

JOB DEMANDS ANALYSIS

Company: City of Vancouver Location: Various street locations

Job Title: Labourer - Construction Classification: Regular Duty

Purpose of Activities

The purpose of the duties of the Labourer - Construction is to assist other members of the construction crew in repairing and maintaining asphalt and concrete road/sidewalk area in Vancouver.

Tools and Equipment

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

- Gloves.
- Safety Hat
- Safety Boots.
- Safety Vest.
- Shovels, rakes, broom, tar brush, pick, straight-bar and other hand tools.
- Wheelbarrow.
- 90 pound jackhammer.
- Tamper.

Usual Methods – Asphalt Removal

As the backhoe removes the roadtop, the labourers will carry out light shoveling to finish breaking up the ground. They will also engage in push-broom work around the cut to keep the roadway clean. They may also use a straight-bar or a pick to clean up the edges of the cut.

Usual Methods - Asphalt Replacement

As the truck backs up with its load of asphalt, the labourers drive their spades into the asphalt so that the packing becomes loosened. Once the asphalt has been dumped, it is shoveled off the road and into the cut (up to 15-kg per shovel full). They also shovel dry mix in advance of the asphalt and use the motorized hand roller to tamp the dry mix and the asphalt.

Usual Methods - Concrete

This primarily involves work to break old concrete with a 90-lb jackhammer, pick and straight bar and then hand load the pieces into the back of the flatbed truck. New concrete work involves regular use of the wheelbarrow full of gravel over uneven surfaces. They also use



a tamper and move steel forms on and off of the trucks and into place. They will also hose down the site regularly. Shovel and rake work can be nearly constant.

Administrative Issues

The labourer works on crews composed of two or three people. They work out of the Manitoba yard or out of a work wagon. They travel by truck. They must work in all environmental conditions.

The labourers are involved in pothole filling, concrete filleting, sidewalk construction, concrete curb construction and asphalt repair. They also occasionally clear snow from bus stops in the winter.

The normal shift is from 0700 to 1530, Monday through Friday, with a 30 minute lunch break and two ten minute coffee breaks.

The environmental conditions can change this job appreciably. It is possible to be exposed to extreme hot conditions that have implications for hydration, sunburn and heatstroke. Wet weather is common and can make footing less reliable even treacherous. Cold is also a possibility as is snow (regularly the case during the winter months since the watersheds are at elevation), although this is less likely than wet conditions.

Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Work in outdoor urban environment.
- Walk over uneven ground, on steep slopes.
- Lift, carry, grip and handle awkward loads.
- Carry out tasks under unpredictable outdoor conditions that often include steady rainfall.
- Exposure to asphalt, concrete and dust.

Worker Decision Variables

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

- Choose postures for carrying out duties (e.g. lifting using hips and maintaining neutral spine, creative energy saving techniques).
- Planning of lifts and routes for carrying (limited).

Accommodative Considerations

- 1. People with injuries to the spine in any region may have difficulty with constant movement of loads from near ground level.
- 2. People with shoulder injuries such as rotator cuff tendinitis, bursitis and instability may have difficulty with the frequent and often challenging.
- 3. People with any upper extremity problems may have difficulty with this position because of regular gripping and carrying of loads.



- 4. Individuals with knee, hip or ankle difficulties may find they have difficulty with this job
- because of constant walking over unpredictable ground while carrying load.

 5. A very high level of general fitness is preferred for this job and individuals who do not present with this feature are likely to be at higher risk for mechanical injury.
- 6. Individuals recovering from systemic illness should be carefully screened before entering this activity.
- 7. Individuals who do not cope well in outdoor work environments would have difficulty with this position.
- 8. There is no significant learning curve associated with the tasks.

Prepared By: Greg Hart, Kinesiologist August 4, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy system supplies the vast majority of energy required to complete the tasks in this position since the work is ongoing in nature. It is a paradox that using good mechanical form in lifting and carrying actually increases energy consumption. Individuals with low aerobic power will take increasing mechanical risks with their bodies as a result of mounting fatigue. There is also a high anaerobic power requirement associated with heavy lifts which can be frequent.

Structural Stresses

Spine – there are a number of issues impacting the spine. It is possible that during prolonged low level work (e.g., working under tarps), the spine becomes flexed and the muscles do not act to support it. There is also increasing laxity of the rear ligaments and the outer ring of the disc with increased pressure on the disc nucleus. This time of prolonged flexion is followed by a period of intense, repetitive exertion that requires significant stabilizing of the spine. There is a profound emphasis on the strength and endurance of the torso stabilizers. If there is bending involved in the lifting, it exacerbates the problems brought on by sitting. If there are asymmetrical lifts and twisting motions while carrying load, the risk of damage to the structures in the spine increases dramatically. Many of these postures are possible in this job.

Shoulders and Neck – due to the considerable load being carried by the upper extremities and the frequent positioning of the arms away from the body, this activity places individuals at increased risk for rotator cuff tendinitis, sub-acromial bursitis and damage to the labral surfaces of the joint. The shoulder is mechanically ineffective when the arms are away from the body, especially under load. This also contributes to significant tension through the muscles of the neck and upper back. When the arm is held above the shoulder (sometimes with force as in jarring asphalt free from truck box), it is in an impingement position which can lead to a number of the conditions stated above.

Arms and Hands – frequent heavy gripping increased the risk of injuries to the elbows and wrist tendinitis which can lead to nerve entrapment scenarios. The gripping is made worse by the wearing of gloves (obviously necessary) and wet materials. As muscles in the shoulder, trunk and legs fatigue, more work often comes from the arms which will also increase loads at the elbow and forearm and could lead to epicondylitis type conditions (i.e., tennis or golfer's elbow).



INTERVENTIONS

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

- Encourage the workers to maintain an increased level of fitness away from work that will
 focus on cardiovascular endurance, anaerobic power, muscular strength, muscular
 endurance and flexibility. Especially cardiovascular endurance. This is the type of work
 where the most impactful intervention is always going to be with the person doing the
 work due to the variability of the presentation of tasks.
- 2. Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job in these very challenging environments.
- 3. Explore different possibilities for loosening asphalt without having to use the spades to jam into the mix.
- 4. Avoid asymmetrical lifts wherever possible.
- 5. Avoid twisting with a load to avoid damage to discs in the spine.
- 6. Keep arms and loads close to the body at all times.
- 7. Test a load before it is lifted.
- 8. Plan the route when manually handling materials.
- 9. Take a moment to extend the spine and warm up the body when switching from driving to strenuous activities.
- 10. Be careful to not increase grip forces unnecessarily.
- 11. Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.
- 12. Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.

Dept: Streets District Contact: Date: August 4, 1999	Referral: Debbie Craig					n: City	of V	anco	uver		Title: Construction Labourer
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G Work Alone E Interact with Public N Operate Equip/Machinery Irregular/Extended Hours * Frequency Legend * Frequency Legend * Moderate Demand; Repetition 1 - 3 hrs daily Always in a crew Always working in areas of pedestrian and vehicle traffic X Roller, wheelbarrow, jackhammer Night & weekend shifts may be utilized * 1 = Seldom; Not Daily 2 = Low Daily Activity; < 1hr 4 = High Frequency Demand; Repetition > 3 hrs daily						Х					
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3 = Moderate Demand; Repetition 1 - 3 hrs daily 4 = High Frequency Demand; Repetition > 3 hrs daily	* Fr		1 =	Sel		Not I	Dailv	2 = 1			
The following shading denotes a HIGH BISK TASK: Modifications should be considered											
							SK T	SK.			

REQD is marked with an X if the particular demand or category is relevant to the purpose of the job.

SIDE refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

PJDC-Construction Labourer

Dept.:		isior	zatior n·						
			••				Contact:		
			FF	EQU	ENC,	Y*	Date:		
PHYSICAL DEMANDS		S I D E	Sel.	Low 2	Mod.	High 4	COMMENTS		
Hearing - Conversations	D	В	•				On site with crew, radio		
P Hearing - Other Sounds		В					Motor, traffic, equipment		
E Vision - Far		В					Most activities		
R Vision - Near		В	Х				Checking fine detail		
C Vision - Colour		۲					Checking line detail		
E Vision - Depth		В				Х	Judging distance in excavations and piles of material		
P Perception - Spatial		В					Working around objects, stepping over uneven scenes		
T Perception - Form		٦				_^	violating around objects, stepping over uneven scenes		
Feeling (Tactile)		В				Х	Gauging grip pressure		
O Reading		٦					addying grip pressure		
N Writing		\vdash							
Speech						_	On site to crew, members of the public		
Inside Work	-			Х			Driving to and from the site		
Outside Work						X	Most of the day		
Hot Conditions >25 deg. C			Х				Occasional in summer		
Cold Conditions <10 deg.C	-		X				Occasional in summer		
Humid			^		Х		Wet weather is common especially in fall and winter		
W Dust					^				
O Vapor Fumes	- 1						Always present except during rain or snow Exhaust of vehicles in traffic, ashphalt and tar		
						X	Roller, trucks, backhoes, jackhammers, tampers On sidewalk and in ditches/roadsides		
K Proximity to Moving Object Noise	- 1					X			
		-					Jackhammer, traffic, other equipment		
	+	\vdash							
N Sharp Tools V Badiant/Thermal Energy							Heat off of ashabelt (040 degrees)		
1 13131131113111131 =113197							Heat off of ashphalt (340 degreesF)		
I Slippery Conditions				X	V		Wet and mud in open excavations		
R Vibration and Related					Х	V	Vibration of Jackhammer/tamper		
O Chemical Irritants		-				Х	Tar, oil, concrete		
N Organic Substances	-								
M Medical Waste	-	 							
E Blood Products				\ <u>\</u>			Compa la patiena la sua limita de mara a forma como de		
N Congested Worksite		_		Х			Some locations have limited space for movement		
T Lighting - Direct		-				X	Daylight		
Lighting - Indirect	-	├							
Lighting - Adjustable		├							
Lighting - Fluorescent		<u> </u>							
Lighting - Incandescent						,,			
Lighting - Shadows etc.	البال	<u> </u>	<u> </u>	<u> </u>	<u> </u>		Depending on location		
Frequency Legend							Low Daily Activity; < 1hr		
3 = Moderate Demand; Repetition The following shading denote		3 hrs			SK TA		High Frequency Demand; Repetition > 3 hrs daily Modifications should be considered		

REQD is marked with an X if the particular demand or category is relevant to the purpose of the job.

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For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT

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