



JOB DEMANDS ANALYSIS

Company: City of Burnaby

Location: Works Yard

Job Title: Parks Development Labourer

Classification: Regular Duty

Purpose of Activities

The Labourer is responsible for performing the labouring tasks associated with sports field, parks, trail and playground construction, renovation, repair and landscaping. The Labourer is also required to perform other unrelated duties that include but are not limited to clean up, demolition and repair of City of Burnaby rental properties, outdoor pools; furniture moving between municipal offices, snow removal, flood control, etc.

Tools and Equipment

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

- Ford one ton Super Duty Truck with dump box
- One ton Gruman van
- Hand tools – shovels, fan rake, rake, potato hook, push broom, corn broom, handsaws, level, hammers, sledge hammers, claw hammer, rubber mallet, machete, hatchet, loppers, picks, pry bars, bolt cutters, axe, branch cutters, pitch forks, tape measures, files, rat tail file, hack saw, utility knife, wrenches, pliers, screw drivers, sockets, vise grips, cutters, cement trowel, scrapers, pipe cutters, pipe wrenches, reflective tape, chains, rope, sponges, buckets, edgers, bungee straps, leather gloves, latex gloves, ear plugs, dust masks, extension ladder, step ladder, clamps, wire cutters, wheelbarrow, flash light, work belts, pouches, spray paint, paint wheel
- Power tools- chain saws and safety gear, weed eaters, water pump, generator, compressor, drills, circular saw
- Nuts, bolts, nails, screws, washers, pipe fittings, water valves, fencing ties
- First Aid kit
- Traffic control – stop signs, traffic cones
- Oil/gas mix, gas in jerry cans
- Steel toe work boots, safety vest, hard hat, ear plugs, safety glasses, visors

Usual Methods

Field Construction

1. Contracted machines excavate and grade field. The Labourer may be required to assist the machine operator with this task.
2. Drainage tile is installed (machine and by hand) by the Labourer.
3. Bring field to required grade (gravel, sand, topsoil, etc.) level by machine and hand. The Labourer will use a shovel, rake or other tools as required.



4. Build and install backstops for ball diamonds, goal posts for soccer fields, install electrical conduit, underground sprinklers etc.
5. Complete finish work of field (seeding, bench installation, edges, etc.). Laying sod is contracted out.

Field Repair/Upgrades

1. Dig out affected area by machine and hand.
2. Bring in new fill material to bring repair area to grade. Spread fill material by machine and hand.
3. Lay sod to complete repair.

Fencing (build/repair)

1. Remove old wood, chain link or privacy fence and load debris to one-ton or contracted truck. A machine will most likely be used to load the contracted truck.
2. Re-dig posthole for wood or chain link fence posts. Place posts in holes and plumb posts. Mix and pour cement into postholes. Wait for posts to set in the cement.
3. Use hand and power tools to build a wood fence.
4. Install and attach rails and end caps between posts.
5. Attach one end of chain link to cemented post, stretch the fence across the remaining posts by hand, come along or truck. Secure chain link fence to posts with wire fence ties. Repeat this step until all the chain link has been attached to the posts.
6. Clean up the work area.

Trail Construction/Maintenance

1. Clear debris from proposed or existing trail. Chain saws and Bush Kings are used to cut trees and brush from the trail.
2. Haul and load debris to trucks for removal. A machine may perform these tasks but it is most often performed by hand by the Labourer.
3. Build and install concrete, wood, or stone retaining walls; bridges, benches, stairs, culverts for drainage, etc. as required on the trail.
4. Fill material is brought onto the trail by truck, bobcat or the back of a Cushman cart.
5. Spread fill material by machine and hand to bring trail to required grade.
6. Clean work area for public use.

Playground Construction

1. Clear playground area of trees, brush, dirt and other debris by machine and hand.
2. Load trees, brush, dirt and other debris into one or five-ton truck(s) for disposal.
3. Build and install playground equipment. Hand and power tool use will be required.
4. Build and install other playground amenities as required (benches, lights, underground sprinklers, etc.).
5. Spread fill material by machine and hand to bring the playground to required grade.
6. Complete finish work at playground.
7. Clean work site for public use.

The Labourer is also responsible for performing other duties that are not related to the positions specific purpose. These tasks include but are not limited to: snow removal, flood control, furniture moving, outdoor pool maintenance, and repair and maintenance associated



with City of Burnaby rental properties. These tasks do not add value to the stated purpose of this position and increase the risk of injury to the Labourer.**

The presence of ** indicates non-value added tasks. These tasks do not contribute to the stated purpose of the work.

Administrative Issues

The Labourer works from Monday to Friday 0700 to 1530 with a ten-minute rest period in the morning, a 30-minute lunch break and a ten-minute rest period in the afternoon. Overtime and on-call are not required of this position. The Labourer works in all weather conditions and may be classified as full-time permanent or Seasonal (April to November). Seasonal Labourers are laid off some time in November and rehired in April. The Labourers estimate that the busiest time of year are the spring and summer months from April to November. The Parks Development Crews usually consist of a Foreman, five Labourers, a five-ton truck driver, contracted excavator operator and other contractors as required.

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.

- Shovel use to scoop or dig in clay and rocky soil conditions
- Lift, carry, throw or place dirt, tree limbs, tree rounds and debris from a shovel or pitchfork from ground level to the one-ton truck (one to one and a half metres high)
- Lift, carry, hold and operate hand and power tools (one to 41-kg) from below ground (dig hole) to above shoulders (use chain saw, hand saws, branch cutters etc)
- Walk between less than ten to several hundred metres from the one-ton truck/Gruman van to the work area
- Stand at work site on grass, dirt, rock, asphalt, concrete
- Bend, stoop, kneel, crawl to perform labouring tasks for construction, renovation, repair and landscaping
- Work in all weather conditions including prolonged periods of rain or heat

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.

- Body positioning with some tasks
- Task organization
- Receive assistance from another Labourer

Accommodative Considerations

1. People with injuries to the spine, in any region, may have difficulty with the static and dynamic movements required in this position.
2. People with shoulder injuries such as rotator cuff tendonitis, bursitis and instability may have difficulty with dynamic and static loading and reaching activities required in this position.



3. People with forearm and elbow injuries such as tennis elbow may have difficulty with the static grip forces required during any power or hand tool use.
4. People with nerve compression injuries in the upper extremities may have difficulty with the repeated and prolonged use of hand and power tools (compression and vibration) below, at and above shoulder height.
5. Post-whiplash and other neck problems may have difficulty with this position.
6. People with lower extremity injuries to the hips, knees and ankles will have difficulty maintaining the required pace and performing the heavy physical labour required in this position.

Prepared By: Jeffrey J. McGinn, Kinesiologist

June 2, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy system will supply the major source of energy while performing the duties and responsibilities of the Labourer. This energy system will be utilized during field, park, trail, playground construction and maintenance as well as the other unrelated duties of this position. The anaerobic energy systems may be required to supply energy for brief intense periods of work, which may include heavy or sustained digging, picking, lifting or carrying; or towards the end of the day when the aerobic energy system has been depleted. In this last instance, the anaerobic energy system becomes the primary energy source

Structural Stresses

Spine – Typically, flexion, extension, lateral flexion and rotation movements will be performed while the Labourer is handling a load (hand or power tools, debris, 1-50 kg). Forward flexed postures during hand and power tool use require no activity from the torso musculature, but increase asymmetrical disc compression and passive stretch on the posterior spinal ligaments and disc fibres. This can contribute to disc integrity problems as well as decondition the torso support musculature. Lateral flexion and/or rotation with or without forward flexion (loaded or unloaded) will significantly increase the shear forces encountered by the discs, fibres and spinal ligaments.

Neck, Shoulders and Upper Extremity– This position requires prolonged and repeated static and dynamic movements from below to above shoulder height. The static and dynamic movements through the shoulder and upper extremity often require the rotator cuff muscle groups, upper trapezius and scalene muscles of the neck to maintain a constant and significant load. Hand and power tool use (predominately both hands) will increase the static and dynamic loading of the forearm flexors, extensors, supinator, pronator teres and the pronator quadratus. Chain saw, jackhammer and other power tools will increase the vibration and compressive forces from the grip to the elbow and shoulder that may lead to over use tendon or nerve injuries. Impingement and inflammatory injuries to the shoulders are likely due to the prolonged static arm position (flexed and abducted shoulder and elbow) required during some work.

Almost all of the Labourer's work is carried out in front of his body with some type of tool or implement. This position will weaken the shoulder girdle support structure and increase the risk of injury to this area. Rotator cuff and biceps tendon tendonitis injuries are likely as the muscle of the upper back and shoulder weaken through prolonged use. As this happens, thoracic spine kyphosis will increase and the cervical spine will be pulled forward out of its neutral position.

Hips and Lower Extremities – will be taxed in the many dynamic movements associated with walking, standing, climbing, lifting and carrying on stable and unstable surfaces (grass, gravel, dirt, rock, concrete, asphalt, mud, ladders, truck boxes, etc.). These surfaces may be wet or dry. Twisting an ankle or knee or a slip and fall injury are the most likely to the lower extremities.



Insect Stings – stinging insects will increase the risk of injury to the Labourer and may range from localized swelling of the affected area to anaphylactic shock and death.

INTERVENTIONS

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

1. Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.
2. Provide Labourer postural awareness training that will focus on the importance of proper body posture and how it relates to their ultimate physical comfort and reducing fatigue level.
3. Heavy physical labour is required in this position. Allow the Labourer adequate time to complete high repetition physically demanding tasks. Frequent rest periods or crew rotation should be considered to reduce fatigue levels, which are likely to lead directly to injury.
4. Continue to use mechanical equipment where ever possible to decrease repetitive, long duration tasks required by the Labourer

PJDC-Parks Develop Labourer

Referral: Lana Ho			Organization: City of Burnaby						Title: Parks Development Labourer		
Dept.: Engineering			Division: Parks						Contact: Ron Soroka		
PHYSICAL DEMANDS			R E Q U I R E D	S I D E	FREQUENCY*				Max. Weight (kg)	Usual Weight (kg)	COMMENTS
					Sel 1	Low 2	Mod 3	High 4			
S T R E N G T H	Lifting - Floor to Knuckle	X	B				X		41	<1-5	hand and power tools, material
	Lifting - Knuckle to Waist	X	B					X	41	<1-5	hand and power tools, material
	Lifting - Waist to Shoulder	X	B					X	41	<1-5	hand and power tools, material
	Lifting - Over Head	X	B	X					15	<1-5	hand and power tools, material
	Carrying - With Handles	X	B					X	41	<1-5	hand and power tools, material
	Carrying - Without Handles	X	E					X	41	<1-5	hand and power tools, material
	Pushing - Upper Extremity	X	E					X	15	<1-5	tool use, saws, positioning material
	Pushing - Hip/Leg Assist	X	E					X	50	<1-5	tool use, saws, positioning material
	Pulling - Upper Extremity	X	E					X	15	<1-5	tool use, saws, positioning material
	Pulling - Hip/Leg Assist	X	E					X	50	<1-5	tool use, saws, positioning material
	Reach - Shoulder or Above	X	B		X				20	<1-5	tool use, positioning material
	Reach - Sho. or Above extnd	X	B	X					15	<1-5	tool use, positioning material
	Reach - Below Shoulder	X	B					X	41	<1-5	hand/power tool use, lift, carry, position materials
	Reach - Bel. Shoulder extnd	X	B		X				41	<1-5	lift and carry tools, equipment, materials
E N E R G Y	Handling	X	E					X	41	<1-5	tools, equipment, materials
	Gripping	X	B					X	50	<1-5	tools, equipment, materials
	Fine Finger Movements	X	D				X		mod	low	operate some tools and equipment
	Aerobic (percent)	X						75	labouring tasks for parks development and contruction		
	Anaerobic (percent)	X				25			possibly for heavy lift, fatigue at end of day		
	High Energy Expenditure	X			X				some labouring tasks, tool use		
	Low Energy Expenditure	X						X	labouring tasks for parks development and construction		
	Neck - Static Flexion	X						X	labouring tasks, tool use below shoulders		
	Neck - Static Neutral	X						X	stand, walk, sit, work at shoulder level with/without tools		
	Neck - Static Extension	X					X		labour tasks from stand/bend/stoop/kneel/crouch above shoulders		
	Neck - Rotation	X	E				X		construction, renovation work, shoulder checks for equipment		
	Throwing	X					X		dirt/debris from shovel		
	Sitting	X			X				drive to/from work site in Gruman van or one ton truck		
	Standing	X						X	at work site on dirt, grass, shale, gravel, asphalt, concrete		
	P O S T U R E S	Walking	X						X	at work site to/from truck/van & work, <10-200 metres or more	
Running/Jumping											
Climbing - Arms and Legs		X		X					into back of one ton truck, ladder		
Climbing - Legs Only		X			X				into back of Gruman van, hills, trails		
Bending/Stooping		X						X	labouring tasks, shovel, tool use, lift, carry		
Crouching		X					X		labouring tasks, tool use		
Kneeling		X			X				labouring tasks, tool use		
Crawling		X		X					install benches, patio stones, finish cement		
Twisting		X	E					X	labouring tasks, shovel, rake, tool and equipment use		
Balancing		X			X				on back of truck, over work, on ladder		
Traveling		X			X				to work site in city of Burnaby		
Work Alone									in a crew office, may perform some tasks alone		
Interact with Public		X			X				in parks and on trails		
Operate Equip/Machinery		X					X		hand and power tools, jackhammer, chain saw, etc.		
Irregular/Extended Hours								0700-1530, Monday - Friday, permanent and seasonal work			
* Frequency Legend 1 = Seldom; Not Daily 2 = Low Daily Activity; < 1hr 3 = Moderate Demand; Repetition 1 - 3 hrs daily 4 = High Frequency Demand; Repetition > 3 hrs daily The following shading denotes a HIGH RISK TASK: Modifications should be considered											

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.

Referral:		Organization:						Title: see 1st page header	
Dept.:		Division:						Contact:	
PHYSICAL DEMANDS		R E Q D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
P E R C E P T I O N	Hearing - Conversations	X				X		co-workers, foreman, contractors, public	
	Hearing - Other Sounds	X					X	trucks, equipment	
	Vision - Far	X					X	labouring tasks	
	Vision - Near								
	Vision - Colour	X		X				dye tablets for checking drainage in ditches	
	Vision - Depth	X					X	labouring tasks, working around trucks/equipment	
	Perception - Spatial	X					X	labouring tasks, working around trucks/equipment	
	Perception - Form	X			X			some tool differentiation required	
	Feeling (Tactile)	X				X		force application in hand/power tool use, positioning material	
	Reading	X		X				blue prints, drawings	
W O R K E N V I R O N M E N T	Writing								
	Speech	X				X		co-workers, foreman, contractors, public	
	Inside Work	X		X				in City of Burnaby rental houses, buildings	
	Outside Work	X					X	parks construction renovation	
	Hot Conditions >25 deg. C	X		X				spring, summer, fall	
	Cold Conditions <10 deg.C	X		X				fall, winter, spring	
	Humid	X		X				during rain or hot weather	
	Dust	X		X				possibly at some work sites	
	Vapor Fumes	X				X		diesel engines on truck, equipment, oil/gas mix for some equip.	
	Hazardous Machines	X					X	around trucks, equipment, hand or power tool use	
	Proximity to Moving Object	X					X	working around trucks and equipment	
	Noise	X					X	trucks, equipment, power tools	
	Electrical Hazard	X		X				overhead power lines when working with trucks and equipment	
	Sharp Tools	X					X	shovels, loppers, utility knife, chain saw, drill, hand saw	
	Radiant/Thermal Energy	X		X				sun, fertilizer, heat from engines or exhaust	
	Slippery Conditions	X		X				wet grass, dirt, gravel	
	Vibration and Related	X		X				jack hammer, chain saw, other power tools	
	Chemical Irritants	X		X				hard/fast concrete mix, pipedope, PVC glue, fertilizer	
	Organic Substances	X		X				decaying vegetation, dog feces	
	Medical Waste	X		X				discarded needles, condoms	
	Blood Products								
	Congested Worksite	X		X				depends on location and tasks	
	Lighting - Direct	X					X	day light, sun light, overhead lights in buildings	
	Lighting - Indirect	X					X	day light, sun light, overhead lights in buildings	
	Lighting - Adjustable								
	Lighting - Fluorescent	X		X				lights in buildings	
Lighting - Incandescent	X		X				lights in homes		
Lighting - Shadows etc.	X		X				depends on time of day and location		

* Frequency Legend 1 = Seldom; Not Daily 2 = Low Daily Activity; < 1hr
3 = Moderate Demand; Repetition 1 - 3 hrs daily 4 = High Frequency Demand; Repetition > 3 hrs daily

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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