in a static concentric movement pattern and impingement and inflammatory injuries to the shoulder and Upper Extremities are likely.

Hips and Lower Extremities – prolonged sitting is likely to shorten the hamstring muscle group of both legs. This in turn will pull the pelvis under the body and prevent the Truck Driver 2/3 from sitting on the sit bones (Ischeal Tuberosity) and promote the undesirable forward flexed spinal posture. Slip and fall injuries while getting in or out (two small steps to one metre) of the truck or dump box are increased during wet weather or wet working conditions.



INTERVENTIONS

Recommendations that could be implemented to increase productivity and lessen the risk of injury are listed below:

1. Encourage the Truck Driver 2/3 to stand and walk or assist with the labouring duties at the work site at every available opportunity to decrease the time spent sitting.
2. Teach the Truck Driver 2/3 to set up the adjustable seat to adopt neutral sitting postures (hip angle, spine, shoulders, elbows and wrists) which will decrease the risk of injury to the spine and upper extremities.
3. Ensure all seats in all trucks are adjustable (forward seat pan tilt, height, seat pan depth, etc.).
4. Install a Sidewinder on the back of some trucks.
5. Encourage the Truck Driver 2/3 to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.
6. Locate the dump box controls in a location that does not require the Truck Driver 2/3 to twist (right rotation) and almost reach down to the floor (right spinal flexion, right lateral flexion of the truck cab to operate. The Truck Driver 2/3 is not in full control of the truck when required to operate the dump box controls.

Referral: Lana Ho		Organization: Burnaby							Title: Truck Driver 2/3	
Dept.: Public Works		Division: Concrete							Contact: Barry Davis	
		FREQUENCY*							Date: February 10, 1999	
PHYSICAL DEMANDS		R E Q D	S I D E	Sel 1	Low 2	Mod 3	High 4	Max. Weight (kg)	Usual Weight (kg)	COMMENTS
S T R E N G T H	Lifting - Floor to Knuckle	X	E		X			15	<1-5	assist crew with labouring duties
	Lifting - Knuckle to Waist	X	E		X			15	<1-5	assist crew with labouring duties
	Lifting - Waist to Shoulder	X	E		X			15	<1-5	assist crew with labouring duties
	Lifting - Over Head	X	E		X			15	<1-5	assist crew with labouring duties
	Carrying - With Handles									
	Carrying - Without Handles	X	E		X			10	<1-5	small hand tools, shovel, < 10M
	Pushing - Upper Extremity	X	B			X		30	<1-5	shift gears, turn wheel
	Pushing - Hip/Leg Assist	X	B			X		BW	<1-3	work clutch/gas/brake, climb to truck
	Pulling - Upper Extremity	X	B			X		30	<1-5	shift gears, turn wheel
	Pulling - Hip/Leg Assist	X	E	X				BW	10 to 20	climb to truck, open/close gate on box
	Reach - Shoulder or Above	X	E		X			BW	10 to 20	
	Reach - Sho. or Above extnd	X	E	X				BW	BW	climb in/out of truck and truck box
	Reach - Below Shoulder	X	B				X	15	<1-3	drive, shift gears, labour at work site
	Reach - Bel. Shoulder extnd	X	B		X			15	<1	dump box controls, labouring
Handling	X	B				X	15	<1-3	steering wheel, gear shift, tools	
Gripping	X	B				X	35	<1-3	steering wheel, gear shift, tools	
Fine Finger Movements	X	B		X			mod	low	dump box controls, split shifter	
E N R G	Aerobic (percent)	X					100			sit to drive truck, climb in/out of truck/truck box, labour
	Anaerobic (percent)									
	High Energy Expenditure									
	Low Energy Expenditure	X					X			sit to drive truck, climb in/out of truck/truck box, labour
P O S T U R E + M O B I L I T Y	Neck - Static Flexion	X					X			drive truck view road, labour at work site
	Neck - Static Neutral	X					X			drive truck, labour at work site
	Neck - Static Extension	X				X				watch for overhead obstructions, view dump box
	Neck - Rotation	X	B				X			shoulder and mirror check while driving
	Throwing	X		X						possibly throw dirt/debris from shovel
	Sitting	X					X			driving and waiting in truck
	Standing	X			X					possibly at work site while labouring
	Walking	X			X					possibly at work site while labouring, < 10m
	Running/Jumping	X			X					down from truck and truck box
	Climbing - Arms and Legs	X			X					in/out of truck and truck box
	Climbing - Legs Only									
	Bending/Stooping	X			X					pre-trip inspection, climb in/out of truck, labour at site
	Crouching	X			X					pre-trip inspection, climb in/out of truck, labour at site
	Kneeling	X			X					pre-trip inspection, climb in/out of truck, labour at site
Crawling	X			X					pre-trip inspection	
Twisting	X	B		X					operate dump box control, visual checks while driving	
Balancing	X			X					on truck steps or edge of truck box	
G E N E R A L	Traveling	X					X			in city of Burnaby to work and dump site, asphalt plant
	Work Alone	X					X			always in truck alone, with others at work site
	Interact with Public	X					X			driving in traffic, possibly at work site
	Operate Equip/Machinery	X					X			single axle or tandem truck
	Irregular/Extended Hours									8 hour day, 2x10min.rest period, 30 min. lunch, some OT

* Frequency Legend 1 = Seldom; Not Daily 2 = Low Daily Activity; < 1hr
3 = Moderate Demand; Repetition 1 - 3 hrs daily 4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a HIGH RISK TASK: Modifications should be considered

REQD is marked with an X if the particular demand or category is relevant to the purpose of the job.

SIDE refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

Referral:		Organization:				Title: see 1st page header			
Dept.:		Division:				Contact:			
PHYSICAL DEMANDS		R E Q U I R E D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
P E R C E P T I O N	Hearing - Conversations	X				X		crew and Foreman	
	Hearing - Other Sounds	X					X	truck, Backhoe, Equipment, 2 way radio	
	Vision - Far	X					X	drive and operate truck	
	Vision - Near								
	Vision - Colour	X					X	traffic lights	
	Vision - Depth	X					X	drive/operate truck at work site, in traffic and dump site	
	Perception - Spatial	X					X	drive/operate truck at work site, in traffic and dump site	
	Perception - Form								
	Feeling (Tactile)	X	R			X		shift gears, steer truck in and around work site/traffic	
	Reading	X			X			street signs, travel log, truck report	
W O R K E N V I R O N M E N T A L	Writing	X			X			travel log, truck report	
	Speech	X				X		crew and Foreman	
	Inside Work	X					X	in cab of truck, no air conditioning	
	Outside Work	X				X		at work site	
	Hot Conditions >25 deg. C	X		X				spring, summer, fall, no air conditioning in truck	
	Cold Conditions <10 deg.C	X		X				pre-trip inspection, labouring at work site	
	Humid	X		X				wet weather conditions	
	Dust	X		X				depends on weather conditions and soil composition	
	Vapor Fumes	X					X	diesel fumes from truck and equipment	
	Hazardous Machines	X					X	single axle or tandem truck with dump box	
	Proximity to Moving Object	X					X	in traffic with truck, dump box, equipment at work site	
	Noise	X					X	truck, equipment at work site, traffic	
	Electrical Hazard	X			X			overhead wires when raising dump box	
	Sharp Tools								
	Radiant/Thermal Energy	X		X				sun burn in hot weather	
	Slippery Conditions	X		X				in wet weather or work site conditions	
	Vibration and Related	X					X	jarring and bouncing in seat to spine	
	Chemical Irritants								
	Organic Substances	X		X				bacteria contamination in truck/box from sewer dig	
	Medical Waste								
	Blood Products								
	Congested Worksite	X			X			at work site maneuvering truck	
	Lighting - Direct	X					X	sun light, street lights, headlights	
	Lighting - Indirect	X					X	sun light, street lights, headlights	
	Lighting - Adjustable								
	Lighting - Fluorescent								
	Lighting - Incandescent								
	Lighting - Shadows etc.	X			X			depends on time of day, weather and location	

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For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT