

## Job Demands Analysis – Semi-Automated Garbage Truck Swamper / Operator

### Purpose

The semi-automated garbage truck swamper/operator is responsible for picking up residential garbage from homes that cannot be accessed by the automated truck.

### Essential Duties

The swamper/operator has 3 essential duties:

Duty #1- Vehicle Inspections (pre-trip and post-trip)

Duty #2 - Driving (to, from and between beats)

Duty #3 – Garbage Collection and Dumping

#### **% of Shift/Hrs**

30 mins

2 hrs

5-6 hrs

### Description of Non-essential Tasks

The swamper/operator may be called upon to perform other, non-essential duties from time to time. These duties may include:

- Keeping the inside of the truck clean (done on an ongoing basis).
- Washing the outside of the truck with a power washer at the wash station (usually done twice a month)

### Summary of Demands

	Sedentary	Light	Medium	Heavy	Very Heavy	Comments
<b>Physical Strength</b>				✓		Based on tote weights
<b>Physical Endurance</b>			✓			Stand/walk for 34-66% of shift
<b>Cognitive</b>				✓		Based on driving requirements

**Shift Structure**

All swamper/operators work day shift from 7am – 3:30pm, M-F. There is a 30 minute lunch break and two 10 minute coffee breaks that operators can take at their discretion. There is no weekend work, no nights and overtime is extremely rare.

**Frequency Rating Definitions**

The frequency rating definitions used in the Summary Table are from the Dictionary of Occupational Titles (DOT, 1991, 4th edition) published by the US Department of Labor. A similar classification is used for each Essential Duty, but the percentages are changed to reflect % of Duty rather than % of shift.

	<b>Time per Day</b>	<b>Percentage of Shift</b>
<b>Never</b>	0 minutes	0 %
<b>Rare</b>	0 - 5 minutes	0-1 %
<b>Infrequent</b>	6 - 25 minutes	2-5 %
<b>Occasional</b>	26 minutes – 2.5 hours	6-33 %
<b>Frequent</b>	2.6 - 5.25 hours	34-66 %
<b>Constant</b>	5.26 - 8 hours	67-100 %

<b>STRENGTH</b>	
<b>Strength Category</b>	<b>Weight Handled</b>
1. Limited	Up to 5 kg.
2. Light	5 kg. to 10 kg.
3. Medium	10 kg. to 20 kg.
4. Heavy	>20 kg

### Job Demands Analysis : Swamper/Operator - Summary Table

a. Physical Demands		Frequency During Shift					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle		x					13.7	80	D3-tipped over tote or additional service pick up NOTE: weight of tote may be 159kg (max) but force to tilt it up calculated to be ~ 80kg
	Lifting – Knuckle to Waist			x				15	20	D3- additional service
	Lifting – Over Shoulder	x								
	Carrying – with Handles	x								
	Carrying – without Handles			x				15	20	D3 - additional service
	Pushing – Upper Extremity				x			10	90	D3 - moving totes, tote arm/hopper controls, tilting up heavy totes
	Pushing – Hips/Legs assist		x					15	20	D3 - particularly heavy tote
	Pulling – Upper Extremity				x			10	20	D3 - moving totes, tote lift/hopper controls
	Pulling – Hip/Leg Assist	x								
Mobility	Reach - Shoulder or Above		x							
	Reach - Below Shoulder		x							D2 - accessing seat controls, parking brake
	Handling						x			D2,D3 - steering wheel and handling totes
	Fine finger movements	x								
	Neck - Static Flexion		x							
	Neck – Static Neutral				x					D2 - driving
	Neck – Static Extension		x							
	Neck – Rotation				x					D2- looking in mirrors
	Throwing	x								
	Sitting					x				D2 - driving
	Standing			x						D3 - operating hopper controls and lift
	Walking				x					D3 - moving totes, walking behind truck
	Running/Jumping	x								
	Climbing		x							D1,D3 - on/off back of truck, in/out of cab
	Bending/Stooping		x							D1 - inspecting low parts of truck
	Crouching		x							D1 - inspecting underneath of vehicle
	Kneeling	x								
	Crawling	x								
Twisting			x						D1, D3 - performing inspection, moving totes	
Balancing		x							D3 - on back of truck	
Travelling						x			D2, D3	

### Job Demands Analysis – Swamper/Operator: Summary Table (continued)

a. Physical Demands (continued)		Frequency During Shift						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations				x			D1, D2, D3 - with co-worker
	Hear/Other Sounds						x	D2, D3 - road noise, horns, sirens, etc
	Vision/Far						x	D1, D2, D3
	Vision/Near						x	D1, D2, D3
	Vision/Colour						x	D1, D2, D3
	Vision/Depth						x	D1, D2, D3
	Perception/Spatial					x		D2 - using mirrors, reversing vehicle
	Perception/Form		x					
	Feeling	x						
	Speech				x			D1, D2, D3 - with co-worker
Work Environment	Inside Work					x		D2 - inside cab of truck when driving to/from beats and along beat for pick up
	Outside Work					x		D1, D3 - when swamping, during inspections
	Slippery			x				D1,D3 - only in poor weather
	Congested worksite						x	D2 - traffic, pedestrians, narrow access
	Chemical Irritants		x					D3 - if improperly disposed of by customers
	Confined Space Entry	x						
	Vapour Fumes				x			D3 - exhaust when swamping, garbage fumes
	Noise						x	D2, D3
	Proximity to moving objects					x		D2, D3 - other vehicles, truck when swamping
Hazardous	Hazardous Machines				x			D3 - hopper and lift mechanisms when swamping
	Electrical hazard	x						
	Hazardous objects		x					D3 - if improperly disposed of by customers
	Radiant/Thermal Energy	x						
	Hot/Cold		x					D1, D3 - depending on weather
	Humid		x					D1, D3 - depending on weather
	Environmental Dust			x				D3 - if improperly disposed of by customers, passing construction areas when swamping
	Organic Substances		x					D3 - if improperly disposed of by customers
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct		x					D1,D2,D3 - low light in early morning at certain times of year, sun glare depending on weather
	Lighting – Indirect		x					
	Vibration – Whole Body					x		D2- vehicle motion
Vibration – Hand/Arm	x							

b. Cognitive and Psychosocial Demands	Frequency During Shift			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure	x			D2, D3- except in case of poor weather or vehicle breakdown
Attention to Detail			x	D1, D2, D3 - inspections, avoiding obstacles in narrow laneways, watching for inappropriate items in hopper
Memory Requirements			x	D2 - remembering beat route, pack outs
Interact with co-workers			x	
Interact with public	x			
Work Alone	x			
Reading		x		D2 - street signs
Writing	x			
Irregular Hours	x			
Operating Equipment			x	D2, D3 - vehicle, hopper and lift controls

## **Physical Environment**

The work takes place outside in the Manitoba Works Yard and inside the cab of the semi-automated garbage truck, and outside on city streets and laneways.

## **Staffing Levels**

The swamper/operator works as part of a two man team. During collection he shares the duties of swamping and driving 50:50. When driving to, from and between the beats driving duties are also usually shared 50:50.

## **Tools and Equipment Used**

Apart from the driving controls, the semi-automated garbage truck is equipped with specialized controls for operating the tote lift and hopper these are located on the back passenger side of the vehicle. Outside the cab on the driver's side of the vehicle are the controls to operate the hopper. Operators may also use a rag to clean cameras and lights.

## **Other Equipment**

The swamper/operator must wear CSA approved boots at all times. When working outside the vehicle he must also wear a safety vest, gloves and ear plugs.

## **Data Collection**

Mandy Gallant, an ergonomic consultant from ErgoRisk Management Group conducted the JDA assessment over the course of two days (Mar 13 & 14, 2008). Data was collected using a tape measure, stopwatch, digital camera and through observation and discussion with selected employees and the on-site supervisor.

## **Contact for the on-site assessment** - Jeremy Herd, Superintendent of Collections

## **Description of Essential Duties**

This section describes the work tasks that comprise the 3 essential duties of the job. Tables (located at the end of this report) provide the physical, cognitive and psychosocial demands for performing each of the essential duties.

### **Essential Duty 1: Pre and Post-Trip Inspections**

Pre-Trip Inspection is performed on the truck before it leaves the yard each morning. Operators check a variety of essential components including fluid levels, hoses, belts, and the hydraulic system (Fig 1 & 2). They look for leaks, and make sure air pressure levels are appropriate. They check that vehicle lights are functioning and wiped clean. They make sure the truck has adequate gasoline, and check vehicle brakes are functioning. They also make sure a fire extinguisher is present in the cab and that inspection stickers are up to date. They check the tote lift system and hopper operation and other necessary aspects of vehicle operation.

At the end of the shift the same things are checked, although since the vehicle has been in operation during the day, some of the controls that have been in use, such as the tote lift system and hopper do not have to be rechecked.

If deficiencies are noted at either inspection or during the course of the day the truck is logged in for repair at the end of the shift. If deficiencies on pre-trip inspection affect the safe operation of the vehicle then the truck is logged in immediately and a different truck is taken out for the day.



Fig 1: Post Trip Inspection



Fig 2: Vehicle Inspection



## **Essential Duty 2: Driving**

Swamper/operators must drive to and from their assigned beats before beginning collection duties. They also drive the truck along the beat route during collection.

## **Essential Duty 3: Garbage Collection and Dumping**

Essential Duty 3 is garbage collection and dumping. One swamper/operator drives from house to house and the other swamper/operator walks behind the vehicle moving totes from each house into position for the tote lift to pick up and dump into the hopper. Swamper/operators alternate these duties over the course of the shift. At the end of the shift the truck is driven to the transfer station for dumping. The sub-tasks that make up this essential duty are:

- Tilting up totes and wheeling them into position for the tote lift arm (Fig 3 & 4).
- Operating the tote lift with levers on the rear of the truck (Fig 5 & 6).
- Operating the hopper controls on the rear of the truck to compress and reposition the garbage.
- If a house is noted to have a problem such as a contaminated load the swamper/operator notes the house address and turns that information in at the end of the shift. If the contamination or situation is dangerous the swamper/operator may call his supervisor on the radio for immediate response.
- Before dumping at the transfer station, the swamper / operator manually removes 2 locking pins from the rear of the truck. The truck then backs up on the tipping floor to the edge of garbage pit. Using controls on the outside of the vehicle just behind the driver side door, the swamper/operator opens the back of the truck and tips it up to dump the load (Fig 7). Dumping process takes approximately 2 minutes.



Fig 3: Tilting up tote to wheel to back of truck.



Fig 4: Heavy totes require significant downward force to tilt up.



Fig 5: Operating tote lift and hopper controls.



Fig 6: Tote lift & hopper control levers.



Fig 7: Operating dump controls

### Essential Duty 1: Swamper/Operator – Pre/Post Trip Inspection

a. Physical Demands		Frequency During Duty					Weight		Comments
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)	
Strength	Lifting – Floor to Knuckle	x							
	Lifting – Knuckle to Waist	x							
	Lifting – Over Shoulder	x							
	Carrying – with Handles	x							
	Carrying – without Handles	x							
	Pushing – Upper Extremity	x							
	Pushing – Hips/Legs assist	x							
	Pulling – Upper Extremity	x							
	Pulling – Hip/Leg Assist	x							
Mobility	Reach - Shoulder or Above		x						Cleaning lights
	Reach - Below Shoulder				x				Checking low parts of truck (brakes/tires)
	Handling				x				
	Fine finger movements	x							
	Neck – Static Flexion	x							
	Neck – Static Neutral	x							
	Neck – Static Extension	x							
	Neck – Rotation				x				Viewing awkward areas around the vehicle
	Throwing	x							
	Sitting	x							
	Standing				x				When checking components
	Walking					x			Around the vehicle
	Running/Jumping	x							
	Climbing			x					In/out of vehicle cab
	Bending/Stooping				x				
	Crouching			x					
	Kneeling	x							
	Crawling	x							
Twisting				x					
Balancing	x								
Travelling	x								

### Frequency Rating Definition for % of Task

The definitions for frequency ratings are contained at the end of the Table (page 14).

**Essential Duty 1 - Swamper/Operator – Pre/Post Trip Inspection (continued)**

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations				x			Communicating with other team member, checking brakes, etc.
	Hear/Other Sounds						x	For safety- awareness of other vehicles
	Vision/Far					x		
	Vision/Near					x		
	Vision/Colour					x		
	Vision/Depth					x		
	Perception/Spatial		x					
	Perception/Form		x					
	Feeling	x						
	Speech				x			Communicating with other swamper/operator
Work Environment	Inside Work			x				Filling out log sheet
	Outside Work						x	
	Slippery				x			Depending on weather
	Congested worksite		x					
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes					x		Vehicle exhaust
	Noise						x	
	Proximity to moving objects				x			Checking tote lift and hopper operation
	Hazardous Machines	x						
	Electrical hazard	x						
	Sharp Tools	x						
	Radiant/Thermal Energy	x						
	Hot/Cold				x			Weather dependent
	Humid				x			Weather dependent
	Environmental Dust	x						
	Organic Substances	x						
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct					x		Low lighting in early morning at certain times of year
Lighting – Indirect			x					
Vibration – Whole Body	x							
Vibration – Hand/Arm		x					When touching certain parts of the vehicle with engine running	

**Essential Duty 1 - Swamper/Operator – Pre/Post Trip Inspection (continued)**

b. Cognitive and Psychosocial Demands	Frequency During Duty			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure	x			
Attention to Detail			x	
Memory Requirements			x	
Interact with co-workers		x		
Interact with public	x			
Work Alone	x			
Reading	x			
Writing		x		Filling out log sheet
Irregular Hours	x			
Operating Equipment		x		Testing tote lift and hopper operation

**Frequency Rating Definitions for % of Duty**

The frequency rating definitions are from the Dictionary of Occupational Titles (DOT, 1991, 4th edition) published by the US Department of Labor.

	Percentage of Duty
<b>Never</b>	0 %
<b>Rare</b>	0-1 %
<b>Infrequent</b>	2-5 %
<b>Occasional</b>	6-33 %
<b>Frequent</b>	34-66 %
<b>Constant</b>	67-100 %

STRENGTH	
Strength Category	Weight Handled
5. Limited	Up to 5 kg.
6. Light	5 kg. to 10 kg.
7. Medium	10 kg. to 20 kg.
8. Heavy	>20 kg

### Essential Duty 2: Swamper/Operator – Driving

a. Physical Demands		Frequency During Duty					Weight		Comments
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)	
<b>Strength</b>	Lifting – Floor to Knuckle	x							
	Lifting – Knuckle to Waist	x							
	Lifting – Over Shoulder	x							
	Carrying – with Handles	x							
	Carrying – without Handles	x							
	Pushing – Upper Extremity	x							
	Pushing – Hips/Legs assist	x							
	Pulling – Upper Extremity	x							
	Pulling – Hip/Leg Assist	x							
<b>Mobility</b>	Reach - Shoulder or Above	x							
	Reach - Below Shoulder		x						Adjust seat controls, gears, parking brake
	Handling						x		Steering wheel
	Fine finger movements	x							
	Neck - Static Flexion	x							
	Neck – Static Neutral					x			Looking at road ahead
	Neck – Static Extension	x							
	Neck – Rotation				x				Checking mirrors
	Throwing	x							
	Sitting						x		
	Standing	x							
	Walking	x							
	Running/Jumping	x							
	Climbing	x							
	Bending/Stooping	x							
	Crouching	x							
	Kneeling	x							
	Crawling	x							
	Twisting		x						Reaching seat controls, parking brake
	Balancing	x							
Travelling						x			

**Essential Duty 2 : Swamper/Operator – Driving (continued)**

a. Physical Demands (continued)		Frequency During Task						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations				x			With co-worker and radio calls
	Hear/Other Sounds						x	Traffic noise, horns, sirens, etc
	Vision/Far						x	
	Vision/Near						x	
	Vision/Colour						x	
	Vision/Depth						x	
	Perception/Spatial				x			Checking mirrors
	Perception/Form		x					
	Feeling	x						
	Speech				x			With co-worker and radio calls
Work Environment	Inside Work						x	
	Outside Work	x						
	Slippery				x			Road conditions weather dependent
	Congested worksite						x	Traffic and narrow access
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes				x			Exhaust and other fumes if windows down
	Noise						x	
	Proximity to moving objects					x		Other vehicles
	Hazardous Machines	x						
	Electrical hazard	x						
	Hazardous objects	x						
	Radiant/Thermal Energy	x						
	Hot/Cold	x						
	Humid	x						
	Environmental Dust		x					If windows down and driving past construction site or dusty material in hopper
	Organic Substances	x						
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct			x				Dependent on weather and time of day/year
Lighting – Indirect	x							
Vibration – Whole Body						x		
Vibration – Hand/Arm	x							



**Table 2: Essential Duty 2 – Swamper/Operator – Driving (continued)**

b. Cognitive and Psychosocial Demands	Frequency During Task			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure	x			Unless breakdown or poor weather slowing work pace
Attention to Detail			x	
Memory Requirements			x	Remembering beat
Interact with co-workers			x	
Interact with public	x			
Work Alone	x			
Reading			x	Street signs, map
Writing	x			
Irregular Hours	x			
Operating Equipment			x	

**Frequency Rating Definitions for % of Task**

The frequency rating definitions are from the Dictionary of Occupational Titles (DOT, 1991, 4th edition) published by the US Department of Labor.

	Percentage of Task
<b>Never</b>	0 %
<b>Rare</b>	0-1 %
<b>Infrequent</b>	2-5 %
<b>Occasional</b>	6-33 %
<b>Frequent</b>	34-66 %
<b>Constant</b>	67-100 %

STRENGTH	
Strength Category	Weight Handled
9. Limited	Up to 5 kg.
10. Light	5 kg. to 10 kg.
11. Medium	10 kg. to 20 kg.
12. Heavy	>20 kg

### Essential Duty 3: Swamper/Operator – Garbage Collection and Dumping

a. Physical Demands		Frequency During Task					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle			x				13.7	80	Tipped over tote or additional service pick up NOTE: weight of tote may be 159kg (max) but force to tilt it up calculated to be ~ 80kg
	Lifting – Knuckle to Waist			x				15	20	Additional service
	Lifting – Over Shoulder	x								
	Carrying – with Handles	x								
	Carrying – without Handles			x				15	20	Additional service
	Pushing – Upper Extremity					x		10	90	Tilting heavy totes, moving totes, arm/hopper controls
	Pushing – Hips/Legs assist		x					15	20	Particularly heavy tote
	Pulling – Upper Extremity					x		10	20	Moving totes, tote lift/hopper controls
Pulling – Hip/Leg Assist	x									
Mobility	Reach - Shoulder or Above		x							
	Reach - Below Shoulder	x								
	Handling				x					Using tote lift and hopper control levers
	Fine finger movements	x								
	Neck - Static Flexion	x								
	Neck – Static Neutral	x								
	Neck – Static Extension	x								
	Neck – Rotation			x						Looking at totes, looking in hopper, watching for traffic, etc
	Throwing	x								
	Sitting	x								
	Standing				x					When operating lift and hopper controls
	Walking					x				Behind vehicle and when moving totes
	Running/Jumping	x								
	Climbing			x						On/off back of truck for short drives
	Bending/Stooping	x								
	Crouching	x								
	Kneeling	x								
	Crawling	x								
Twisting				x					When moving totes	
Balancing			x						When riding on back of truck	
Travelling						x				

#### Frequency Rating Definition for % of Task

The definitions for frequency ratings are contained at the end of the Table (page 22).

### Essential Duty 3 – Swamper/Operator – Garbage Collection and Dumping (cont.)

a. Physical Demands (continued)		Frequency During Task						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations			x				With driver or customers
	Hear/Other Sounds						x	Traffic noise, animals, etc
	Vision/Far						x	
	Vision/Near						x	
	Vision/Colour						x	
	Vision/Depth						x	
	Perception/Spatial		x					
	Perception/Form		x					
	Feeling	x						
	Speech			x				With driver or customers
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			Weather dependent
	Congested worksite		x					Only if awkward access to totes
	Chemical Irritants		x					If contaminated load
	Confined Space Entry	x						
	Vapour Fumes						x	Vehicle exhaust and garbage fumes
	Noise						x	
	Proximity to moving objects					x		Tote lift and hopper
	Hazardous Machines					x		Tote lift and hopper
	Electrical hazard	x						
	Hazardous objects		x					If contaminated load
	Radiant/Thermal Energy	x						
	Hot/Cold				x			Weather dependent
	Humid				x			Weather dependent
	Environmental Dust			x				If contaminated load, or walking past construction area
	Organic Substances		x					If contaminated load
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct				x			Low levels of lighting depending on time of day and time of year
Lighting – Indirect	x							
Vibration – Whole Body			x				Riding on back of truck	
Vibration – Hand/Arm			x				When operating lift controls, controls	

**Essential Duty 3:Swamper/Operator – Garbage Collection and Dumping (cont.)**

b. Cognitive and Psychosocial Demands	Frequency During Task			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure	x			Except in case of break down or poor weather slowing work pace
Attention to Detail			x	Monitor loads for hazardous substances, placement of tote for lift
Memory Requirements		x		Pack out addresses
Interact with co-workers			x	
Interact with public	x			
Work Alone	x			
Reading	x			
Writing	x			
Irregular Hours	x			
Operating Equipment			x	Tote lift, hopper controls, dump controls

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