

Job Demands Analysis

Water Operations Ops III (maintenance) worker

Purpose

The Ops III (maintenance) job entails fixing leaks in services, firelines and water mains on city property either by repairing the pipe or performing a renewal.

Essential Duties

The Ops III (maintenance) worker has 4 essential duties:

Duty #1: Call Truck (assessing leaks)

Duty #2: Pipe repair or renewal

Duty #3: Site Preparation and Maintenance

Duty #4: Driving

% of shift or # hrs

50%

2 hrs (leak crews)

5 hrs (leak crews)

50% (call truck only)

1hr (leak crews only)

Description of Non-essential Tasks

The Ops III (maintenance) worker may be required to perform other work tasks on an occasional basis. Examples of the tasks that may be performed are:

- Keeping trucks clean
- Speaking with the public

Summary of Demands

	Sedentary	Light	Medium	Heavy	Very Heavy	Comments
Physical (strength)				✓		strength requirement
Physical (endurance)				✓		Stand/walk 67%-100% of shift
Cognitive			✓			

Shift Structure

Leak crews (regular and emergency truck) work from 7am-3:30pm, M-F. There is a 30 minute lunch break and two 10 minute coffee breaks that may be taken at any time.

The emergency truck is also on call for after hours work.

There are 2 call trucks that work 10 hr shifts 4 days/week (Sun-Wed for 1 truck and Wed-Sat for the 2nd truck).

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 – Ops III (maintenance) worker - 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				<3	50	D1,2,3 -Tools, pipe, fittings
	Lifting – Knuckle to Waist			x				5	29	D1,2,3 -Pumps, tool bucket, fittings
	Lifting – Over Shoulder		x					<3	10	D1,2,3 -Putting things away high up in truck
	Carrying – with Handles			x				10	28	D1,2,3 -Tool bucket, saws, pumps
	Carrying – without Handles			x				<3	32	D1,2,3 -Fittings, tools, pipe
	Pushing – Upper Extremity			x				3	23	D1,2,3 -Sweeping, Preassembly
	Pushing – Hips/Legs assist				x			5	23	D1,2,3 -Sweeping, tamping, guiding items move by excavator, preassembly
	Pulling – Upper Extremity			x				5	15	D1,2 -Preassembly, wrench use
	Pulling – Hip/Leg Assist			x				5	91	D2,3 -Preassembly, open/close hydrants
Mobility	Reach - Shoulder or Above		x					D3 - Putting away tools		
	Reach - Below Shoulder				x			D1,2,3,4 -preassembly, using tools, adjusting seat controls, laying pipe		
	Handling					x		D1,2,3,4 - tools, steering wheel, fittings, pipe		
	Fine finger movements		x					D1,2 - small nuts or fittings		
	Neck - Static Flexion				x			D1,2,3 - preassembly, sweeping, digging, laying pipe		
	Neck – Static Neutral				x	x		D4 - varies depending on regular leak crew or call truck		
	Neck – Static Extension		x					D2,3		
	Neck – Static Rotation		x					D1,2,3,4		
	Throwing	x								
	Sitting				x	x		D1,2,4 - preparing pipe, driving (more sitting for call truck)		
	Standing					x		D1,2,3		
	Walking					x		D1,2,3		
	Running/Jumping	x								
	Climbing			x				D1,2,3 - in/out of ditches, in/out tool truck		
	Bending/Stooping			x				D1,2,3 - digging, laying pipe, preassembly, listening for leaks		
	Crouching			x				D1,2 - laying pipe, preassembly		
	Kneeling			x				D2 - laying pipe, cutting, preassembly		
	Crawling	x								
	Twisting				x			D1,2,3		
Balancing		x					D1,2,3			
Travelling			x		x		D4 - varies between leak crew and call truck			

Job Demands Analysis – Ops III (maintenance) worker - Summary Table (cont.)

a. Physical Demands (continued)		Frequency During Shift						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	D1,2,3,4 - Coworkers, public
	Hear/Other Sounds						x	D1,2,3,4 -Vehicles, sirens
	Vision/Far						x	D1,2,3,4
	Vision/Near						x	D1,2,3,4
	Vision/Colour				x			D4 - traffic lights, road signs
	Vision/Depth						x	D1,2,3,4
	Perception/Spatial				x			D1,2,3,4 - connecting up pipe, building barricades, looking in mirrors when driving
	Perception/Form			x				D1, 3,4 - Looking for utility lines, driving in poor weather
	Feeling	x						
	Speech						x	D1,2,3,4
Work Environment	Inside Work				x	x		D4 - inside truck when driving (varies between leak crew and call truck)
	Outside Work						x	D1,2,3
	Slippery				x			D1,2,3,4 - wet weather
	Congested worksite			x	x			D1,2,3,4 - Varies depending on nature of job and whether driving in busy traffic
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes						x	D1,2,3 - vehicle exhaust
	Noise						x	D1,2,3,4
	Proximity to moving objects					x		D2,3,4 - excavator, vehicles
	Hazardous Machines				x			D2,3 - backhoe/excavator
	Electrical hazard			x				D1,3 - hand exposing utility lines
	Sharp/Hazardous Tools			x				D1,2,3 - saws, pipe cutter, drills
	Radiant/Thermal Energy			x				D2 - pipe saw
	Hot/Cold		x					D1,2,3 - weather dependent
	Humid		x					D1,2,3 - weather dependent
	Environmental Dust				x			D1,2,3
	Organic Substances	x						
	Medical Waste	x						
	Blood Products		x					D3 - discarded syringes
	Lighting Issues – Direct		x					D1,2,3,4 - dark mornings in winter
	Lighting Issues – Indirect	x						
	Vibration – Whole Body				x	x		D4 - driving (varies between leak crews and call trucks)
	Vibration – Hand/Arm				x			D2,3 - tamping, saws, jackhammer, drills

Job: Ops III (maintenance)
 Employer: City of Vancouver
 Reports to: Superintendent of Water Operations

Department: Engineering – Water Operations Union: CUPE 1004
 Location: varies

b. Cognitive and Psychosocial Demands	Frequency During Shift			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision			x	D1,2,3,4
Time Pressure		x		D1,2,3 - more so for emergency truck on call
Attention to Detail		x		D1,2,4- attaching fittings, cutting pipe, driving
Memory Requirements	x			
Interact with co-workers			x	D1,2,3,4
Interact with public	x			
Work Alone	x			
Reading		x		D1,2,4 - street signs, reviewing plans before starting job, work orders, etc
Writing		x		D1 - paperwork
Irregular Hours	x			
Operating Equipment		x		D1,2,3,4 -Saws, plate tamper, jack hammer, drills, vehicle

Physical Environment

The work takes place on city streets and sidewalks and in ditches dug in these areas.

Staffing Levels

The Ops III (maintenance) worker usually works as part of a 2 man for regular leak crews and call truck and as part of a 3 man crew for the emergency truck.

Tools and Equipment Used

The Ops III (maintenance) worker primarily uses pipe saws, hacksaws, pipe cutters, service keys, leak phones, pumps, jack hammers, plate tampers, shovels and brooms.

Other Equipment

The Ops III (maintenance) worker must wear CSA approved boots at all times as well as a hard hat and safety vest. Safety glasses are required when cutting pipe with saws and ear protection when around loud noises.

Data Collection

Mandy Gallant, an ergonomic consultant from ErgoRisk Management Group conducted the JDA assessment on July 25th, 2008. Data was collected using a tape measure, industrial scale, Chatillon push/pull force gauge, digital camera and through observation and discussion with selected employees, safety support staff and the sub-foreman.

Contact for the on-site assessment

Mark Stevenson was the contact for the on-site assessment.

Description of Essential Duties

This section describes the work tasks that comprise the 4 essential duties of the job. Tables 1 - 4 (located at the end of this report) provide the physical, cognitive and psychosocial demands for performing each of the essential duties.

Essential Duty 1: Call Truck

The call truck is dispatched in response to calls or complaints of leaks or other service disruption. The call truck drives to the site to assess the leak and determine if it is on city property. The Ops III worker removes the service tile top at the property boundary and uses a valve key to shut off the water to the property. He listens using a leak phone to determine whether the leak is city side or property side (figure 1).



Figure 1: Ops III worker listening for a leak through the leak phone placed against service key.



Figure 2: Ops III worker hand digging.

If the leak is small enough the Ops III worker may repair the leak on the spot. This may require some hand digging to access the leak in the service line and to access the main

(figure 2). The Ops III worker then shuts off service at the main, cuts the pipe on either side of the leak and replaces it with a small section of new pipe.

Typically a call truck may respond to 8 calls in a shift and most of the time they do not perform repairs, but assess the leak and pass the information back to dispatch. In the case of larger leaks or water main bursts, etc the call truck Ops III worker will take immediate action to contain the leak by turning off water service, etc.

Essential Duty 2: Pipe repair and renewal

Leak crews repair or replace leaky pipe. Two man leak crews work on residential services with pipe of a diameter less than 4" (typically ¾" copper or 2" Kaitec plastic coated aluminum). The crew consists of 1 Ops III worker and 1 sub-foreman. The emergency truck has a 3 man crew (1 Ops III worker, 1 pipe-layer and 1 sub-foreman) and performs repairs on pipe of a diameter larger than 4" such as found on firelines and water mains.

For small pipe leaks, and depending on the leak itself, the age of the pipe and history of the pipe, the leak crew may perform a repair to the pipe or renew it. In the case of a repair, the Ops III workers either hand digs or has the backhoe dig down to access the point of the leak in the service line and to access the main (figure 2). The Ops III worker then shuts off service at the main, cuts the pipe on either side of the leak and replaces it with a small section of new pipe.

If a renewal is required then the Ops III worker must remove the existing ¾" copper pipe and replace it with new pipe. To remove the old copper pipe the worker cuts the pipe at both the main and the property boundary with a hand held pipe cutter (figure 3). He then inserts a cable into the pipe from the property side, the end of which is attached to the new section of pipe (figure 4). Once fed through the existing leaky pipe, the cable is attached to the backhoe which pulls the old pipe out and new pipe into place at the same time.



Figure 3: Ops III worker cutting ¾" copper service pipe with a pipe cutting tool.



Figure 4: Ops III worker feeding cable through the existing pipe to perform a renewal of service.

The emergency truck performs similar work but on larger pipes. As such, their fittings and tools are larger and heavier than for the services leak crew. The emergency truck is also on call every night so the emergency truck Ops III worker works more overtime and longer hours than the services leak crew Ops III worker.

The emergency truck pipe layer performs the actual laying of the pipe, and the Ops III worker performs preassembly tasks such as cutting the pipe, attaching fittings, etc (figure 5). The Ops III worker may also wrap the pipe in plastic if necessary for the soil conditions.



Figure 5: Ops III worker attaching a fitting to large diameter pipe.

Essential Duty 3: Site Preparation and Maintenance

Site preparation and maintenance encompasses a variety of different tasks and makes up the majority of the Ops III (maintenance) worker's job. To access services, firelines and mains, digging is primarily performed by the excavator, but Ops III workers hand expose in areas where utility and other lines are located (Figure 6). Ops III workers also perform some hand digging depending on the access required for the pipes. Ops III workers also put up barricades and signs to stop or divert traffic around the worksite (figure 7).



Figure 6: Ops III worker and sub-foreman hand exposing lines.



Figure 7: Worker with barricades to divert traffic.

The Ops III worker also performs some tamping once the ditches have been filled in by the excavator (figure 8). Once the job is completed the Ops III worker performs some sweeping and general area clean up. He is also responsible for cleaning and putting tools away back in the truck at the end of the day (figure 9).



Figure 8: Ops III worker tamping the site after work completed.



Figure 9: Ops III worker putting tools away in back of leaks truck.

Essential Duty 4: Driving

Ops III workers typically share driving duties 50% with the sub-foreman. Crews pick the truck up in the yard in the morning and a pre-trip inspection is performed (figure 11). Pre-trip inspection of the truck includes, checking tires, lights, fluid levels, windshield wipers, etc. If necessary the driver will fill the vehicle with gas either at the beginning or end of the shift. Depending who is driving first, the inspection may be performed by the Ops III worker or the sub-foreman.

In the case of the call truck 50% of the shift is spent driving. In the case of the leak crews approximately 1 hr per day is spent driving. At the end of the day the leak crew may drive to the next day's job site to erect barricades or no parking signs in preparation for the next day's work. The truck is then driven back to the yard at the end of the day.

Job: Ops III (maintenance)
Employer: City of Vancouver
Reports to: Superintendent of Water Operations

Department: Engineering – Water Operations Union: CUPE 1004
Location: varies



Figure 11: Ops III worker performing pre-trip vehicle inspection.

Essential Duty 1: Ops III (maintenance) worker – Call Truck

a. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle			x				11	15	Service keys, tools, service tile
	Lifting – Knuckle to Waist			x				11	15	Service keys, tools
	Lifting – Over Shoulder		x					5	10	Putting away tools in truck
	Carrying – with Handles			x				10	15	Tool bucket
	Carrying – without Handles			x				11	15	Hand tools, service keys
	Pushing – Upper Extremity			x				5	15	Turn key to turn service on/off
	Pushing – Hips/Legs assist			x				5	15	Sweeping, pipe repair
	Pulling – Upper Extremity			x				5	15	Turn key to turn service on/off
	Pulling – Hip/Leg Assist			x				5	23	Pipe repair, turning stiff keys
Mobility	Reach - Shoulder or Above		x							Tools on top shelf of truck
	Reach - Below Shoulder			x						Using tools if repairing pipe
	Handling					x				service key, tools
	Fine finger movements			x						Small nuts if performing repairs
	Neck – Static Flexion			x						Digging, working on pipe, inserting service key
	Neck – Static Neutral				x					
	Neck – Static Extension		x							Looking up at backhoe
	Neck – Static Rotation			x						Listening for leaks
	Throwing	x								
	Sitting			x						
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing			x						In/out of truck and ditches if doing a repair
	Bending/Stooping			x						Listening for leaks
	Crouching		x							Performing a repair
	Kneeling		x							
	Crawling	x								
	Twisting			x						Listening for leaks, turning service key
	Balancing	x								
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: Ops III (maintenance) worker – Call Truck

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	Coworkers, public
	Hear/Other Sounds						x	Vehicles, sirens, listening for leaks
	Vision/Far						X	
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial		x					
	Perception/Form		x					Visualizing pipe when digging if doing a repair
	Feeling	x						
	Speech						x	
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			wet weather
	Congested worksite		x					If leak at busy construction site
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes						x	vehicle exhaust
	Noise						x	
	Proximity to moving objects			x				excavator occasionally, vehicles
	Hazardous Machines		x					Backhoe occasionally
	Electrical hazard		x					hand exposing utility lines if doing a repair
	Sharp/Hazardous Tools		x					pipe cutter, saw if doing a repair
	Radiant/Thermal Energy	x						
	Hot/Cold		x					weather dependent
	Humid		x					weather dependent
	Environmental Dust		x					if digging
	Organic Substances	x						
	Medical Waste	x						
	Blood Products	x						
	Lighting Issues – Direct		x					dark mornings in winter
Lighting Issues – Indirect	x							
Vibration – Whole Body	x							
Vibration – Hand/Arm		x					If using power tools during a repair	

Essential Duty 1: Ops III (maintenance) worker – Call Truck

b. Cognitive and Psychosocial Demands	Frequency During Duty			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision			X	
Time Pressure		X		If a significant leak
Attention to Detail		X		Identifying leak
Memory Requirements	X			
Interact with co-workers			X	
Interact with public	X			
Work Alone	X			
Reading		X		Work orders, plans
Writing		X		Reports/analyses of leaks
Irregular Hours	X			
Operating Equipment	X			

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 – Ops III (maintenance) worker – Pipe Repair and Renewal

a. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle			x				5	50	Tools, pipe, fittings
	Lifting – Knuckle to Waist			x				5	29	Hand tools, tool bucket, fittings
	Lifting – Over Shoulder		x					3	10	Putting tools away on top shelf of truck
	Carrying – with Handles			x				10	28	Tool bucket, saws, pumps
	Carrying – without Handles			x				3	32	Hand tools, service key, pipe
	Pushing – Upper Extremity				x			3	23	Feeding cable through pipe, preassembly
	Pushing – Hips/Legs assist			x				5	23	Attaching fittings, preassembly
	Pulling – Upper Extremity			x				5	15	Pull cable, preassembly, wrapping pipe in plastic
Pulling – Hip/Leg Assist			x				5	91	Attaching fittings, preassembly, turning service/hydrant keys	
Mobility	Reach - Shoulder or Above		x					Top shelf of truck		
	Reach - Below Shoulder					x		Laying pipe, attaching fittings, cutting pipe		
	Handling					x		Pipe, tools, fittings		
	Fine finger movements		x					Turning small nuts or screws		
	Neck - Static Flexion					x		Looking down at pipe when working on it		
	Neck – Static Neutral		x							
	Neck – Static Extension		x							
	Neck – Static Rotation		x							
	Throwing	x								
	Sitting			x				Working on pipe		
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing			x				In/out of ditch or back of truck		
	Bending/Stooping				x			Laying pipe, assembly work		
	Crouching				x			Working on pipe		
	Kneeling			x				Feeding cable through pipe, attaching fittings		
Crawling	x									
Twisting				x			Attaching fittings, laying pipe, assembly			
Balancing		x								
Travelling	x									

**Note: weights vary between regular leak crew (lighter) and emergency truck (heavier)

Frequency Rating Definition for % of Duty

The definitions for frequency ratings are contained at the end of the Table (page 18).

Essential Duty 2 – Ops III (maintenance) worker – Pipe Repair and Renewal

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	Co-workers and occasionally public
	Hear/Other Sounds						x	Vehicles, sirens
	Vision/Far						x	
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial			x				Orienting fittings
	Perception/Form		x					
	Feeling	x						
	Speech						x	Talk to co-workers and public
	Work Environment	Inside Work	x					
Outside Work							x	
Slippery					x			During wet weather
Congested worksite					x			Vehicle traffic, tools and equipment, small spaces at times
Chemical Irritants		x						
Confined Space Entry		x						
Vapour Fumes							x	Vehicle exhaust, generators
Noise							x	Vehicles, excavator, tools
Proximity to moving objects						x		Cars, excavator
Hazardous Machines					x			excavator
Electrical hazard			x					
Sharp/Hazardous Tools					x			Pipe cutter, saws, drills
Radiant/Thermal Energy			x					Pipe saw
Hot/Cold			x					Weather dependent
Humid			x					Weather dependent
Environmental Dust					x			
Organic Substances		x						
Medical Waste		x						
Blood Products		x						
Lighting Issues – Direct			x					Occasional dark mornings in winter
Lighting Issues – Indirect	x							
Vibration – Whole Body	x							
Vibration – Hand/Arm			x				Saws, drills and other power tools	

Essential Duty 2 – Ops III (maintenance) worker – Pipe Repair and Renewal

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		Attaching fittings, cutting pipe
Memory Requirements	X			
Interact with co-workers			X	
Interact with public	X			
Work Alone	X			
Reading		X		Reviewing plans and work orders
Writing	X			
Irregular Hours	X			
Operating Equipment		X		Saws, drills and other tools

Frequency Rating Definitions for % of Duty

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Rare	0-1 %
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Occasional	6-33 %
Frequent	34-66 %
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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 – Ops III (maintenance) worker – Site Prep and Maintenance

a. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle			x				<3	15	brooms, shovels, tools
	Lifting – Knuckle to Waist			x				10	23.5	tool bucket/box, fencing, pump
	Lifting – Over Shoulder		x					<3	10	Putting things away on high shelves in truck
	Carrying – with Handles			x				10	20	Tool bucket, gas can
	Carrying – without Handles			x				<3	15	brooms, shovels, valve keys
	Pushing – Upper Extremity			x				3	5	sweeping
	Pushing – Hips/Legs assist				x			5	23	Sweeping, tamping, guiding items moved by excavator
	Pulling – Upper Extremity			x				5	15	guiding items moved by excavator
Pulling – Hip/Leg Assist			x				5	91	Opening/closing hydrants, tamping	
Mobility	Reach - Shoulder or Above		x							Top shelf in tool truck
	Reach - Below Shoulder				x					Digging, sweeping, using tools
	Handling					x				Brooms, shovels, tools, tamper, fencing, etc
	Fine finger movements	x								
	Neck - Static Flexion				x					Looking at ground when digging, sweeping, tamping, etc
	Neck – Static Neutral		x							
	Neck – Static Extension		x							
	Neck – Static Rotation		x							
	Throwing	x								
	Sitting		x							
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing			x						In/out of trenches, steps into truck
	Bending/Stooping				x					Sweeping, shovelling
	Crouching		x							
	Kneeling		x							
	Crawling	x								
Twisting			x						Shovelling, digging, moving equipment	
Balancing		x								
Travelling	x									

Frequency Rating Definition for % of Duty

The definitions for frequency ratings are contained at the end of the Table (page 21).

Essential Duty 3 – Ops III (maintenance) worker – Site Prep and Maintenance

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	Co-workers and occasionally public
	Hear/Other Sounds						x	Vehicles, sirens
	Vision/Far						x	
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial	x						
	Perception/Form			x				When hand exposing lines
	Feeling	x						
	Speech						x	Talk to co-workers and public
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			During wet weather
	Congested worksite				x			Vehicle traffic, tools and equipment
	Chemical Irritants	x						
	Confined Space Entry	x						
	Vapour Fumes						x	Vehicle exhaust, generators
	Noise						x	Vehicles, power tools
	Proximity to moving objects					x		Cars, excavator
	Hazardous Machines					x		Often near excavator, tamper
	Electrical hazard			x				When hand exposing utility/power lines
	Sharp/Hazardous Tools			x				Saws and other tools
	Radiant/Thermal Energy	x						
	Hot/Cold		x					Weather dependent
	Humid		x					Weather dependent
	Environmental Dust				x			Worse when digging going on
	Organic Substances	x						
	Medical Waste	x						
	Blood Products		x					Discarded needles occasionally found on site
	Lighting Issues – Direct		x					Occasional dark mornings in winter
Lighting Issues – Indirect	x							
Vibration – Whole Body	x							
Vibration – Hand/Arm				x			Tamper, jackhammer	

Essential Duty 3 – Ops III (maintenance) worker – Site Prep and Maintenance

b. Cognitive and Psychosocial Demands	Frequency During Duty			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision			X	
Time Pressure		X		Depending on severity of leak and urgency of repair
Attention to Detail	X			
Memory Requirements	X			
Interact with co-workers			X	
Interact with public	X			
Work Alone	X			
Reading	X			
Writing	X			
Irregular Hours	X			
Operating Equipment		X		Tamper, jackhammer

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
13. Limited	Up to 5 kg.
14. Light	5 kg. to 10 kg.
15. Medium	10 kg. to 20 kg.
16. Heavy	>20 kg

Essential Duty 4 – Ops III (maintenance) worker – Driving

b. Physical Demands		Frequency During Duty						Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)	Max (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							Adjust rear-view mirror, close hood	
	Reach - Below Shoulder			x						Adjust seat controls, checking tires and fluid levels during pre-trip	
	Handling						x			Steering wheel, oil dipstick, dashboard controls, etc	
	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						x				
	Standing	x									
	Walking	x									
	Running/Jumping	x									
	Climbing	x									
	Bending/Stooping			x							During pre-trip inspection
	Crouching			x							During pre-trip inspection
	Kneeling	x									
	Crawling	x									
	Twisting			x							Shoulder check, parallel parking, getting in/out of vehicle, pre-trip inspection
	Balancing	x									
Travelling						x					

Frequency Rating Definition for % of Duty

The definitions for frequency ratings are contained at the end of the Table (page 21).

Essential Duty 4 – Ops III (maintenance) worker – Driving

c. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations					x		Co-workers
	Hear/Other Sounds						x	Traffic noise, sirens, etc
	Vision/Far						x	
	Vision/Near						x	
	Vision/Colour						x	
	Vision/Depth						x	
	Perception/Spatial				x			Checking mirrors
	Perception/Form		x					Poor visibility conditions
	Feeling	x						
	Speech					x		Co-workers
Work Environment	Inside Work						x	
	Outside Work	x						
	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			x				Exhaust fumes if windows down when driving
	Noise						x	
	Proximity to moving objects						x	Other vehicles
	Hazardous Machines	x						
	Electrical hazard	x						
	Sharp/Hazardous Tools	x						
	Radiant/Thermal Energy	x						
	Hot/Cold	x						
	Humid	x						
	Environmental Dust		x					If windows down and driving past construction site.
	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 4 – Ops III (maintenance) worker – Driving

d. Cognitive and Psychosocial Demands	Frequency During Duty			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision			x	Sub-foreman in vehicle
Time Pressure	x			
Attention to Detail			x	Watching the road
Memory Requirements			x	Remembering directions and road signs
Interact with co-workers		x		
Interact with public	x			
Work Alone	x			
Reading		x		Road signs
Writing	x			
Irregular Hours	x			
Operating Equipment			x	truck

Frequency Rating Definitions for % of Duty

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