



JOB DEMANDS ANALYSIS

Company: Corporation of Delta

Location: Works Yard

Job Title: Truck Driver 2/3 Crane/HIAB

Classification: Regular Duty

Purpose of Activities

The Truck Driver 2/3 Crane/HIAB drives and operates a ten speed Tandem axle truck with a 5.5 metre open deck and a six ton HIAB boom crane. The Truck Driver 2/3 will pick-up and deliver tools, equipment and product in the Fraser Valley, North Vancouver, Vancouver and Delta.

Tools and Equipment

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

- Clothing – Steel Toe boots, hard hat, gloves, safety vest
- Ten Speed Tandem Axle Truck (air brakes) with a 5.5 metre open deck
- Six ton HIAB boom crane
- Chains, tie down straps, cheaters, blocks, lifting straps, stakes
- Small hand tools (hook, hammer, shovel, etc.)

Usual Methods

The Truck Driver 2/3 Crane/HIAB will perform a pre-trip vehicle inspection every morning. This will include greasing the truck, checking and topping up fluid levels, checking air brakes, tire pressure and ensuring all lights are in working order. The truck is then used to pick up and deliver tools, equipment and materials to and from a work site or vendor.

Loading

1. Drive to loading location (work site, works yard, vendor.)
2. Maneuver the truck into position beside the load. Check area for overhead wires or other obstructions. Exit truck.
3. Pull out stabilizers for Crane/HIAB (64-kg force required) by hand. Use controls to level truck with stabilizers.
4. Operate Crane/HIAB controls to maneuver the boom over the load. The controls are located on either side of the truck.
5. Place the lifting straps through the load. Hook the lifting straps to the lifting ring on the Crane/HIAB boom. Operate the Crane/HIAB controls to lift the load from the ground onto the truck deck. Position the load on the truck deck with the Crane/HIAB.
6. Climb up to the truck deck (1.5 m, three ladder steps).
7. Unhook the lifting straps from the load.



8. Climb down from the truck deck. Return the Crane/HIAB boom to the travelling position.
9. Secure the load to the truck with chains, straps and stakes. Chains and straps may be thrown over the load to the far side of the truck deck. The Truck Driver 2/3 may have to climb up onto the truck deck to secure the chains or straps over the load. Climb down from the truck deck.
10. Use a cheater to tighten the load down to the truck deck.
11. Use the controls to lift the stabilizers off the ground. Push in the stabilizers for the Crane/HIAB (64-kg force required) by hand.
12. Return the lifting straps to storage.
13. Climb back into the cab of the truck.
14. Drive the truck to drop off location.

Unloading

1. Maneuver the truck into position to unload the cargo. Check the area for overhead wires or other obstructions. Exit the truck.
2. Pull out the stabilizers for the Crane/HIAB (64-kg force required) by hand. Use the controls to level the truck with the stabilizers.
3. Operate the Crane/HIAB controls to maneuver the boom over the load. The controls are located on either side of the truck.
4. Remove the tie down straps from over the load. Use a cheater if required. Roll up the straps and place in storage.
5. Grab the lifting straps from the storage bin; climb up to the truck deck (1.5m from the ground, three ladder steps).
6. Place the lifting straps through the load. Hook the lifting straps to the lifting ring on the Crane/HIAB boom.
7. Climb down from the truck deck.
8. Operate the Crane/HIAB controls to lift the load off the truck deck to the ground. Position the load on the ground with the Crane/HIAB.
9. Unhook the lifting straps from the load. Put the lifting straps in the storage bin. Return the Crane/HIAB boom to the travelling position.
10. Use the controls to lift the stabilizers off the ground. Push in the stabilizers for the Crane/HIAB (64-kg force required) by hand.
11. Climb into the cab of the truck.
12. Drive the truck to the next pick-up location.

In some instances the cargo may be loaded on or unloaded off the truck deck by a forklift, if one is available.

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

Administrative Issues

The Truck Driver 2/3 Crane/HIAB works an eight hour day, Monday to Friday from 0800 to 1630 with a ten-minute rest period in the morning, a 30-minute lunch break and a ten-minute rest period in the afternoon. Overtime and on-call are not requirements of this position. The truck is equipped with power steering, air brakes, fully adjustable air ride drivers seat, a ten speed split shift gearbox and a six-ton HIAB boom crane. The Truck Driver 2/3 estimates that he travels up to 200 kilometres per day in the Fraser Valley, North



Vancouver, Vancouver and Delta. The Truck Driver 2/3 Crane/HIAB usually works alone. However, a Labourer will be provided on request.

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
- Climb approximately 1.3 metres (two steps) to get in and out of the truck cab
- Climb three ladder steps to 1.5 metres to get on and off the truck deck
- Crouch, kneel, bend and stoop to grease and perform Pre-trip Inspection on truck and Crane/HIAB every morning
- Bend, stoop, crouch, kneel to put chains or lifting straps through load
- Stand on ground to operate Crane/HIAB controls
- Twist spine to operate Crane/HIAB controls and keep visual contact with load
- Reach below and above shoulders to drive the truck, operate Crane HIAB controls, secure load to truck and remove load from the truck
- Drive the truck through traffic in the Fraser Valley, North Vancouver, Vancouver and Delta

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.

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

Accommodative Considerations

1. Class 3 license with air brake endorsement is required to drive the tandem axle 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 and Crane/HIAB.
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 the truck, operate the Crane/HIAB controls and secure the load to the truck.
4. People with nerve compression injuries in the right upper extremity 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 1.3 metres from the ground) and on and off the truck deck (1.5 metres from the ground, three ladder steps).

Prepared By: Jeffrey J. McGinn, Kinesiologist

May 20, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy system will provide the major source of energy for the Truck Driver 2/3 Crane/HIAB. This position is primarily sedentary with low level energy expenditure while driving the truck, operating the Crane/HIAB and loading and unloading cargo on the truck deck. It is not likely that the anaerobic energy system will be required to provide energy for the Truck Driver 2/3 Crane/HIAB.

Structural Stresses

Spine – The sedentary nature of this work can place significant passive loads on the spinal structures. Prolonged sitting increases disc compression forces. A flexed spine sitting posture requires no activity from the torso musculature, but increases asymmetrical disc compression and passive stretch on the posterior ligaments and disc fibres. This forward flexed posture can contribute to disc integrity problems over time as well as decondition the torso support musculature. This passive stretch on the ligaments (ligament creep) destabilizes the spine and any maximal lifting, carrying, pushing or pulling (securing the load to the truck) immediately after prolonged sitting will increase the risk of injury.

During Crane/HIAB operation, the Truck Driver 2/3 is required to rotate (static or concentric contraction) left and/or right to maintain visual contact with the load. These movements will increase asymmetrical compression on the discs increasing the risk of injury

Neck, Shoulders and Upper Extremities – 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 Crane HIAB 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 maneuvering the truck, will increase the static tension in the upper trapezius and scalene muscles as well.

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 Crane /HIAB 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 steps to 1.3 metres) of the truck cab and on and off the truck deck (three ladder steps to 1.5 metres) 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. Teach the Truck Driver 2/3 Crane/HIAB 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.
2. Encourage the Truck Driver 2/3 Crane/HIAB to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.
3. Install a remote Crane/HIAB boom control that can be operated away from the truck. This will decrease the right and left spinal rotation and allow for neutral postures when operating the Crane/HIAB.

Referral: Cathy Cook			Organization: Corporation of Delta						Title: Truck Driver 2/3 Crane/HIAB		
Dept.: Engineering			Division: Roads/Traffic						Contact:Pete Jokish		
PHYSICAL DEMANDS			R E Q U I R E D	S I D E	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	COMMENTS
					Sel 1	Low 2	Mod 3	High 4			
S T R E N G T H	Lifting - Floor to Knuckle	X	D		X			20	<1-20	chains, strap, tie downs, some material	
	Lifting - Knuckle to Waist	X	D			X		20	<1-20	chains, strap, tie downs, some material	
	Lifting - Waist to Shoulder	X	D		X			20	<1-20	chains, strap, tie downs, some material	
	Lifting - Over Head	X	D		X			20	<1-20	chains, strap, tie downs, some material	
	Carrying - With Handles	X	D		X			20	<1-20	straps, shovel	
	Carrying - Without Handles	X	D		X			20	<1-20	chains, straps, tie downs, cheater, blocks	
	Pushing - Upper Extremity	X	B				X	20	<1-20	drive truck, crane/HIAB controls, chains	
	Pushing - Hip/Leg Assist	X	B		X			64	<1-64	tie down load, cheater, push stabilizer in	
	Pulling - Upper Extremity	X	B				X	20	<1-20	drive truck, crane/HIAB controls, chains	
	Pulling - Hip/Leg Assist	X	B		X			64	<1-64	tie down load, cheater, push stabilizer in	
	Reach - Shoulder or Above	X	D		X			20	<1-20	chains/straps over load to tie down	
	Reach - Sho. or Above extnd	X	D		X			20	<1-20	chains/straps over load to tie down	
	Reach - Below Shoulder	X	B				X	20	<1-20	drive, operate crane/HIAB, tie down load	
	Reach - Bel. Shoulder extnd	X	D		X			20	<1-20	lift, carry chains, straps, cheater, bars	
E N E R G Y P O S T U R E + M O B I L I T Y	Handling	X	D				X	20	<1-20	steering wheel, crane controls, chains	
	Gripping	X	D				X	20	<1-20	steering wheel, crane controls, chains	
	Fine Finger Movements	X	D			X		max.	low	chains, straps, truck and crane controls	
	Aerobic (percent)	X					100	drive truck, operate crane/HIAB controls			
	Anaerobic (percent)										
	High Energy Expenditure										
	Low Energy Expenditure	X					X	drive truck, operate crane/HIAB controls			
	Neck - Static Flexion	X						drive truck, tie down load			
	Neck - Static Neutral	X				X		drive truck, stand, walk			
	Neck - Static Extension	X				X		watch boom of crane/HIAB, look up to deck, tie down load			
	Neck - Rotation	X	E				X	shoulder check to drive, operate crane/HIAB boom/controls			
	Throwing	X	E		X			throw chains, straps over load to tie down or remove			
	Sitting	X					X	in truck, air ride, fully adjustable seat, 200 km/day			
	Standing	X				X		at work site, operate crane/HIAB, pick up/deliver load			
G E N E R A L	Walking	X			X			around truck, on truck deck, to/from shipping doors			
	Running/Jumping										
	Climbing - Arms and Legs	X			X			up/down to truck (1.3 m, two steps), on/off truck deck (1.5 m)			
	Climbing - Legs Only										
	Bending/Stooping	X			X			lift, carry chains, secure load to truck tie downs			
	Crouching	X			X			pre-trip inspection, tie down load to truck			
	Kneeling	X			X			pre-trip inspection, tie down load to truck			
	Crawling	X			X			pre-trip inspection			
	Twisting	X	E		X			operate crane/HIAB controls, reach for chains with hook			
	Balancing										
	Traveling	X					X	200 km/day, Fraser Valley, Vancouver, North Vancouver			
	Work Alone	X					X	all the time, Labourer on request			
	Interact with Public	X					X	drive in traffic, pick up and deliver load			
	Operate Equip/Machinery	X					X	10 speed tandem axle truck, 6 ton crane HIAB			
Irregular/Extended Hours							0800-1630, no OT or stand by				

* 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 D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
PERCEPTION	Hearing - Conversations	X				X		cell phone, crews, supervisors, shipper/receivers	
	Hearing - Other Sounds	X			X			cell phone, vehicle traffic	
	Vision - Far	X					X	drive truck, operate crane/HIAB, tie down/untie load	
	Vision - Near								
	Vision - Colour	X					X	traffic lights	
	Vision - Depth	X					X	drive truck in traffic, operate crane/HIAB	
	Perception - Spatial	X					X	drive truck in traffic, operate crane/HIAB	
	Perception - Form								
	Feeling (Tactile)	X			X			operate crane/HIAB controls, use cheater to tie down load	
	Reading	X					X	street signs, maps, job list	
WORKING CONDITIONS	Writing	X			X			pick-up/delivery orders	
	Speech							cell phone, crews, supervisor, shipper/receivers	
	Inside Work	X					X	in cab of truck, possibly in some buildings	
	Outside Work	X				X		operate crane/HIAB, tie down/untie load	
	Hot Conditions >25 deg. C	X		X				spring, summer, fall, no air conditioning in truck	
	Cold Conditions <10 deg.C	X		X				operate crane/HIAB outside in fall, winter, spring	
	Humid	X		X				wet weather	
	Dust	X		X				possibly at some job sites	
	Vapor Fumes	X					X	diesel fumes from truck	
	Hazardous Machines	X					X	10 speed tandem axle truck, 6 ton crane/HIAB	
ENVIRONMENTAL	Proximity to Moving Object	X					X	drive truck in traffic, operate crane/HIAB, swinging load	
	Noise	X					X	engine noise, external traffic	
	Electrical Hazard	X		X				overhead wires	
	Sharp Tools	X			X			screw drivers, utility knife	
	Radiant/Thermal Energy	X		X				sun burn, rays enhanced through truck windows	
	Slippery Conditions	X		X				wet/icy road conditions, slip and fall at job site on truck deck	
	Vibration and Related	X					X	truck vibration, stiff suspension, air ride seat	
	Chemical Irritants								
	Organic Substances	X		X				pick up/deliver sewer materials	
	Medical Waste								
TASKS	Blood Products								
	Congested Worksite							drive truck in traffic, job site, operate crane/HIAB in small area	
	Lighting - Direct	X					X	day light, sun light, head lights, street lights	
	Lighting - Indirect	X					X	day light, street lights	
	Lighting - Adjustable								
	Lighting - Fluorescent								
	Lighting - Incandescent								
Lighting - Shadows etc.	X		X				depends on location, weather and time of day		

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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.

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