



JOB DEMANDS ANALYSIS

Company: GVRD

Location: Watershed

Job Title: Chlorine Truck Driver

Classification: Regular Duty

Purpose of Activities

The purpose of the Chlorine Truck Driver position is to ferry tonners of chlorine from one watershed operation to another and to/from the supplier of chlorine.

Tools and Equipment

The following tools and equipment are used to perform their duties:

- GMC/White cabover Flatbed truck, standard transmission.
- Budgit Crane/Hoist.
- Caldwell Hoist.
- Tonners of Chlorine (2.2 m long and 0.83 m in diameter, 1500 kg full and 590 kg empty).
- Locking blocks with cotter pins on truck bed.
- Safety (portable gas detector, B-kit, Tyvek suit, Scott Pak).

Usual Methods – Load Tonners

1. Get out of cab.
2. Place four (4) dangerous goods stickers in holders on outside of truck.
3. Climb onto truck bed (1.40 m).
4. Guide forklift driver.
5. Push/roll tonner into position.
6. Flip up blocks and slide two pins into place.
7. Repeat for four tonners.
8. Twist bolts to lock blocks in place.
9. Climb down off of the truck bed.
10. Climb back into truck (1.20 m).

Usual Methods – Crane Operation (Budgit)

1. Pull crane along beam to tonner.
2. Push button to lower crane.
3. Push button to hook bar and then raise tonner.
4. Push tonner (30 kg) down to loading position.
5. Lower tonner to truck or concrete position.



The Caldwell crane is fully automated so it is not necessary to push the tonners. However, the short control wire means that the operator has to follow the crane, stepping over tonners as they go. There is at least one individual available to assist the driver at each stop.

Administrative Issues

The early part of the shift is normally used for phone calls, warming up the truck and checking the brakes. This vehicle does not necessarily operate everyday depending on demand for chlorine.

The driver may visit all three watersheds as well as the StanChem plant and may also visit Lion's Gate and Lulu Island sewage treatment plants.

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.

- Seated position.
- Operate cranes.
- Climb on and off truck bed and in/out of cab.
- Driving while seated in traffic.
- Work outside.
- Route determination.

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.

- Some control over pacing.
- Timing of breaks.
- Some control of loading methods

Accommodative Considerations

1. People with injuries to the spine in any region may have difficulty with the static and largely seated postures. They may also have difficulty with getting in and out of the vehicle several times.
2. Individuals with knee or ankle/foot problems would be very challenged by the agility requirements and regular climbing up and down required.
3. People with shoulder injuries such as rotator cuff tendinitis, bursitis and instability may have difficulty with the steady shifting of gears on the right side.
4. People with any upper extremity problems may have difficulty with this position (especially grip related issues like carpal tunnel syndrome and epicondylitis).
5. post-whiplash or individuals with neck problems may find that the vibration involuntarily increases muscle tension to reduce shear (it is likely that the driver will adapt to this requirement within a few weeks).



6. The sitting required for this position would aggravate individuals with hemorrhoids or suffering from vascular insufficiency in the legs
7. There is a learning curve associated with this work.

Prepared By: Greg Hart, Kinesiologist

March 18, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy system supplies the vast majority of energy required to complete the tasks in this position since the work can be characterized as being light activity, mostly seated with only occasional light exertion.

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. If great care is not taken to control posture, it is not unusual to have people adopt a flexed spine posture that requires no activity from the torso musculature, but increases asymmetrical disc compression, passive stretch on the posterior ligaments and disc fibres. This can contribute to disc integrity problems over time as well as contributing to deconditioning of the torso support musculature. This issue is complicated by the tendency of the driver's seat to tip back and by the significant (4 cm) anterior-posterior shear vibration that is present in the vehicle.

Shoulders and Neck – the right arm must reach into an extended position to operate the gearshift with some force required. This is a weak biomechanical position for the shoulder and arm to operate.

Arms and Hands – grip is a key issue in having to manipulate pins and bolts as well as handling a steering wheel on a big truck in traffic.

Special Stresses

This truck is carrying lethal cargo and some individuals may be intimidated by that prospect.

INTERVENTIONS

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

1. Purchase a new truck that has significantly reduced vibration and more steady seat.
2. Lengthen the control wire on the Caldwell Hoist so that the operator does not have to follow the tonner's path when moving these objects around.
3. Provide regular education in effective use of the body and neutral joint positions for this type of work.
4. Encourage regular conditioning of the body to counter the effects of spending so much time in a sedentary job.

PJDC-Chlorine Truck Driver

Referral: Keith Arkell		Organization: GVRD						Title: Chlorine Truck Driver		
Dept.:		Division:						Contact: Ron Caldwell		
								Date: March 18, 1999		
PHYSICAL DEMANDS		R E Q 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									
	Lifting - Knuckle to Waist									
	Lifting - Waist to Shoulder									
	Lifting - Over Head									
	Carrying - With Handles									
	Carrying - Without Handles									
	Pushing - Upper Extremity		D				X	15	5	Shifting gears, closing safety locks on deck
	Pushing - Hip/Leg Assist		B			X		30	30	Rolling tonners on deck of truck
	Pulling - Upper Extremity		R				X	10	3	Shifting gears back
	Pulling - Hip/Leg Assist									
	Reach - Shoulder or Above		B			X		15	5	Secure bolts and blocks into place on truck bed
	Reach - Sho. or Above extnd									
	Reach - Below Shoulder		D				X	mod.	min.	Hook crane to tonners, gear shift
	Reach - Bel. Shoulder extnd		D		X			mod.	min.	Hook crane to tonners
Handling		B			X		max.	mod.	Tonners, crane, blocks, pins and bolts	
Gripping		B				X	max.	min.	Steering wheel, gearshift, crane parts, tonners	
Fine Finger Movements		D				X	min.	min.	Operate push button controls for crane, bolts	
E	Aerobic (percent)						95	Most activity		
N	Anaerobic (percent)				5			Occasional brief strenuous activity		
R	High Energy Expenditure									
G	Low Energy Expenditure						X	Seated most of the time with only light activity otherwise		
P O S T U R E + M O B I L I T Y	Neck - Static Flexion									
	Neck - Static Neutral					X				Steady highway driving posture
	Neck - Static Extension									
	Neck - Rotation						X			Shoulder and mirror checking while driving
	Throwing									
	Sitting						X			60 minutes at a time while driving - seat (air ride) tips back
	Standing				X					Brief periods at journey's end, when picking up chlorine
	Walking				X					Less than 40 metres at a time around vehicle at watershed
	Running/Jumping									
	Climbing - Arms and Legs		B			X				On and off the deck of the truck(1.40 m), in/out of cab (1.20m)
	Climbing - Legs Only		B		X					Up/down stairs at loading/unloading area
	Bending/Stooping									
	Crouching				X					Check brakes, undo locks on security gates at watershed
	Kneeling									
Crawling										
Twisting										
Y	Balancing					X				On the deck of the truck, stepping over tonners while guiding crane
G E N E R A L	Traveling						X			Throughout the GVRD and into the mountains east of the city
	Work Alone						X			Except when unloading or loading
	Interact with Public						X			Mostly in the role of a driver in traffic
	Operate Equip/Machinery						X			Drive truck, operate crane at watershed
	Irregular/Extended Hours									

* 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.

PJDC-Chlorine Truck Driver

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	
P E R C E P T I O N	Hearing - Conversations		B		X			Talking with people at Stan Chem or watershed
	Hearing - Other Sounds		B				X	Traffic noises, crane noises
	Vision - Far		B				X	Driving and most any other activity
	Vision - Near		B		X			Examine seals and other details
W O R K E N V I R O N M E N T A L	Vision - Colour							
	Vision - Depth						X	Judgeing distance and speed while driving, position tonners
	Perception - Spatial						X	Moving large truck in and out of traffic and loading areas
	Perception - Form							
	Feeling (Tactile)						X	Judge pressure on switches and steering wheel/gearshift
	Reading				X			Work orders, invoices
	Writing				X			Work orders, invoices
	Speech				X			Talking to co-workers and suppliers representatives for safety
	Inside Work						X	Inside truck cab, in watershed buildings
	Outside Work					X		Loading and unloading tonners, opening/closing gates
	Hot Conditions >25 deg. C			X				Occasional in summer
	Cold Conditions <10 deg.C							Possible in winter, especially at higher elevations
	Humid				X			Rain and high humidity are common
	Dust			X				In dry weather
	Vapor Fumes					X		Vehicle exhaust
	Hazardous Machines						X	Crane, forklift, tonners
Proximity to Moving Object					X		Crane, forklift, tonners	
Noise						X	Road and engine noise, pump noise at watershed facilities	
E N V I R O N M E N T A L	Electrical Hazard							
	Sharp Tools							
	Radiant/Thermal Energy					X		Through the windshield of the vehicle
	Slippery Conditions			X				During rain and snow conditions
	Vibration and Related						X	High acceleration anterior-posterior shear vibration in cab
	Chemical Irritants			X				Possible exposure to chlorine
	Organic Substances							
	Medical Waste							
	Blood Products							
	Congested Worksite				X			Working on trailer deck with tonners and in some watersheds
	Lighting - Direct						X	Daylight
	Lighting - Indirect						X	Reflected daylight
T A S K	Lighting - Adjustable							
	Lighting - Fluorescent				X			In GVRD facilites
	Lighting - Incandescent				X			In GVRD facilites
	Lighting - Shadows etc.							

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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