



JOB DEMANDS ANALYSIS

Company: City of Burnaby

Location: Works Yard

Job Title: Labourer – Flushing Truck

Classification: Regular Duty

Purpose of Activities

The purpose of the duties of the Labourer is to assist the operator in maintaining clear storm and sanitary drains.

Tools and Equipment

The Labourer will use the following tools and equipment to perform their duties:

- Flushing Truck (1996 Ford Truck, single axle, with auxiliary motor for flushing attachments).
- Gloves.
- Safety Boots.
- Safety Vest.
- Safety Helmut.
- Hose.
- Rodding attachments.

Usual Methods

1. Check over truck at work's yard.
2. Climb into the truck (1.7 m).
3. Ride on passenger side of truck to first work site.
4. Climb down from truck at site.
5. Pick-up cones from the front of the vehicle and distribute around vehicle to warn traffic away.
6. Remove manhole cover with bar.
7. Swing hose reel into place over hole.
8. Attach appropriate head to the hose.
9. Slip hose through the collar (tigertail).
10. Lean over hole and dangle hose head by the tigertail until it connects with the drain hole.
11. Engage motor on flusher to run the hose into the drain pipe.
12. Pull hose out with motor after flush is complete (sometimes the hose has to be pulled out by hand).
13. Steps 7 through 12 can also occur in open culverts. It is possible to have to drag the hose for up to 100 metres (often through heavy brush) in locations where the truck cannot back over the target area.
14. Detach hose head and replace on vehicle.
15. Collect cones and replace on the front of the truck.



16. Climb into truck
17. Repeat steps 2 to 16.

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 labourer works from 0700 to 1530, Monday to Friday. Overtime is possible in the night hours due to serious rainfall and/or flooding from drain back-ups.

Working around water is a key element of this job. Some of this water can be from sanitary sewers which is contaminated with waste products. They are responsible for cleaning sanitary, storm and culvert drains clear. They also clear house connections.

The environmental conditions can change this job appreciably. It is possible to be exposed to extreme hot conditions that have implications for hydration, sunburn and heatstroke. Wet weather is common and can make footing less reliable, bags more slippery and grip forces much higher. Cold is also a possibility as is snow, although this is less likely than wet conditions.

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.

- Ride in a large vehicle.
- Walk over uneven ground and through bush, water.
- Exposure to sanitary sewer water.
- Handle hoses and attachments.
- Carry out tasks under unpredictable outdoor conditions that often include steady rainfall.

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.

- Choose postures for carrying out duties (e.g. lifting using hips and maintaining neutral spine, creative energy saving techniques).
- Positioning of equipment (usually).
- Timing of breaks.

Accommodative Considerations

1. People with injuries to the lumbar spine may have difficulty with forward bending postures that are common in most duties of this job. Additionally, vibration from riding in the vehicle can be aggravating.
2. Neck problems could be irritated by the substantial forward flexion in this job.
3. People with any upper extremity problems may have difficulty with this position because of heavy gripping and fine control of dangling hose.



4. Individuals with knee, hip or ankle difficulties may find have difficulty with this job because of exposure to walking over unpredictable ground while pulling hose and the regular climbing in and out of the vehicle.
5. Individuals recovering from systemic illness should be carefully screened before entering this activity.
6. There is no significant learning curve associated with the tasks.

Prepared By: Greg Hart, Kinesiologist

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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 is usually of low intensity. Periodically, there could be heavy demands on the aerobic and anaerobic energy systems to supply energy when pulling hose or travelling across rough terrain.

Structural Stresses

Spine – forward bending over culverts and manholes places potential flexion loads on the lumbar and thoracic spine. Sometimes this includes handling light loads and it is possible to adopt neutral spine postures in these instances but it is difficult. This activity can increase asymmetrical loading on the discs of the spine which can weaken the outer ring of the disc and leave it more susceptible to failure over time.

Neck – since much of this job requires the labourer to be looking down it means that the cervical spine is maintained in flexion for some periods of time.

Arms and Hands – frequent heavy gripping while wearing gloves and in wet environments increases the risk of injuries to the elbows and wrist tendinitis which can lead to nerve entrapment scenarios. The gripping is made worse by the wearing of gloves (obviously necessary) and wet materials. As muscles in the shoulder, trunk and legs fatigue, more work often comes from the arms which will also increase loads at the elbow and forearm and could lead to epicondylitis type conditions (i.e., tennis or golfer's elbow).

Knees and Ankles/Feet – straddling ditches and manholes and travelling over uneven ground while pulling hose are all common scenarios in this job. This can produce stress through the ligaments in these joints.

INTERVENTIONS

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

1. Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance.
2. Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job.
3. Maintain a neutral spine whenever possible.
4. Create a portable stand to take the weight of the hose while it is being dangled in the hole.
5. Provide portable lighting that shines into the hole or culvert.
6. Keep arms and loads close to the body at all times.
7. Be careful to not increase grip forces unnecessarily.

PJDC-Flushing Truck Lab.

Referral: Lana Ho		Organization: City of Burnaby							Title: Flushing Truck - Labourer		
Dept.: Engineering		Division: Sewers							Contact: Dan Stewart		
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	B			X		70	30	Hose stuck in hole, manhole cover	
	Lifting - Knuckle to Waist	X	B			X		70	30	Hose stuck in hole, manhole cover	
	Lifting - Waist to Shoulder										
	Lifting - Over Head										
	Carrying - With Handles										
	Carrying - Without Handles										
	Pushing - Upper Extremity	X	D			X		mod.	min.	Levers on hose reel and motor	
	Pushing - Hip/Leg Assist										
	Pulling - Upper Extremity	X	D			X		mod.	min.	Levers on hose reel and motor	
	Pulling - Hip/Leg Assist	X	B		X			100	25	Pulling hose up to 100 metres through bush, manhole	
	Reach - Shoulder or Above										
	Reach - Sho. or Above extnd										
	Reach - Below Shoulder	X	B				X	15	5	Dangling hose in hole or culvert	
	Reach - Bel. Shoulder extnd	X	B			X		15	5	Dangling hose in hole or culvert	
Handling	X	B				X	Max.	Mod.	Hose, levers, tools, heads, tigertail, manholes		
Gripping	X	B				X	Max.	Mod.	Hose(slippery with gloves), parts, levers		
Fine Finger Movements											
E N R G Y	Aerobic (percent)	X					90	Most activities although at rates approaching 4 METS			
	Anaerobic (percent)	X		10				During heavy lifting, dragging hose, disentangling hose			
	High Energy Expenditure	X			X			During walking through heavy brush, heavy labour activities			
	Low Energy Expenditure	X				X		Many activities including standing and riding in the truck			
P O S T U R E + M O B I L I T Y	Neck - Static Flexion	X					X	Looking down into manholes, culverts			
	Neck - Static Neutral										
	Neck - Static Extension										
	Neck - Rotation	X	B			B		Normal dyanmic activity			
	Throwing										
	Sitting	X					X	In vehicle bench seat			
	Standing	X	B				X	On a variety of surfaces for about 10 minutes per occasion			
	Walking	X				X		Usual < 20 m, sometimes up to 100m, occasional in brush			
	Running/Jumping	X		X				Jump over ditches, obstacles			
	Climbing - Arms and Legs	X	B			X		In/out of truck, occasionally into manhole			
	Climbing - Legs Only	X	B		X			Up and down ditches			
	Bending/Stooping	X				X		Look into a sewer, culvert or pipe, engaging hose			
	Crouching	X				X		To attach pipe, to access pipe or clog			
	Kneeling	X			X			To attach pipe, to access pipe or clog			
Crawling	X		X				Look into a culvert or pipe				
Twisting											
Balancing	X				X		Standing on the edge of manholes, culverts				
G E N E R A L	Traveling	X				X	Within the Burnaby city				
	Work Alone	X		X			Work with and Equipment operator, can be separated temp.				
	Interact with Public	X				X	As a driver, in person while flushing sewers or culverts				
	Operate Equip/Machinery	X	B			X	Drive large truck, operate flushing equipment				
	Irregular/Extended Hours	X		X			Some overtime at night, emergencies				

* 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.

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