



JOB DEMANDS ANALYSIS

Company: City of Richmond

Location: Works Yard

Job Title: Truck Driver 1 – Litter Attendant **Classification:** Regular Duty

Overview of Activities

These people work alone and travel from location to location each day in a three-quarter-ton pick-up truck fitted with a special dumping box and side compartments for storage. At each site, they empty a variety of different garbage bins and put the refuse in the back of their truck. They may also walk for extended periods of time through parks and boulevards picking up individual bits of trash using a grasping extension tool.

Purpose of Activities

The purpose of this job is to keep the public spaces in the City of Richmond clear of garbage and debris.

Tools and Equipment

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

- Portable radio
- Grasper Extension Tool
- Rake
- Garbage bags
- Gloves
- Pens, pencils, paper
- Maps
- Keys

Usual Methods

In addition to those listed below there is also the matter of replacing the roll of bags from Stores at least twice a week. These rolls are very heavy and must be placed in the truck at close to shoulder height.

The back of the truck also needs to be dumped and usually that is done through an automated process, however occasionally they may have to manually remove bags from the back of the truck.



Usual Methods – Emptying Cans

1. Drive to location next to garbage container (sometimes involves getting out and opening a gate to gain access to a park area).
2. Get out of truck (left-hand drive).
3. Walk around to side compartment and tear off a new garbage bag.
4. Walk (less than 10 metres, usually) to garbage container.
5. Pull bag away from the rim of the container.
6. Pull top of bag closed and grasp with one or two hands (often depending on perceived load).
7. Lift bag (can weigh over 20 kg) out of can (arms to above shoulder level). It is also possible at this step that the worker will decide to push the can onto the ground and pull the bag out to avoid lifting it. They will then have to right the can before continuing to the next step.
8. Place on ground.
9. Place new bag into can (and replace lid if necessary)
10. Carry full bag towards the vehicle.
11. Lift bag to shoulder height (or higher in some shorter individuals) and push over the top of hopper on the vehicle.
12. Climb back into the truck.
13. Repeat steps 1 – 12.

Note: There are different types of garbage receptacles. Some have lids that must be removed and replaced, others (that are positioned on poles at bus stops are smaller and require a key to unlock).

Usual Methods – Litter Pick-up

1. Drive to location to start walking route (sometimes involves getting out and opening a gate to gain access to a park area).
2. Get out of truck (left-hand drive).
3. Walk around to side compartment to retrieve grasping tool and bag.
4. Carry grasping tool in dominant hand and bag in non-dominant hand.
5. Walk across grass (some grade possible) until a piece of litter is located.
6. Extend arm and depress shoulder (perhaps stoop slightly) to position grasping tool over litter.
7. Squeeze the trigger on the grasping tool to grab litter.
8. Lift dominant arm (abduction and external rotation of the shoulder) while maintaining grasp (static contraction of forearm flexors).
9. Once over the bag, release the grasp and return arm to resting position.
10. Repeat steps 4 – 9 several hundred times over several kilometers of walking (varies depending on the day from as little as one to perhaps eight kilometers).



Note: There are some pieces of litter that are too large to grasp and so the individual will stoop or squat to pick-up the item. Sometimes it can go into the bag, other times it will be deposited into the truck directly. Some of these items can be heavy and unwieldy (e.g., part of blown truck tire, construction waste)

Administrative Issues

There are five individuals that work full time covering five routes. Each route is a combination of garbage can locations and litter pick-up from the ground that takes place on roadways, in school yards and in parks. Each person works five days a week (Monday to Friday). Shifts are 8 hours in duration (0730 – 1600).

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:

- Be exposed to organic and other refuse.
- Drive a medium-sized vehicle.
- Wear gloves and other protective clothing.
- Work around traffic.
- Work around fixed objects provoking awkward postures like stooping, crouching and extended reaches.
- Handle items according to where they have been positioned and how they are constructed (e.g., awkward design of equipment).
- Use a radio to interact with colleagues.
- Work outside in all weather conditions.
- Work according to a schedule/route.

Employee Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job:

- Limited choice of postures for carrying out some duties (e.g. retrieving refuse from the ground, handling bags and garbage cans).
- Limited control over storage strategies and methods for moving items around.
- Limited control over techniques for removing garbage and putting it in the hopper of the truck.
- Limited control over the order of the unusual methods.



Accommodative Considerations

- Individuals with spinal injuries, especially disc related, may have difficulty with this position because of the time spent in flexed postures, often under load.
- People with hand, wrist and elbow difficulties will have trouble with the repetitive high intensity gripping (with gloves) and heavy manual handling.
- People with foot, ankle or knee problems that are exacerbated by high volumes of standing or walking may have difficulty with this job.
- Individuals with neck and shoulder difficulties will have considerable difficulty with the reaching and repetitive arm work away from the body and at or above shoulder level, especially on the dominant arm.
- Individuals who are not self-directed and are not effective working alone may have difficulty with this work.
- The learning curve for this job is generally slight with no formal certification.

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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 quite steady in nature (sitting, standing and slow walking). However there are specific anaerobic (high power) stresses in certain body parts like the arms, back and hips during lifting activities. Occasionally there are increased metabolic power demands associated with lifting and pushing or pulling of heavy loads. Typical ongoing energy requirements are in the range of 7 to 15 ml/kg/min or 3 – 5 METS. Maximum momentary demand might reach 7 - 9 METS. The volume of walking, getting in and out of a vehicle, manual activity and lifting means that energy demands are significant when accumulated over the typical work day.

Structural Stresses

Spine – there are a number of activities in this job that encourage varying positions of spinal flexion. This is common because much of the work is done from above the blockage. The effect of this posture is to increase compression on the intervertebral discs and place a regular creep on the posterior elements of the lumbar discs and the associated ligament structures. Regular forward flexion also triggers increased static muscle activity in the spinal erector muscles.

Hands and Elbows –there is regular gripping and force application with the muscles of the forearm and much of this force is static in nature with the forearm flexors providing grip force for holding onto plastic bags and squeezing the grasper while the forearm extensors are statically engaged to manage wrist position against both gravity and the heavy flexion force in these activities. These forces in conjunction with the regular wrist flexion posture carry the potential of leading to muscle strains, epicondylitis issues at the elbows and the risk for nerve irritation in the Carpal Tunnel. The grip forces are often very high while holding onto slippery plastic bags and pushing or pulling against resistance.

Neck and Shoulders – reaching and regular lifting of the arms at or above the level of the shoulders places increased muscular requirements on the neck and shoulder structures. Movement of the arms away from the body increases the load on neck muscles to assist in stabilizing the shoulder girdle. The positioning of the arms away from the body increases the wear on the rotator cuff muscles. This is particularly exacerbated when the arms are near to or above shoulder level. Much of this job includes managing loads with the arms away from the body, sometimes on the end of an implement. However, the load presented by the arm alone in conjunction with the abducted and externally rotated position of the dominant shoulder creates wear on the



shoulder joint and related structures. There is significant repetition of shoulder level movements.

Other Stresses

There is regular interaction with other people (including the public).

INTERVENTIONS

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

1. Formalize arrangements with Parks employees to avoid the shredding of litter by the large lawn grooming equipment. This will decrease the number of items that need to be picked up from ground level.
2. Encourage employees to engage in movement activities focused on increasing spinal extension before they engage in lifting or other heavy manual tasks, especially after driving or being in repetitive flexed postures.
3. Reposition the bag dispenser so that it is possible to load a new roll of bags without having to lift and hold the roll.
4. Explore the use of a vehicle that has a low side or back loading system to eliminate the requirement for lifting the loads to shoulder height when putting debris into the back of the truck. An example of this type of vehicle would be a Haul-All.
5. Change pole-mounted receptacles so that with the removal of a key, the receptacle can be inverted draining the contents into a bag or bucket that is hung on the pole.
6. Mount the large cans in frames that have a locking pin, that when removed allow the can to rotate forward allowing the worker to pull the bag out of the can without having to lift.
7. Explore other possible receptacle designs in a brainstorming session.



8. Consider a public awareness campaign (potentially backed with a by-law) to discourage the dumping of heavy organic household garbage in park/school garbage receptacles.
9. Conduct a participatory review of the work in all the different areas to uncover all the challenges and incompatibilities. Several individuals have different ideas about how the work areas could function more effectively for themselves (in terms of productivity and comfort).
10. Take regular breaks to put hip, shoulder and torso structures through a momentary full range of motion to offset flexed postures as much as possible.
11. Provide work/task specific training in ergonomics and self-care to all workers.