



JOB DEMANDS ANALYSIS

Company: City of Burnaby

Location: Works Yard

Job Title: Driver/Swamper

Classification: Regular Duty

Purpose of Activities

The purpose of the duties of the Driver/Swamper is to move residential refuse from the community to the disposal centres.

Tools and Equipment

The Driver/Swamper will use the following tools and equipment to perform their duties:

- Rear loading Garbage Truck.
- Gloves.
- Safety Boots.
- Safety Vest.

Usual Methods – Regular Pick-up

The following will be carried out at between 800 and 1000 homes per day with total loads accumulating from 10,000 kg to 16,000 kg depending on the time of year (essentially an average of 10 – 15 kg per household and between two and four items per household) with special Yard Waste collections being the highest loads. The driving task is alternated between the two workers every one to two hours depending on the specific crew. Loads range from 5 or 8 kg to highs of 40 kg.

1. Check over truck at work's yard.
2. Drive (or ride depending on day) truck out to route area.
3. One person drives the other loads.
4. Swamper walks up to 5 metres on gravel or uneven pavement.**
5. Picks up garbage as either a can (up to 1.4 m high), large garbage bag(s), small grocery plastic bags, boxes of material, bundles of brush and other items. This activity can also include reaching into the bin which can involve bending at the waist.**
6. Carries refuse (one or two cans or bags or combination) to the back of the truck. May throw the refuse into the truck if it is not too heavy or far away.
7. Lifts refuse into the back of the truck (1 metre). If it is a can it must be inverted with one arm help above shoulder height.**
8. Carry can back to residence and place it down (if can is used).**
9. Repeat steps 4 to 8 if large amounts of refuse at residence.
10. Walk (10 metres) or step-up onto the rear step (0.8 metres) of the truck and hang onto the handholds as the vehicle travels to the next residence.**
11. Step off truck and begin at step 4 again.



12. Occasionally cycle the compactor on the truck by operating levers (1 metre from ground).
13. Driver and swamper exchange positions after approximately an hour.**
14. When the truck is full, it is driven to the waste site in Richmond (up to a 45 minute drive).

Usual Methods – Yard Waste

The Yard Waste is seasonal and only runs from the beginning of April through to the end of summer with the heaviest work in April. These routes are larger and often the distances between the residences are larger, but the volume and the weight of the refuse are significantly higher. Yard waste is deposited in a special yard in Burnaby instead of going to Richmond.

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 Driver/Swamper starts work at 0700 and works on a “Task System.” This means that the crews work until they complete their route and return to the yard. Once all the crews have returned, everyone can leave for the day. Depending on volume, this can often be around 1230 or 1300. It is uncommon for the crews to take any official breaks or lunches. Every route has to be picked up on the appointed day, so irrespective of how heavy the work is it needs to be completed.

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.

There are foremen in the field who take care of complaints and write notices for residences that put out ineligible materials for pick-up (e.g., building materials). There are currently five zones in the City of Burnaby and they run ten trucks.

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.
- Lift, carry, grip and handle unpredictable loads.
- Meet daily deadlines (task).
- 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).
- Planning of lifts and routes for carrying.
- Placement of the truck with respect to the residence.
- Frequency and timing of switching duties.

Accommodative Considerations

1. People with injuries to the spine in any region may have difficulty with constant movement of loads from near ground level to the back of the truck.
2. People with shoulder injuries such as rotator cuff tendinitis, bursitis and instability may have difficulty with the frequent and often challenging loads and the frequent elevated arm postures.
3. People with any upper extremity problems may have difficulty with this position because of constant gripping and carrying of loads.
4. Post-whiplash and other neck problems may have difficulty with this position because of constant upper extremity load and elevated arm postures
5. Individuals with knee, hip or ankle difficulties may find have difficulty with this job because of constant walking over unpredictable ground while carrying load.
6. A very high level of general fitness is preferred for this job and individuals who do not present with this feature are likely to be at higher risk for mechanical injury.
7. Individuals recovering from systemic illness should be carefully screened before entering this activity.
8. Individuals who do not cope under deadline pressure or in outdoor high-autonomy work environments would have difficulty with this position.
9. There is no significant learning curve associated with the tasks.

Prepared By: Greg Hart, Kinesiologist

February 24, 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 ongoing in nature. Previous studies conducted at sea level suggest that the energy requirements exceed 1.3 Litres of oxygen uptake each minute requiring the worker to have a maximum aerobic power of close to 45 ml/kg/min. It is a paradox that using good mechanical form in lifting and carrying actually increases energy consumption. Individuals with low aerobic power will take increasing mechanical risks with their bodies as a result of mounting fatigue. The “Task System” employed in Burnaby increases these demands further.

Structural Stresses

Spine – there are a number of issues impacting the spine. While the individual is driving, the spine becomes flexed and the muscles do not act to support it. There is also increasing laxity of the rear ligaments and the outer ring of the disc with increased pressure on the disc nucleus. This time of inactivity is followed by a period of intense, repetitive exertion that requires significant stabilizing of the spine. There is a profound emphasis on the strength and endurance of the torso stabilizers. If there is bending involved in the lifting, it exacerbates the problems brought on by sitting. If there are asymmetrical lifts and twisting motions while carrying load, the risk of damage to the structures in the spine increases dramatically.

Shoulders and Neck – due to the considerable load being carried by the upper extremities and the frequent positioning of the arms away from the body, this activity places individuals at increased risk for rotator cuff tendinitis, sub-acromial bursitis and damage to the labral surfaces of the joint. The shoulder is mechanically ineffective when the arms are away from the body, especially under load. This also contributes to significant tension through the muscles of the neck and upper back. When the arm is held above the shoulder, it is in an impingement position which can lead to a number of the conditions stated above.

Arms and Hands – frequent heavy gripping increased 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).



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. Avoid asymmetrical lifts wherever possible.
4. Avoid twisting with a load to avoid damage to discs in the spine.
5. Keep arms and loads close to the body at all times.
6. Test a load before it is lifted.
7. Plan the route from the residence to the truck, get the truck as close as possible.
8. Take a moment to extend the spine and warm up the body when switching from driving to swamping.
9. Be careful to not increase grip forces unnecessarily.
10. Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.
11. Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.
12. Begin a participative review of the "Task System" to explore alternatives that decrease pace of demand on workers.

PJDC-Driver/Swamper

Referral: Lana Ho			Organization: City of Burnaby						Title: Labourer		
Dept.: Engineering			Division: Garbage						Contact:Bill Geiger		
PHYSICAL DEMANDS			REQ	D	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	Date: May 4, 1999
					Sel 1	Low 2	Mod 3	High 4			
S T R E N G T H	Lifting - Floor to Knuckle		B				X	50	8	Garbage cans, bags, brush	
	Lifting - Knuckle to Waist		B				X	50	8	Garbage cans, bags, brush to hopper	
	Lifting - Waist to Shoulder		B				X	50	8	Garbage cans, bags, brush to hopper	
	Lifting - Over Head		D			X		1	neg	Cans and bottles into plastic containers	
	Carrying - With Handles		B				X	50	12	Garbage cans of all sizes for <5 metres	
	Carrying - Without Handles		B				X	50	8	Garbage bags, boxes, brush <5 metres	
	Pushing - Upper Extremity										
	Pushing - Hip/Leg Assist										
	Pulling - Upper Extremity		B			X		25	10	Removing garbage from a bin or can	
	Pulling - Hip/Leg Assist		R				X	20	20	Assist in getting onto back step of truck	
	Reach - Shoulder or Above		B			X		20	12	Grab handhold for riding on the truck	
	Reach - Sho. or Above extnd										
	Reach - Below Shoulder		D			X		20	4	Reach into cans, bins to retrieve baggs	
	Reach - Bel. Shoulder extnd		D			X		20	4	Reach into cans, bins to retrieve baggs	
	Handling		B				X	8	2	Garbage cans, bags, brush w/gloves	
Gripping		D				X	max.	mod.	Garbage cans, bags, brush w/gloves		
Fine Finger Movements		B		X			mod.	min.	Pick up paper, small items		
E	Aerobic (percent)					85	Walking, lifting and climbing on truck, driving				
N	Anaerobic (percent)				15		Very heavy lifts, high volume stops, walking up hill				
R	High Energy Expenditure					X	Walking, lifting and climbing on truck				
G	Low Energy Expenditure				X		Driving in vehicle, brief walking and standing				
P O S T U R E S + M O B I L I T Y	Neck - Static Flexion										
	Neck - Static Neutral										
	Neck - Static Extension										
	Neck - Rotation		B		X		Shoulder check while driving				
	Throwing		B			X	Bags and other pieces of garbage into truck (<3 metres)				
	Sitting					X	While driving vehicle (max. 60 minutes/time)				
	Standing				X		Briefly while waiting for compactor to cycle				
	Walking					X	Several kilometres per day at rapid pace				
	Running/Jumping		B			X	Jumping/stepping down from riding step				
	Climbing - Arms and Legs		B			X	One step onto back of truck, two steps into the cab				
	Climbing - Legs Only		B		X		Walking up hills, can be steep (<200 metres)				
	Bending/Stooping						X	Virtually all items they pick up are below mid-thigh level			
	Crouching				X		To pick up small pieces of garbage				
	Kneeling										
	Crawling										
Twisting					X	Not necessary, but common when throwing or turning					
Balancing		B			X	Riding on step over sometimes rough terrain					
G E N	Traveling					X	Throughout Burnaby in a garbage truck, to waste station				
	Work Alone										
	Interact with Public					X					
	Operate Equip/Machinery		B				X	Garbage truck(drive and run compacting equipment)			
Irregular/Extended Hours						X	Task system, employees leave after route completed				

* 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		
PERCEIVING	Hearing - Conversations		B			X		Colleagues, members of the public in person/radio	
	Hearing - Other Sounds		B				X	Radio, traffic, machine sounds	
	Vision - Far		B				X	Driving, locating garbage and destination	
	Vision - Near								
	Vision - Colour								
	Vision - Depth		B				X	Seeing and reaching into bins and around obstacles, driving	
	Perception - Spatial		B				X	Backing truck up around obstacles, keeping hands clear	
	Perception - Form								
	Feeling (Tactile)		B			X		Holding bags, cans with gloves	
	Reading								
OPERATING	Writing								
	Speech					X		Talking with colleagues and public in person/radio	
	Inside Work								
	Outside Work						X	On the streets and in the alleys	
	Hot Conditions >25 deg. C					X		In the summer months	
	Cold Conditions <10 deg.C					X		In the fall, winter and early spring	
	Humid					X		Often rains, can be humid in summer months	
	Dust					X		Especially near construction sites and when windy	
	Vapor Fumes					X		Vehicle exhaust	
	Hazardous Machines		B				X	Large truck with compacting machinery, crush risk	
KNOWLEDGE	Proximity to Moving Object						X	Garbage truck backing up on hills, in slippery conditions	
	Noise					X		Noise of truck compaction system	
	Electrical Hazard					X		Risk of truck contacting overhead wires	
	Sharp Tools					X		Glass, metal, branches, etc.	
	Radiant/Thermal Energy					X		Through windshield, off of other cars and pavement	
	Slippery Conditions				X			Heavy rain and mud, ice and snow (infrequent)	
	Vibration and Related				X			heavy jarring when driving, whole body when riding step	
	Chemical Irritants		B		X			Any number of chemicals could be hidden in trash	
	Organic Substances		B				X	Food scraps, animal feces and yard waste	
	Medical Waste			X				Needles and other discarded items	
MOVING	Blood Products								
	Congested Worksite								
	Lighting - Direct						X	Overhead natural light	
	Lighting - Indirect						X	Reflections off of vehicles and buildings	
	Lighting - Adjustable								
	Lighting - Fluorescent								
	Lighting - Incandescent								
	Lighting - Shadows etc.					X		Early and late in the day, around obstacles	

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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