



JOB DEMANDS ANALYSIS

Company: City of Vancouver

Location: Receiving Facility

Job Title: Recycling Operator

Classification: Regular Duty

Purpose of Activities

The purpose of the Recycling Operator is to sort and collect residential recyclable waste and transport it to the receiving facility.

Tools and Equipment

The Recycling Operator will use the following tools and equipment to perform his duties:

- Recycling Collection Vehicle - ...(left (sit) and right (stand) hand drive controls, adjustable seats, collection receptacles on right side of vehicle)
- Notices of regulations/extra bags for residents
- Two-way radio

Usual Methods

1. Perform the pre-trip vehicle inspection at the shop.
2. Drive to the collection zone.
3. Make adjustments for the right-sided driving (operator stands while driving, for rapid in-out movements).
4. Drive up to the "bluebox", stop the vehicle and get out.
5. Pick up the box/bags and deposit the materials into the appropriate bin (glass/cans, newsprint, mixed paper) in the truck.
6. Return the box/bags to the curb, step into the vehicle and proceed to the next blue-box.
7. Activate external-bin dumping procedure when the hopper is full. This transfers waste from the smaller external hopper to large internal hopper. If internal hopper fills, the operator must return to the receiving facility, dump the load, and return to the route.
8. Repeat steps 4-7 until area is completed.
9. Drive (left side of vehicle) to where partners are and help complete their route.
10. Return to the Yard.



Administrative Issues

The Recycling Operator works 0700 to 1530, Monday to Friday with a 30-minute lunch break. Breaks are taken at the Recycling Operators discretion. There is one Recycling Operator per vehicle, and four Recycling Operators per “team”. A team is responsible for attending to a geographical area and when each Recycling Operator finishes his respective route, he will assist the other Recycling Operators with their routes. There is a five-day cycle of routes. Any repairs and mechanical maintenance needed to the vehicle are recorded on a standard form by the driver, and submitted directly to the mechanics’ shop.

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.
- Stand for a large portion of the day on the left leg.
- 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 set out.



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 side of the truck as well as the twisting and impact associated with climbing in and out of the truck several hundred times each day.
2. People with shoulder injuries such as rotator cuff tendonitis, 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 and the regular climbing in and out of the vehicle.
6. Individuals with spine or pelvic misalignments may be negatively affected by the regular standing and climbing in and out of the truck..
7. 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.
8. Individuals recovering from systemic illness should be carefully screened before entering this activity.
9. Individuals who do not cope under deadline pressure or in outdoor high-autonomy work environments would have difficulty with this position.
10. There is no significant learning curve associated with the tasks.

Kevin Antonishen
Kinesiologist

September 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. 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 pace of the work on these routes is very high with only about 30 seconds required at maximum to complete each residence. It is higher than regular garbage collection due to the constant up and down from the cab and no other worker to spell off.

Structural Stresses

Spine – The twisting of the torso required to get in and out of the truck cab every 20 – 30 seconds places a load on the discs in the spine. If there is bending involved in the lifting, this exacerbates the loads on the discs. 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 regular load being carried by the upper extremities and the frequent positioning of the arms away from the body (especially at shoulder level), this activity places individuals at increased risk for rotator cuff tendonitis, 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 tendonitis which can lead to nerve entrapment scenarios due to less than optimal coupling between the worker and the material. 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 set out to the truck, get the truck as close as possible.
8. Explore options for decreasing the height of the bins on the side of the truck and making them somewhat wider so that they present a larger target.
9. Be careful to not increase grip forces unnecessarily.
10. Review foot wear for stability and lightweight construction.
11. Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.

PJDC-Recycling Operator

Referral: Debbie Craig				Organization: City of Vancouver					Title: Recycling Operator			
Dept.: Engineering				Division: Solid Waste					Contact:			
PHYSICAL DEMANDS				R E Q D	S I D E	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	Date: September 1999
						Sel 1	Low 2	Mod 3	High 4			COMMENTS
S T R E N G T H	Lifting - Floor to Knuckle	X	B				X	20	5.5	Blue box and/or bags		
	Lifting - Knuckle to Waist	X	B				X	20	5.5	Blue box and/or bags		
	Lifting - Waist to Shoulder	X	B				X	20	5.5	Blue box and/or bags		
	Lifting - Over Head											
	Carrying - With Handles	X	B				X	20	5.5	Blue box		
	Carrying - Without Handles	X	E				X	20	5.5	bags		
	Pushing - Upper Extremity	X	B			X		20	5.5	Blue box/bags into hopper, hopper control		
	Pushing - Hip/Leg Assist					X		20	5.5	Blue boxes/bags to hopper		
	Pulling - Upper Extremity	X	B			X		20	5.5	Blue Boxes/bags from curb		
	Pulling - Hip/Leg Assist	X	E			X		20	5.5	Blue boxes/bags from curb		
	Reach - Shoulder or Above	X	E		X			20	5.5	Getting into vehicle, load blue box/bags to hopper		
	Reach - Sho. or Above extnd											
	Reach - Below Shoulder	X	E				X	20	5.5	Operators control switches, bags		
	Reach - Bel. Shoulder extnd		E		X			20	5.5	Blue boxes/bags		
	Handling	X	E				X	20	5.5	Blue boxes/bags		
Gripping	X	E		X			20	5.5	Blue boxes/bags			
Fine Finger Movements	X	E		X			mod	low	Controls (buttons, switches)			
E	Aerobic (percent)	X				90	drive truck load, blue boxes/bags to truck					
N	Anaerobic (percent)				10		fatigue at end of day for unfit individuals					
R	High Energy Expenditure				X		fatigue at end of day for unfit individuals					
G	Low Energy Expenditure	X				X	drive truck, load blue boxes/bags to truck					
P O S T U R E + M O B I L I T Y	Neck - Static Flexion						view load on ground					
	Neck - Static Neutral						stand, sit to drive, walk to blue box/bag or curb					
	Neck - Static Extension	X			X		during bin dumping					
	Neck - Rotation	X				X	shoulder check, aware of surroundings while performing duties					
	Throwing				X		depends on working style (up to 1-metre bag toss)					
	Sitting	X				X	driving					
	Standing	X				X	driving					
	Walking	X				X	between truck and blue box/bags at curb < 5 metres					
	Running/Jumping				X		in and out of vehicle (depends on style)					
	Climbing - Arms and Legs	X				X	in and out of vehicle					
	Climbing - Legs Only											
	Bending/Stooping	X				X	load recyclable from curb to truck load, vehicle inspection					
	Crouching	X			X		load recyclable from curb to truck load, vehicle inspection					
	Kneeling	X			X		vehicle inspection					
	Crawling	X		X			vehicle inspection					
Twisting	X	E				magnitude depends on style, but motion is essential						
Y	Balancing	X				X	stand on right hand drive					
G E N E R A L	Traveling	X				X	in city to collect recyclable					
	Work Alone	X				X	on truck, work in a team					
	Interact with Public	X			X		possibly homeowners on route					
	Operate Equip/Machinery	X				X	Recycle truck and hopper controls					
	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												

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 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-Recycling Operator

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	X		X				two-way radio, co-workers	
	Hearing - Other Sounds	X					X	traffic, vehicle operating sounds	
	Vision - Far	X					X	drive truck and load recyclable to hopper	
	Vision - Near								
V I S I O N	Vision - Colour	X					X	traffic lights, street and traffic signs	
	Vision - Depth	X					X	drive truck in traffic, maneuver on street to pick up recyclable from curb	
	Perception - Spatial	X					X	driving through lanes, emptying/dumping	
	Perception - Form	X					X	driving, sorting	
F E E L I N G	Feeling (Tactile)	X			X			grasp blue boxes/bags, materials, (wear gloves) controls	
	Reading	X		X				reports	
	Writing	X		X				reports	
	Speech	X			X			coworkers, public	
W O R K	Inside Work	X				X		drive in cab of vehicle between pick-ups and routes	
	Outside Work	X					X	load material to truck, dump truck	
	Hot Conditions >25 deg. C	X		X				seasonally dependant	
	Cold Conditions <10 deg.C	X		X				seasonally dependant	
E N V I R O N M E N T	Humid	X		X				seasonally dependant	
	Dust	X		X				seasonally dependant pollens, etc.	
	Vapor Fumes	X					X	diesel from truck, exhaust fumes from traffic	
	Hazardous Machines	X					X	drive recycle truck, operate hopper/compactor	
P R O X I M I T Y	Proximity to Moving Object	X					X	work in traffic on residential/main streets	
	Noise	X					X	traffic and truck noise	
	Electrical Hazard	X		X				boom and low power lines in lane	
	Sharp Tools								
R I S K	Radiant/Thermal Energy	X		X				sun burn, hot hydraulic oil	
	Slippery Conditions	X		X				wet and cold weather, mud, snow and ice	
	Vibration and Related	X					X	drivers seat and deadman switch absorb much	
	Chemical Irritants	X		X				may be in/around blue-box	
M E D I C A L	Organic Substances	X		X				may be in/around blue-box	
	Medical Waste	X		X				may be in/around blue-box	
	Blood Products	X		X				may be in/around blue-box	
	Congested Worksite	X		X				work being done in lanes, parked cars	
L I G H T I N G	Lighting - Direct	X					X	sun light, day light, street lights, head lights	
	Lighting - Indirect	X					X	sun light, day light, street lights, head lights	
	Lighting - Adjustable								
	Lighting - Fluorescent								
	Lighting - Incandescent								
	Lighting - Shadows etc.	X		X				depends on time of day and location	

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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