

Job Demands Analysis Sewer Operations Ops II Worker (Construction)

Purpose

The Ops II (construction) job entails laying new sanitary and storm pipes under city streets to replace older single sewer pipes.

Essential Duties

The Ops II worker has 4 essential duties:

	% of Shift/Hrs
Duty #1 – Laying Pipe	20% (padman excepted)
Duty #2 – Preparing the Site	60%
Duty #3 – Site Maintenance	20%
Duty # 4 – Padman	20% (padman only)

(NOTE: the padman is a special duty as 1 crew member typically acts as the padman on a regular basis and others would only step in if the regular padman is sick. Padman does not typically lay pipe in the ditch, but is involved in site preparation and site maintenance duties in roughly the same percentage as other Ops II workers).

Description of Non-essential Tasks

The Ops II worker may be required to perform other work tasks on an occasional basis.

Examples of the tasks that may be performed are:

- Cleaning up in work trailers
- Organizing tools in tool wagon
- Interacting with the public to answer questions, etc

Summary of Demands

	Sedentary	Light	Medium	Heavy	Very Heavy	Comments
Physical				✓		strength requirement for timbering and lifting pipe
Physical				✓		stand/walk for 67-100% of the shift
Cognitive			✓			

Shift Structure

All Ops II workers work from 7am-3:30pm, M-F. There is a 30 minute lunch break that is typically taken at 11:30 am and two 10 minute coffee breaks typically taken at 9:30am and 2pm. Overtime is common at certain times of the year.

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 II (construction) - 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				7.8	73.5	D1, D2, D3 -Tools, pipe, max wt 8"x8" timbers
	Lifting – Knuckle to Waist			x				7.8	27	D1, D2,D3 - stacked PVC, items in wheelbarrows, fencing
	Lifting – Over Shoulder		x					7.8	17	D1, D2, D3 - Top shelf tool wagon, air jacks, receiving pipe in ditch
	Carrying – with Handles		x					18	22.5	D2, D3 - Generator, chop saw
	Carrying – without Handles			x				7.8	55	D1,2,3,4 - Pipes, timbers, fences
	Pushing – Upper Extremity			x				15	23	D1, D2 -Guiding steel sets and concrete pipe, inserting pipes or bends
	Pushing – Hips/Legs assist			x				5	73.5	D1, D2, D3 - Wheelbarrow, broom, timbering, guiding steel cages, levering pipes into place
	Pulling – Upper Extremity			x				15	23	D1,D2 - guiding steel sets, levering pipes into place
	Pulling – Hip/Leg Assist		x					45.5	56	D1, D2 - Removing manhole covers, levering pipes into place,
P	Reach - Shoulder or Above		x							D2-Setting air jacks, climbing ladders
	Reach - Below Shoulder			x						D1, D2-Pouring cement, accessing pipe, eqpt
	Handling					x				D1, D2, D3, D4 -Pipe, tools, fencing, guide stick
	Fine finger movements	x								
	Neck - Static Flexion			x						D1, D2, D3, D4 -Looking into ditch, sweeping
	Neck – Static Neutral	x								
	Neck – Static Extension			x						D1, D2, D4 -Looking up from in ditch, watching excavator, talking to operator
	Neck – Rotation		x							
	Throwing	x								
	Sitting	x								
	Standing					x				D1, D2, D3, D4
	Walking					x				D1, D2, D3, D4
	Running/Jumping	x								
	Climbing			x						D1, D2- ladders
	Bending/Stooping				x					D1, D2, D3, D4 Grinding, cutting, laying pipe, shovelling, sweeping, measuring grade
	Crouching		x							D1 - inside pipe or manhole
	Kneeling			x						D1 - Cutting pipe
	Crawling	x								
Twisting				x					D1,D2, D3, D4	
Balancing			x						D1, D2 -on steel forms or on pipe in ditch	
Travelling	x									

Job Demands Analysis – Ops II (construction) : 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
	Hear/Other Sounds						x	D1, D2, D3
	Vision/Far			x				D2
	Vision/Near						x	D1, D2, D3
	Vision/Colour		x					D2 - dye test
	Vision/Depth						x	D1, D2, D3
	Perception/Spatial		x					D2 - timbering
	Perception/Form			x				D2, D4 - utility and water lines being uncovered
	Feeling			x				D4 - probing for lines with probe bar
	Speech					x		D1, D2, D3
Work Environment	Inside Work	x						
	Outside Work						x	D1, D2, D3
	Slippery				x			D1, D2, D3 - wet weather
	Congested worksite					x		D1, D2, D3
	Chemical Irritants		x					D1 - meth lab flushing into sewers
	Confined Space Entry		x					D1 - manholes
	Vapour Fumes			x				D1, D2
	Noise						x	D1, D2, D3
	Proximity to moving objects						x	D1, D2, D3
	Hazardous Machines						x	Excavator, saws
	Electrical hazard			x				D1, D2
	Hazardous objects		x					D1, D2
	Radiant/Thermal Energy		x					D1, D2 - coring machine, eqpt that heats up
	Hot/Cold		x					D1, D2, D3 - weather
	Humid		x					D1, D2, D3 - weather
	Environmental Dust				x			D1, D2, D3 - worse on very dry/windy days
	Organic Substances				x			D1, D2
	Medical Waste	x						
	Blood Products	x						
	Lighting Issues – Direct		x					D1, D2, D3 - dark mornings in winter
	Lighting Issues – Indirect	x						
	Vibration – Whole Body		x					
	Vibration – Hand/Arm			x				D1, D2, - plate tamper, jackhammer, saw

Job Demands Analysis – Ops II (construction) : Summary Table (continued)

b. Cognitive and Psychosocial Demands	Frequency During Shift			Comments
	Never / Rare	Infrequent / Occasional	Frequent / Constant	
Degree of Supervision			x	D1, D2, D3
Time Pressure		x		D1, D2 - if trucks are waiting
Attention to Detail		x		
Memory Requirements		x		
Interact with co-workers			x	D1, D2, D3
Interact with public	x			
Work Alone	x			
Reading	x			
Writing	x			
Irregular Hours	x			
Operating Equipment		x		D1, D2, D3 - plate tamper, jackhammer, saws, grinder, pipe cutter

Physical Environment

The work takes place outside on city streets and in ditches dug into the streets.

Staffing Levels

The Ops II worker (construction) usually works in a team of 7-12 people.

Tools and Equipment Used

The Ops II worker (construction) uses chop saws, pipe cutters, grinders, ladders, air jacks, hammers, rope chains, jackhammers, plate tampers, shovels, brooms, and picks.

Other Equipment

The Ops II (construction) 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 and ear protection when around loud noise.

Data Collection

Mandy Gallant, an ergonomic consultant from ErgoRisk Management Group conducted the JDA assessment over the course of two days (April 25th & 30th, 2008). Data was collected using a tape measure, digital camera, Chatillon push/pull force gauge, industrial scale and through observation and discussion with selected employees and the on-site supervisor.

Contact for the on-site assessment

Danny Alves was the primary 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. Table 4 describes the specific padman's duties which differ from the regular Ops II worker (construction).

Essential Duty 1: Laying Pipe

Laying pipe entails preparing, positioning and connecting sanitary and storm pipe of differing types, lengths and diameters. Tasks include lifting and carrying the specified pieces of pipe to the area of the ditch where pipe laying is taking place (Fig. 1). The pipe is cut to length with a chop saw for PVC or concrete pipe (Fig. 2), or pipe cutter for VIT pipe (Fig. 3). In the case of PVC pipe the cut end is then ground for better fit using a grinder or router.



Fig 1: Carrying VIT pipe



Fig 2: Cutting PVC with chop saw.

The pipe is lowered into the ditch by 2 workers using a rope chain (Fig. 4) and is received by 1 or 2 workers who have descended by ladder into the ditch. The Ops II worker places the pipe in position and then levers it into the previous section of pipe using a probe bar placed vertically into the gravel behind the pipe (Fig. 5). The pipe is marked with a black line to indicate when it is fully seated. For concrete pipe it is transported and lowered into the ditch by excavator and guided into place by the Ops II worker.



Fig 3: Pipe cutter for VIT pipe



Fig 4: Lowering pipe into ditch with rope chain.

If a connection is being made with a residential pipe the Ops II worker may install several different pipe bends (angled pieces of pipe) onto a Y-connection in the main pipe. He lubricates the bend or connecting piece of pipe (Fig. 6) before attaching it. The worker then connects the pipe up to the level of the existing residential pipe and makes the connection to the residential pipe with a special connector that can join clay sewer pipes to PVC. These connectors are also used to join PVC pipe to VIT pipe in the mains.



Fig 5: Levering pipe into place with probe bar.



Fig 6: Lubricating bend before connecting it.

A Swedish drill, coring machine or jackhammer may be used to cut into cement pipe when connecting into manholes or cutting into cement mains. When using a jackhammer in the manhole workers typically have it top roped above and rotate in 15

minute shifts with the jackhammer. Workers may also pour concrete from a hopper lowered by excavator during manhole construction.

Essential Duty 2: Preparing the Site

Preparing the site before laying the pipe involves digging the trench, shoring the walls and shovelling and levelling the gravel in the ditch to support the pipe at the appropriate grade. An excavator is used to dig the ditch but the padman hand exposes power and utility lines (Fig 7.). He uses a shovel to dig away dirt around the lines and in the case of utility lines a metal probe bar to poke the ground near where the lines are expected to be found. Typically the padman spends 5 – 7 minutes hand exposing lines and does this 10 -15 times per day depending on the job.

Ops II workers assist in moving and positioning the steel cage (Fig. 8) as well as installing Finn form shoring around existing residential pipe for connections. Finn form shores are put together by the workers with air jacks between the pieces of Finn form and it is lifted into the ditch by the excavator. Steel cables need to be attached to the steel cage or Finn form shores for the excavator to move them around and some climbing and balancing is required by the worker (Fig. 9)



Fig. 7: Padman hand exposing lines.



Fig. 8: Guiding steel cage into place.



Fig. 9: Attaching cables to cage for moving it.

Gravel is poured into the ditch by machinery and workers level it off and pack it under the pipes for support, preparing a level surface to receive new pieces of pipe. When climbing in and out of the ditch workers must climb up and down ladders (Fig 10). Other workers hand down shovels, small pieces of pipe or other equipment.

When new manholes are needed the Ops II worker participates in timbering to build the wooden set that will house the manhole (Fig 11). Timbering is heavy work, which occurs for 1-2 hours every week or two depending on the job. Workers are manually lifting and manoeuvring heavy lumber into place to build the set and brace it once it is in the ground. Excavators lower the manhole pieces in place and Ops II workers pour cement to seat everything in place. Once the ditch is filled in and tamped by the excavator the Ops II workers may also need use a plate tamper to tamp further.



Fig 10: Typical ladder positioning in ditch



Fig 11: Timber set fully constructed.

Essential Duty 3: Site Maintenance

Site maintenance involves keeping the site clear of gravel and other debris which could be a safety hazard or interfere with work. It involves shovelling, sweeping and general clean up, as well as cleaning and putting away tools. As well, workers position fences around the ditch in the evening to safeguard the site for the public and remove them in the morning prior to starting work (Fig 12). Workers frequently use wheelbarrows to move tools and equipment around and for clearing up at the end of the day and bringing tools and equipment out in the morning (Fig 13).



Fig. 12: Carrying fences to safeguard ditch.



Fig. 13: Wheelbarrow to transport supplies and eqpt.

Essential Duty 4: Padman

Like other Ops II workers, the padman performs standard site maintenance and site preparation and he is involved with timbering, moving pipe, etc. As part of site preparation (described in essential duty 2) the padman also hand exposes residential water and utility lines as the ditch is being dug. The padman is less frequently involved with laying pipe in the ditch as he is the eyes and ears of the site and must be able to see the goings on.

In addition to these standard Ops II duties, the padman has some specialized duties that other Ops II workers do not typically perform: He is responsible for measuring the grade of the pipe and making sure it is in agreement with the engineering plans. He uses a grade stick and laser leveller to check the grade 5 or 6 times for each section of pipe laid (Fig 14). The padman performs some calculations each morning before setting up his laser leveller with the appropriate grade for the job that day.

The padman is also the primary communicator between the excavator operator and the pipe layer. He is always in visual contact with the ditch and tells the excavator what needs to be done through verbal and hand signals (Fig 15).



Fig. 14: Padman's grade stick.



Fig. 15: Padman monitoring pipe laying in ditch.

Essential Duty 1: Ops II Worker (construction) - Laying Pipe

a. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle					x		8.5	35	Lifting pipe
	Lifting – Knuckle to Waist	x						8.5	35	Pipes piled up
	Lifting – Over Shoulder			x				8.5	17	Receiving pipe in ditch
	Carrying – with Handles	x								
	Carrying – without Handles					x		8.5	35	pipe
	Pushing – Upper Extremity				x			15	23	Attaching smaller pieces of pipe and bends to make connections
	Pushing – Hips/Legs assist			x				15	45.5	Guiding cement pipe in place, levering PVC pipe together
	Pulling – Upper Extremity				x			15	23	Guiding pipe
	Pulling – Hip/Leg Assist			x				15	45.5	Levering PVC pipe pieces together with probe bar
Mobility	Reach - Shoulder or Above				x					Receiving pipe in ditch
	Reach - Below Shoulder					x				Accessing pipe
	Handling						x			
	Fine finger movements	x								
	Neck – Static Flexion					x				Looking into ditch, down at pipe
	Neck – Static Neutral		x							
	Neck – Static Extension				x					Up to receive pipe
	Neck – Rotation		x							
	Throwing	x								
	Sitting	x								
	Standing						x			
	Walking					x				
	Running/Jumping	x								
	Climbing				x					ladders
	Bending/Stooping					x				Accessing pipe
	Crouching		x							Inside wide diameter pipe (some days never)
	Kneeling				x					
	Crawling	x								
	Twisting					x				
	Balancing				x					ladders
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 II Worker (construction) - Laying Pipe (continued)

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	
	Hear/Other Sounds						x	
	Vision/Far		x					
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial	x						
	Perception/Form	x						
	Feeling	x						
	Speech					x		
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			Weather dependent
	Congested worksite					x		Tight spaces in ditch
	Chemical Irritants		x					
	Confined Space Entry	x						
	Vapour Fumes		x					
	Noise						x	
	Proximity to moving objects					x		If excavator lowering concrete or heavy VIT
	Hazardous Machines					x		Saws, grinder, excavator
	Electrical hazard	x						
	Sharp Tools				x			Cutting and grinding pipe
	Radiant/Thermal Energy	x						
	Hot/Cold		x					Weather dependent
	Humid		x					Weather dependent
	Environmental Dust					x		
	Organic Substances			x				Depends on job
	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				If using swedish drill or coring machine or jackhammer in manhole (depends on job)	

Essential Duty 1: Ops II Worker (construction) - Laying Pipe(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	Cutting pipe, seating pipe, making good connections
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		Saws, grinder, pipe cutter

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 II Worker (construction) – Preparation of Site

a. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle			x				6.8	73.5	Timbers, ladders, shovels, etc
	Lifting – Knuckle to Waist			x				6.8	22.5	generator
	Lifting – Over Shoulder		x					6.8	17	Air jacks
	Carrying – with Handles			x				16.4	22.5	Generator, saw
	Carrying – without Handles				x			6.8	55	Timbers, ladders, shovels, etc
	Pushing – Upper Extremity				x			9	25	Guiding steel cage
	Pushing – Hips/Legs assist			x				9	73.5	Timbers, wheelbarrows
	Pulling – Upper Extremity				x			9	25	Guiding steel cage
	Pulling – Hip/Leg Assist		x						56	Removing manhole cover
Mobility	Reach - Shoulder or Above			x				Guiding steel cage as it is being lowered, raising timbers		
	Reach - Below Shoulder					x		shovelling		
	Handling						x	Shovels, tools, etc		
	Fine finger movements	x								
	Neck - Static Flexion				x			Shovelling		
	Neck – Static Neutral		x							
	Neck – Static Extension			x				Watching excavator move cages and finn form		
	Neck – Rotation		x							
	Throwing	x								
	Sitting	x								
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing			x						
	Bending/Stooping					x		Shovelling (particularly padman)		
	Crouching		x							
	Kneeling		x							
	Crawling	x								
	Twisting					x		Shovelling (particularly padman)		
Balancing			x				Attaching cables to steel cages, ladders			
Travelling	x									

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 II Worker (construction) – Preparation of Site (continued)

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						x	
	Hear/Other Sounds						x	
	Vision/Far			x				Watching for vehicles, supplies arriving
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial		x					Timbering
	Perception/Form				x			Padman when hand exposing lines
	Feeling							
	Speech						x	
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			Wet weather
	Congested worksite					x		
	Chemical Irritants		x					
	Confined Space Entry	x						
	Vapour Fumes			x				Inside ditch and vehicle exhaust
	Noise						x	
	Proximity to moving objects					x		Excavator, trucks
	Hazardous Machines					x		Excavator, trucks
	Electrical hazard				x			Padman hand exposing lines, overhead lines
	Sharp Tools				x			Probing stick, Swedish drill, jackhammer
	Radiant/Thermal Energy	x						
	Hot/Cold		x					
	Humid		x					
	Environmental Dust					x		
	Organic Substances		x					
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct		x					Dark mornings in winter
Lighting – Indirect	x							
Vibration – Whole Body		x						
Vibration – Hand/Arm			x				Jackhammer, coring machine, Swedish drill, tamper (not used every day)	

Essential Duty 2: Ops II Worker (construction) – Preparation of Site (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	Shovelling gravel supporting pipes, timbering, hand exposing lines (padman)
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		Jackhammers, Swedish drill, coring machine, tamper

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
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 II Worker (construction) – Site 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			5	20	managing tools and eqpt
	Lifting – Knuckle to Waist				x			5	27	managing tools and eqpt, moving fencing
	Lifting – Over Shoulder		x					5	15	Putting away tools and eqpt on top shelf in tool wagon
	Carrying – with Handles			x				9	22.5	Managing tools (generator and saws)
	Carrying – without Handles				x			5	27	Managing equipment, shovels, moving fencing
	Pushing – Upper Extremity					x		5	5	sweeping
	Pushing – Hips/Legs assist					x		5	15	Sweeping, wheelbarrows
	Pulling – Upper Extremity				x			5	15	wheelbarrows
	Pulling – Hip/Leg Assist	x								
Mobility	Reach - Shoulder or Above		x							Top shelf of tool wagon
	Reach - Below Shoulder					x				Broom, shovel
	Handling						x			Broom, wheelbarrows, shovels
	Fine finger movements	x								
	Neck - Static Flexion				x					Sweeping, shovelling
	Neck – Static Neutral		x							
	Neck – Static Extension		x							
	Neck – Rotation		x							
	Throwing	x								
	Sitting	x								
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing	x								
	Bending/Stooping				x					Sweeping, shovelling
	Crouching	x								
	Kneeling	x								
	Crawling	x								
	Twisting				x					Sweeping, shovelling
	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 II Worker (construction) – Site Maintenance (continued)

a. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations					x		
	Hear/Other Sounds						x	
	Vision/Far		x					
	Vision/Near						x	
	Vision/Colour	x						
	Vision/Depth						x	
	Perception/Spatial		x					
	Perception/Form		x					
	Feeling	x						
	Speech					x		
Work Environment	Inside Work	x						
	Outside Work						x	
	Slippery				x			Wet weather
	Congested worksite			x				
	Chemical Irritants		x					
	Confined Space Entry	x						
	Vapour Fumes			x				Vehicle exhaust
	Noise						x	
	Proximity to moving objects					x		Excavator, trucks
	Hazardous Machines					x		Excavator, trucks
	Electrical hazard		x					
	Hazardous objects		x					
	Radiant/Thermal Energy	x						
	Hot/Cold		x					
	Humid		x					
	Environmental Dust				x			Especially on dry days
	Organic Substances	x						
	Medical Waste	x						
	Blood Products	x						
	Lighting – Direct		x					Dark mornings in winter
Lighting – Indirect	x							
Vibration – Whole Body	x							
Vibration – Hand/Arm	x							

Essential Duty 3: Ops II Worker (construction) – Site Maintenance (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			
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
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 II Worker (construction) – Padman specialized duties

b. Physical Demands		Frequency During Duty					Weight		Comments	
		Never	Rare	Infrequent	Occasional	Frequent	Constant	Usual (kg)		Max (kg)
Strength	Lifting – Floor to Knuckle					x		3	3	Grade stick
	Lifting – Knuckle to Waist			x				3	3	Grade stick if leaned against something and not on ground
	Lifting – Over Shoulder		x							
	Carrying – with Handles		x							
	Carrying – without Handles					x		3	3	Grade stick
	Pushing – Upper Extremity	x								
	Pushing – Hips/Legs assist	x								
	Pulling – Upper Extremity	x								
	Pulling – Hip/Leg Assist	x								
Mobility	Reach - Shoulder or Above					x		Raising grade stick, performing hand signals		
	Reach - Below Shoulder					x		Lowering grade stick into ditch		
	Handling					x		Grade stick		
	Fine finger movements	x								
	Neck - Static Flexion				x			Looking into ditch		
	Neck – Static Neutral		x							
	Neck – Static Extension				x			Looking up at excavator and operator		
	Neck – Rotation		x							
	Throwing	x								
	Sitting	x								
	Standing					x				
	Walking					x				
	Running/Jumping	x								
	Climbing	x								
	Bending/Stooping				x			Lowering grade stick into ditch		
	Crouching		x							
	Kneeling				x			At edge of ditch communicating with workers in ditch		
	Crawling	x								
	Twisting				x			Manipulating grade stick		
Balancing	x									
Travelling	x									

Frequency Rating Definition for % of Duty

The definitions for frequency ratings are contained at the end of the Table (page 24).

Essential Duty 4: Ops II Worker (construction) – Padman specialize duties (cont.)

c. Physical Demands (continued)		Frequency During Duty						Comments
		N	R	I	O	F	C	
Sensory / Perception	Hear/Conversations						X	
	Hear/Other Sounds						X	
	Vision/Far						X	
	Vision/Near						X	
	Vision/Colour	X						
	Vision/Depth						X	
	Perception/Spatial			X				Reading plans/cut sheets
	Perception/Form		X					
	Feeling			X				Probing for lines with probe bar
	Speech						X	
Work Environment	Inside Work	X						
	Outside Work						X	
	Slippery				X			Wet weather
	Congested worksite					X		
	Chemical Irritants		X					
	Confined Space Entry	X						
	Vapour Fumes		X					
	Noise						X	
	Proximity to moving objects						X	Excavator, trucks
	Hazardous Machines						X	Excavator, trucks
	Electrical hazard		X					
	Hazardous objects		X					
	Radiant/Thermal Energy	X						
	Hot/Cold		X					
	Humid		X					
	Environmental Dust				X			Depending on site conditions
	Organic Substances	X						
	Medical Waste	X						
	Blood Products	X						
	Lighting – Direct		X					Dark mornings in winter
Lighting – Indirect	X							
Vibration – Whole Body	X							
Vibration – Hand/Arm	X							

Essential Duty 4: Ops II Worker (construction) – Padman specialized duties (cont.)

d. 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	Attention to grade and setting laser leveller, etc
Memory Requirements			X	Details of grade, cut sheet, etc
Interact with co-workers			X	
Interact with public	X			
Work Alone	X			
Reading	X			
Writing	X			
Irregular Hours	X			
Operating Equipment		X		Laser leveller, grade stick

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
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Infrequent	2-5 %
Occasional	6-33 %
Frequent	34-66 %
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STRENGTH	
Strength Category	Weight Handled
17. Limited	Up to 5 kg.
18. Light	5 kg. to 10 kg.
19. Medium	10 kg. to 20 kg.
20. Heavy	>20 kg