



## JOB DEMANDS ANALYSIS

**Company:** City of Burnaby

**Location:** Works Yard

**Job Title:** Operator – Flushing Truck

**Classification:** Regular Duty

### Purpose of Activities

The purpose of the duties of the Flushing Truck Operator is maintain 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. Drive vehicle in traffic to first work site.
4. Climb down from truck at site.
5. Perhaps remove manhole cover with bar.
6. Swing hose reel into place over hole.
7. Attach appropriate head to the hose.
8. Slip hose through the collar (tigertail).
9. Lean over hole and dangle hose head by the tigertail until it connects with the drain hole.
10. Engage motor on flusher to run the hose into the drain pipe.
11. Pull hose out with motor after flush is complete (sometimes the hose has to be pulled out by hand).
12. 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.
13. Run motor and hose reel while labourer works at other end of hose.
14. Detach hose head and replace on vehicle.
15. Climb into truck
16. 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 operator 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.

- Drive 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.
- Respond to traffic conditions.

#### 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.
- Driving techniques.

#### 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 a learning curve associated with the tasks.

Prepared By: Greg Hart, Kinesiologist February 4, 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 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.

**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 Oper.

Referral: Lana Ho		Organization: City of Burnaby						Title: Flushing Truck - Operator		
Dept.: Engineering		Division: Sewers						Contact: Dan Stewart		
								Date: February 4, 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	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, steering
	Pulling - Hip/Leg Assist	X	B		X			100	25	Pulling hose up to 100 m through bush, manhole
	Reach - Shoulder or Above	X	B		X			min.	min.	During some driving/steering
	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
E N E R G Y	Handling	X	B				X	Max.	Mod.	Hose, levers, tools, heads, tigertail, manholes
	Gripping	X	B				X	Max.	Mod.	Hose(slippery w/ gloves), parts, levers, steering
	Fine Finger Movements	X	B		X			min.	min.	Operate signals, truck controls
	Aerobic (percent)	X					90	Most activities although at rates approaching 4 METS		
P O S T U R E S	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		
	Neck - Static Flexion	X					X	Looking down into manholes, culverts		
M O B I L I T Y	Neck - Static Neutral									
	Neck - Static Extension									
	Neck - Rotation	X	B			X		Normal dyanmic activity, shoulder checking while driving		
	Throwing									
	Sitting	X					X	In vehicle operator air-ride 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		
	G E N E R A L	Crawling	X		X				Look into a culvert or pipe	
Twisting										
Balancing		X				X		Standing on the edge of manholes, culverts		
Traveling		X					X	Within the Burnaby city		
N O T E	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.

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				X	Co-workers over the noise of equipment, via radio	
	Hearing - Other Sounds	X	X				X	Equipment and traffic sounds	
	Vision - Far	X					X	Most all activities including driving and working truck equip.	
	Vision - Near								
	Vision - Colour								
	Vision - Depth	X					X	Working in traffic, judging distances in sewer manholes	
	Perception - Spatial	X					X	Reaching around equipment and obstacles, driving	
	Perception - Form	X					X	Discerning the difference between different bits and tools	
	Feeling (Tactile)	X	B			X		Feeling inside culverts/using tools where no sight available	
	Reading	X			X			Work orders, signs	
NOTES	Writing	X	D		X			Notes	
	Speech	X					X	Communicate with co-worker, public, others via radio	
WORKING CONDITIONS	Inside Work	X				X		Time spent in the truck and in office	
	Outside Work	X					X	In all weather conditions every day	
	Hot Conditions >25 deg. C	X		X				Occasionally during summer months	
	Cold Conditions <10 deg.C	X				X		Regularly in the winter months	
	Humid	X		X				During rain and in summer months	
	Dust	X				X		On dry days this is common in many areas	
	Vapor Fumes	X					X	Sewer gases, diesel and gasoline fuels	
	Hazardous Machines	X					X	Truck and flushing equipment	
	Proximity to Moving Object	X					X	Working around traffic, boom, hose and reel on truck	
	Noise	X					X	Equipment is loud when running for flush	
	Electrical Hazard	X			X			Overhead wires, underground electrical lines	
	Sharp Tools	X				X		Blades on some flushing bits	
	Radiant/Thermal Energy	X				X		Sunlight through truck windows	
	Slippery Conditions	X					X	Mud and water on asphalt, grass, culverts, ditches	
	Vibration and Related						X	Riding in the truck	
	Chemical Irritants	X		X				Spills of a variety of substances, oil and gasoline	
	Organic Substances	X					X	Raw sewage, dead animals, rotting vegetation	
	Medical Waste			X				Syringes in sewers or culverts	
	Blood Products								
	TASKS	Congested Worksite							
Lighting - Direct		X					X	Sunlight, outdoors or through cab windows	
Lighting - Indirect		X				X		Reflections from buildings, vehicles and water	
Lighting - Adjustable		X				X		Portable light for checking culverts and manholes	
Lighting - Fluorescent									
Lighting - Incandescent									
Lighting - Shadows etc.		X				X		Behind buildings or truck, in ditches	

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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