

Job Demands Analysis – Recycling Truck Operator

Purpose

The recycling truck operator is responsible for picking up recyclable materials from residential homes and apartment buildings in the city of Vancouver.

Essential Duties

The recycling truck operator has 2 essential duties:

	% of Shift/Hrs
Duty #1 - Driving	50%
Duty #2 – Collecting	50%

Description of Non-essential Tasks

The recycling truck 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).
- Answer questions from the public

Summary of Demands

	Sedentary	Light	Medium	Heavy	Very Heavy	Comments
Physical Strength				✓		Based on tote weights
Physical Endurance				✓		Stand/walk/lift for up to 75% of shift
Cognitive				✓		Based on driving requirements

Shift Structure

All recycling truck 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 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.

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

STRENGTH	
Strength Category	Weight Handled
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 : Recycling Truck Operator - Summary Table

a. Physical Demands		Freq. During Shift					Weight		Comments		
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)	
Strength	Lifting – Floor to Knuckle		V			V		3	10	D2 -bags, blue boxes (up to 3300 times/shift), rare for Cushman	
	Lifting – Knuckle to Waist		x					3	10	D2 - picking up bags, blue boxes if not at ground level	
	Lifting – Over Shoulder		x					3	10	D2-shorter operators lifting boxes up to dump into hopper	
	Carrying – with Handles	V				V		3	10	D2- blue boxes to/from truck (few steps), never for Cushman	
	Carrying – without Handles	V				V		3	10	D2-carry bags to/from truck (few steps), never for Cushman	
	Pushing – Upper Extremity			V	V			<2	10	D2- moving empty totes, dump switches in cab, infreq for regular truck, occ for cushman	
	Pushing – Hips/Legs assist			x				20	45	D2-moving full totes, moving dividers in back of truck	
	Pulling – Upper Extremity			V	V			<2	10	D2 - moving empty totes, switches in cab, infreq for regular truck, occ for cushman	
	Pulling – Hip/Leg Assist				x			20	70	D2-moving totes, up a ramp or step/curb, moving dividers	
Mobility	Reach - Shoulder or Above		x							D2 - climb into back of truck, unlock dividers	
	Reach - Below Shoulder					x				D1,2 - pre-trip, adjust seat, collecting	
	Handling						x			D1,2 -truck controls, bags, blue boxes, totes	
	Fine finger movements	x									
	Neck - Static Flexion	x									
	Neck – Static Neutral	x									
	Neck – Static Extension	x									
	Neck – Rotation	x									
	Throwing	V			V					D2- Never for Cushman, Occ for regular (toss bags into hopper)	
	Sitting				V	V					D1 - Varies: occ for regular, freq -Cushman
	Standing			V		V					D1,2 - Varies: freq-regular drive working side, emptying bags and infreq-Cushman
	Walking					x					D1,D2 -between truck and curb/alley when collecting, pre-trip inspection
	Running/Jumping	x									
	Climbing				x						D2 - 2 steps in/out of truck at each pick up
	Bending/Stooping					x					D1,2-check something on pre-trip, collecting
	Crouching		x								D1,2 -pre-trip, pick up dropped item
	Kneeling		x								D2 - pick up spilled items
	Crawling	x									
Twisting				x						D1,2-shoulder check, collecting, dumping	
Balancing	x										
Travelling					x					D1 - to/from beat and dump, along beat	

Job Demands Analysis – Recycling Truck Operator: Summary Table (continued)

a. Physical Demands (continued)		Frequency During Shift						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations		V		V			D1,2- Varies: Rare for regular truck and occasional for Cushman
	Hear/Other Sounds						x	D1,2-Vehicles, pedestrians, alarms, workers
	Vision/Far						x	D1,2-Driving, monitor environment
	Vision/Near						x	D1,2-Driving, collecting
	Vision/Colour					x		D1-Driving demands
	Vision/Depth						x	D1,2-Driving and collecting
	Perception/Spatial					x		D1- Viewing items in mirrors or back up camera
	Perception/Form		x					D1-Watching for obstacles in poor visibility conditions
	Feeling	x						
	Speech		V		V			D1,2- Varies: Rare for regular truck and occasional for Cushman
Work Environment	Inside Work					x		D1-Inside truck driving and dumping
	Outside Work					x		D1,2-pre-trip, collecting
	Slippery		x					D1,2-Outside work in wet weather, slippery road conditions, snow/ice
	Congested worksite				x			D1,2-Depends on traffic, time of day, location of work
	Chemical Irritants			x				D2- dripping liquids from recycled containers
	Confined Space Entry	x						
	Vapour Fumes			V		V		D1,2- Varies between freq for regular driver- Exhaust, chemicals, etc, infreq for Cushman
	Noise						x	D1,2- vehicle and street noise
	Proximity to moving objects					x		D1,2-Vehicles and pedestrians, depending on time of day and location of work, hopper
Hazardous	Hazardous Machines					x		D2 - Hopper
	Electrical hazard	x						
	Hazardous objects	x						
	Radiant/Thermal Energy	x						
	Hot/Cold		x					D2-Extremes are rare & weather dependent
	Humid		x					D2-Extremes are rare & weather dependent
	Environmental Dust				x			D1,2 - unpaved back lanes, especially in dry conditions
	Organic Substances		x					D2- if on outside of blue box, bags or totes
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct		x					D1,2-Dark early mornings in winter
	Lighting – Indirect	x						
	Vibration – Whole Body					x		D1-Driving
	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		D1,2 -must finish beat and may help others in group
Attention to Detail		x		D1,2 - keep materials separate, driving demands
Memory Requirements		x		D1 - remembering route and directions
Interact with co-workers	V	V		D1,2-Rare for regular truck, occasional for Cushman (alone when driving, together when dumping totes)
Interact with public	x			
Work Alone		V	V	D1,2-constant for regular truck, freq for Cushman (alone when driving, together when dumping totes)
Reading		x		D2 - street signs, maps if necessary, forms
Writing	x			D1 - truck sign out sheet, pre/post-trip form
Irregular Hours	x			
Operating Equipment			x	D1,2- truck, hopper controls

Physical Environment

The work takes place inside the cab of the recycling truck, outside on city streets and laneways and at the recycling dump.

Staffing Levels

The recycling truck operator works alone, with the exception of the crew that does tote pulls with the Cushman 3 days/week. In that case the recycling truck operator and Cushman operator work together but in separate vehicles.

Tools and Equipment Used

Apart from the driving controls, the recycling truck is equipped with specialized controls for operating the tote lift and hopper these are located on the working side of the truck. The Cushman is a pick up truck with rear mounted tote lift controls.

Other Equipment

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

Data Collection

Mandy Gallant, an ergonomic consultant from ErgoRisk Management Group conducted the JDA assessment on Jan 15th, 2009. Data was collected using a tape measure, digital camera, Chatillon push/pull force gauge and through observation and discussion with selected employees and the sub-foreman.

Contact for the on-site assessment – Matt Baillie, Sub-Foreman Recycling

Description of Essential Duties

This section describes the work tasks that comprise the 2 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: Driving

Pre-trip inspection is performed on the recycling truck before it leaves the yard each morning. Operators check a variety of essential components including fluid levels, hoses, belts, tires, vehicle lights, brakes, etc (Fig.1). They check the tote lift system and hopper operation and other necessary aspects of truck 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 hopper operation do not have to be rechecked.

Typically operators keep the same truck each day. 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: Example of potential posture for pre-trip inspection.



Fig. 2: Driving working side of recycling truck.

Recycling trucks have two sets of driving controls. On the driving side the operator is seated and uses typical foot pedals and driving controls like any other standard vehicle. On the working side of the truck the operator is standing on a dead man switch that releases the brakes and he/she drives from a standing position (Fig. 2). He/she has a foot pedal for the gas and brake operated by the right foot, as well as a hand brake. The operator is typically weight bearing through the left leg when driving the working side, although there is a small perch seat behind, on which the operator can support some of his/her body weight. The working side is used only when moving from house to house along the beat. When driving on main roads the operators must use the driving side controls. To change between the 2 sets of driving controls there is a switch on the console between the 2 sides.

Operators must drive to and from their assigned beats before beginning collection duties and they drive to the dump once or twice a shift. If their beat includes a lot of apartments and tote pick ups then the truck fills faster and they may have to dump more often. Typically recycling truck operators may spend 2 hrs driving with the driving side controls in a typical shift. Operators also drive the truck along the beat route during collection and the working side is used for this type of driving. On average 2 hrs of the shift is spent driving the working side along the beat.

In some areas of the city there are totes that are awkwardly located in areas that are difficult for a recycling truck to access. Rather than operators having to manually move the totes a long distance up hills or ramps to get to the recycling truck a Cushman vehicle is used. The Cushman is a standard pick-up truck that has been retrofitted with a tote lift on the back. 3 days/week a Cushman vehicle goes out with a recycling truck and drives to the locations of awkward totes. The Cushman driver hooks the totes to the back of the Cushman and drives them up the ramp or out of the narrow area to the recycling truck for dumping. The Cushman drives along with the recycling truck from location to location for the hard to access totes. There is more driving for this tote pull crew and it is all drivers side driving. Typically a Cushman operator and the associated recycling truck operator may drive 5 hrs per shift. They alternate 50/50 between driving

the Cushman and driving the recycling truck. On the other 2 days a week the Cushman driver operates a regular recycling truck.

Essential Duty 2: Collecting

Once the recycling truck reaches the start of its beat the operator switches to working side controls and begins collection. This entails driving at slow speed the short distances between individual residences either on city streets or in back alleys. The driver stops at each residence and gets out to collect the recyclables. The operator typically steps out leading with the right foot each time and the repeated stepping down may occur 800-1100 times per shift. At individual homes there is a blue box for mixed recyclables, a blue bag for newspapers and a yellow bag for mixed paper. The operator lifts each of these 3 items and dumps them into the hopper (Fig. 3). In an average shift an operator may collect at 800-1100 homes. Given that there are typically 3 items at each home this is equivalent to 2400-3300 lifts in a typical shift.



Fig. 3: Bending to lift blue box.

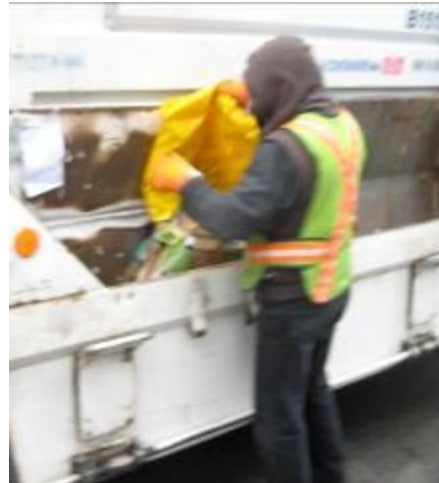


Fig. 4: Dumping yellow bag into hopper.

In the cases of the bags the operator may toss the whole bag into the hopper and then reach in and hold the bottom of the bag, lifting it up to empty it (Fig. 4). At times the operator may also reach into the hopper to remove an item that has ended up in the wrong section of the hopper (Fig. 5). When the hopper is full the operator uses a lever control on the side of the truck to empty the hopper. In the case of apartment buildings or other multiple residences the recyclables are collected in 360L totes. The operator

wheels the tote to the recycling truck and hooks it on the side of the hopper and using the same hopper controls, dumps the tote into the truck (Fig 6).



Fig. 5: Reaching into hopper to pull item out from wrong section.



Fig. 6: Moving 360L totes for dumping.

Once the truck is full the operator drives to the dump and dumps each of the 3 types of recyclables in a different area in the dump. The dumping process entails opening the bubble (rear of the truck), backing up to the appropriate area and dumping the load (Fig. 7). The operator uses controls inside the cab to unlock the dividers separating each area in the back of the truck so that each section of recyclables is dumped in turn. After dumping the operator locks the dividers back in place and this may require climbing into the back of the truck and pushing or pulling the divider back into place (Fig. 8 & 9). Typically a truck may dump twice a shift, but if the beat has a lot of tote pick ups that fills the truck faster and they may have to dump more frequently.



Fig. 7: Operating dump controls at dump site.



Fig. 8: Climbing in to back of truck to lock dividers back in place.



Fig. 9: Locking dividers back into position after dumping.



Fig. 10: Locking dividers back into position after dumping.

In the case of the Cushman vehicle, the operator drives as close as possible to the tote, then gets out and manually moves the tote to the back of the Cushman and hooks it onto the lift (Fig.10). He/she then lifts the tote a few inches off the ground using controls on outside rear of the truck (Fig. 11) and drives back to the recycling truck. The operator then removes the tote from the Cushman and hooks it onto the side of the recycling truck and it is then dumped into the back of the truck. The Cushman operator

then walks the empty tote back to where it came from. The work for the Cushman operator is more physically demanding than for the recycling truck operator on this team because the Cushman operator has to push/pull and otherwise manoeuvre heavy totes up/down curbs, ramps, through gates and other awkward areas to get it to the back of the Cushman. For this reason the Cushman operator and the recycling truck operator typically trade roles during the shift so that each does 50% of the manual work.



Fig. 11: Cushman lift controls.

Essential Duty 1: Recycling Truck Operator - Driving

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					Pre-trip, climbing in/out of driving side
	Reach - Below Shoulder		x						Adjust seat controls, checking tires during pre-trip inspection
	Handling						x		Steering wheel, oil dipstick, turn indicator and other truck controls
	Fine finger movements	x							
	Neck – Static Flexion	x							
	Neck – Static Neutral					x			Looking at road ahead
	Neck – Static Extension	x							
	Neck – Static Rotation	x							
	Throwing	x							
	Sitting					V	V		Varies: Const for Cushman and freq for regular when driving from driving side
	Standing	V				V			Varies: Never for Cushman and freq when driving from working side on regular truck
	Walking		x						Pre-trip inspection only
	Running/Jumping	x							
	Climbing	x							
	Bending/Stooping		x						Pre-trip inspection only
	Crouching	x							
	Kneeling	x							
	Crawling	x							
Twisting			x					Shoulder check, getting in/out of vehicle, looking at side mirrors, leaning to controls	
Balancing					x			When climbing in/out of truck and standing on working side	
Travelling						x			

Frequency Rating Definition for % of Duty

The definitions for frequency ratings are contained at the end of the Table (page 15).

Essential Duty 1: Recycling Truck Operator – Driving (continued)

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations		V		V			Varies: Rare for regular truck and occasional for Cushman
	Hear/Other Sounds						x	Traffic noise, sirens, etc
	Vision/Far						x	Driving demands
	Vision/Near						x	Driving demands
	Vision/Colour						x	Driving demands
	Vision/Depth						x	Driving demands
	Perception/Spatial				x			Checking mirrors
	Perception/Form		x					Poor visibility conditions
	Feeling	x						
	Speech		V		V			Varies: Rare for regular truck and occasional for Cushman
Work Environment	Inside Work						x	Inside cab of truck
	Outside Work		x					Pre-trip only
	Slippery			x				Depends on road conditions and weather
	Congested worksite				x			Depends on traffic conditions and time of day.
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes		V			V		Varies between rare for Cushman and frequent for regular truck, especially when on working side.
	Noise						x	
	Proximity to moving objects						x	Other vehicles
	Hazardous Machines	x						
	Electrical hazard	x						
	Sharp Tools	x						
	Radiant/Thermal Energy	x						
	Hot/Cold	x						
	Humid	x						
	Environmental Dust		V		V			Varies between rare for Cushman and occ for regular truck, especially when on working side in an unpaved alley
	Organic Substances	x						
	Medical Waste	x						
	Blood Products	x						
	Lighting Issues – Direct		x					Dark mornings in winter, poor weather
Lighting Issues – Indirect	x							
Vibration – Whole Body						x		
Vibration – Hand/Arm	x							

Essential Duty 1: Recycling Truck Operator – Driving (continued)

b. Cognitive and Psychosocial Demands	Frequency During Duty			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure		x		Must finish beat each day
Attention to Detail		x		Keeping materials separate
Memory Requirements		x		Beat route, driving directions
Interact with co-workers	√	√		Varies between rare for regular truck and occasional for Cushman
Interact with public	x			
Work Alone			x	
Reading			x	Maps, street signs, parking signs, log sheet, etc
Writing	x			Log sheet, pre/post-trip sheet
Irregular Hours	x			
Operating Equipment			x	Recycling Truck or Cushman

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
Never	0 %
Rare	0-1 %
Infrequent	2-5 %
Occasional	6-33 %
Frequent	34-66 %
Constant	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: Recycling Truck Operator – Collecting

a. Physical Demands		Frequency During Task					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle		V			V		3	10	Bags, blue boxes (up to 3300 times/shift), rare for Cushman - dropped item
	Lifting – Knuckle to Waist		x					3	10	Bags, blue boxes if not at ground level, dropped items
	Lifting – Over Shoulder		x					3	10	Shorter operators lifting boxes up to dump into hopper, dropped items
	Carrying – with Handles	V				V		3	10	Blue box to truck (few steps), never for Cushman
	Carrying – without Handles	V				V		3	10	Bags to truck (few steps), never for Cushman
	Pushing – Upper Extremity				V	V		<2	10	Moving empty totes, dump switches in cab, occ regular truck, freq for Cushman
	Pushing – Hips/Legs assist			V	V			20	45	Moving full totes (infreq regular trucks, occ Cushman), move dividers in back of truck
	Pulling – Upper Extremity				V	V		<2	10	Moving empty totes, switches in cab, occ for regular truck, frequent for Cushman
	Pulling – Hip/Leg Assist				V	V		20	70	Moving totes, up ramp or step/curb (occ regular trucks, freq Cushman) moving dividers
Mobility	Reach - Shoulder or Above			x						Climb into back of truck, unlock dividers
	Reach - Below Shoulder					x				Pick up recyclables, reach into hopper
	Handling						x			Lift controls, bags, blue boxes, totes
	Fine finger movements	x								
	Neck - Static Flexion	x								
	Neck – Static Neutral	x								
	Neck – Static Extension	x								
	Neck – Rotation	x								
	Throwing	V			V					Varies between occ for regular -Toss bags into hopper and never for Cushman
	Sitting	x								
	Standing					x				At side of truck emptying bags, hook up tote
	Walking					x				Between truck and pick up location
	Running/Jumping	x								
	Climbing				x					2 steps in/out of truck at each pick up
	Bending/Stooping					x				When picking up recyclables, tipping up tote
Crouching		x							Pick up dropped item	
Kneeling		x							Pick up spilled items	

Crawling	x						
Twisting				x			Turn to dump, manoeuvring totes
Balancing	x						
Travelling	x						

Essential Duty 2: Recycling Truck Operator – Collecting (continued)

a. Physical Demands (continued)		Frequency During Task						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations		V			V		Varies: Rare for regular truck and frequent for Cushman
	Hear/Other Sounds						x	Vehicles, pedestrians, alarms, workers
	Vision/Far						x	Monitor environment
	Vision/Near						x	Collecting
	Vision/Colour						x	Ability to discern between yellow/blue bags
	Vision/Depth						x	Collecting
	Perception/Spatial		x					
	Perception/Form		x					Watching for obstacles in poor visibility conditions
	Feeling	x						
	Speech		V			V		D1,2- Varies: Rare for regular truck and frequent for Cushman
Work Environment	Inside Work	x						
	Outside Work						x	Collecting
	Slippery		x					Wet weather, slippery road conditions, snow/ice
	Congested worksite				x			Depends on traffic, time of day, location of work
	Chemical Irritants				x			Dripping liquids from recycled containers
	Confined Space Entry	x						
	Vapour Fumes						x	Exhaust, chemicals, etc,
	Noise						x	Vehicle and street noise
	Proximity to moving objects					x		Vehicles and pedestrians, depending on time of day and location of work, hopper
	Hazardous Machines					x		Hopper
	Electrical hazard	x						
	Hazardous objects	x						
	Radiant/Thermal Energy	x						
	Hot/Cold		x					Extremes are rare & weather dependent
	Humid		x					Extremes are rare & weather dependent
	Environmental Dust				x			Unpaved back lanes, especially in dry conditions
	Organic Substances		x					If on outside of blue box or bags or totes
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct		x					Dark early mornings in winter
Lighting – Indirect	x							
Vibration – Whole Body	x							
Vibration – Hand/Arm	x							

Essential Duty 2: Recycling Truck Operator – Collecting (continued)

b. Cognitive and Psychosocial Demands	Frequency During Task			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision	x			
Time Pressure		x		Must finish beat and may help others in group
Attention to Detail		x		Keep materials separate
Memory Requirements	x			
Interact with co-workers		√	√	Rare for regular truck, frequent for Cushman
Interact with public	x			
Work Alone	√	√		Constant for regular truck, rare for Cushman
Reading	x			
Writing	x			
Irregular Hours	x			
Operating Equipment		x		hopper controls

Frequency Rating Definitions for % of Task

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Infrequent	2-5 %
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Frequent	34-66 %
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STRENGTH	
Strength Category	Weight Handled
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10. Light	5 kg. to 10 kg.
11. Medium	10 kg. to 20 kg.
12. Heavy	>20 kg