



JOB DEMANDS ANALYSIS

Company: City of Burnaby

Location: Piper Nursery

Job Title: Parks Trim Crew

Classification: Regular Duty

Purpose of Activities

The Parks Trim Crew is responsible for cutting grass with a Kubota, X-Mark and Toro riding rotary mower and a weed eater powered by a two stroke engine. The Trim Crew will cut grass where the larger gang reel mowers are not able to access in parks, sport fields and boulevards.

Tools and Equipment

The Parks Trim Crew will use the following tools and equipment to perform their duties:

- Clothing – Steel Toe boots, ear protection, safety vest, face shield, safety glasses
- Kubota, X-Mark, Toro riding mower
- Half ton truck with trailer
- Weed eater, backpack blower – powered by two-stroke engine, weed eater equipped with shoulder strap.
- Small hand tools (shovels, brooms, rakes, jerry cans, tie down straps, traffic cones, etc.)
- Pogo and 20-litre bucket for litter pick up – a Pogo is a long handled aluminum stick with jaws on one end and a pistol grip handle on the other. The Pogo is operated by squeezing and releasing the handle to open and close the jaws.

Usual Methods

Riding Mower

1. Perform a pre-trip vehicle inspection every morning. This will include greasing the mower; checking and topping up fluid levels; checking brakes, lights and tire pressures on mower, half-ton truck and trailer.
2. Drive to work location (park, sports field, boulevard, etc.). Set up traffic cones for traffic control if required. **
3. Open gate if required. **
4. Perform litter pick up if required. Generally, a Parks Maintenance Crew will have performed this task before the arrival of the Parks Trim Crew. **
5. Lower trailer tailgate (32-kg) to ground. Remove tie downs and set aside. **
6. Back riding mower off trailer.
7. Cut grass at park, sports field or on boulevard.
8. Drive mower back onto trailer and secure with tie downs.
9. Assist partner on Park Trim Crew with remaining weed eating or clean up duties.
10. Close and lock park or sports field gate. **



11. Drive to next work area.
12. Repeat steps 1-10.

Weed Eating

1. Unload weed eater(s) from back of half-ton truck.**
2. Fill weed eater with oil/gas mix.**
3. Ensure protective clothing is on (boots, long pants, face shield, safety glasses, hearing protection).
4. Pull the pull cord two stroke engine on weed eater.
5. Lift the weed eater to knuckle height, secure the shoulder strap around shoulders. This shoulder strap is designed to distribute the weight of the weed eater over one or both shoulders.
6. Weed eater edges, around tree bowls and other objects where the gang reel and rotary mowers were not able to cut the grass.

Site Clean Up

1. Unload backpack blower from back of half-ton truck.**
2. Fill the backpack blower with oil/gas mix.**
3. Pull the pull cord to start the two-stroke engine.
4. Lift the backpack blower and place on back. Secure the shoulder straps and waist tie down of the backpack blower on the body.
5. Walk required area, blowing debris from the sidewalk or path.
6. Remove backpack blower and place back into the storage area on the half-ton truck.
7. Use rakes, brooms and shovels to complete clean up.

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

Administrative Issues

The Parks Trim Crew works an eight-hour day, Monday to Friday from 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. There are no overtime or on call requirements in this position. The riding mowers are equipped with power steering, a hand and foot throttle, clutch, brake, unadjustable spring seat and open cab. The X—Mark Rotary Mowers are operated by pulling or pushing a right and left handle rather than a steering wheel. Two people on a Parks Trim Crew rotate between operating the riding rotary mower and the weed eater and backpack blower. This rotation usually occurs between site locations. The Parks Trim Crew position operates from April to November as the weather permits. The Parks Trim Crew 1 is reassigned in the winter or laid off.

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.

- Sit to drive and operate the rotary riding mower
- Climb one-step approximately 60 centimetres high to get on and off the rotary-riding mower.



- Crouch, kneel, bend and stoop to perform Pre-trip Inspection on mowers, half ton truck and trailer
- Reach below right shoulder (flexion) to steer and operate Kubota and Toro; reach below shoulders to operate push and pull steering mechanism for X-Mark
- Use both right and left lower extremities (pushing from seated position) to operate foot throttle, and brake
- Litter pick up (garbage, rocks, tree branches, etc.) by hand or Pogo and bucket
- Wear backpack blower with adjustable harness
- Grasp and carry weed eater (single or double shoulder harness) for several hours per day
- Wear protective clothing and hearing protection

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.

- Sitting posture (neutral spine, shoulders, elbows slightly open, hips above knees are the desired postures)
- Adjust shoulder harness on backpack blower and weed eater
- Operate weed eater from left or right side of body

Accommodative Considerations

1. People with injuries to the spine, in any region, may have difficulty with the static and dynamic movements required drive and operate the rotary riding mowers as well as the weed eater.
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 to drive and operate the rotary riding mowers. In addition, the shoulder harness of the weed eater and backpack blower may increase the compression forces on the shoulder joint complex.
3. People with nerve compression or structural injuries in the upper extremities (fingers, hands, wrist and elbows) may have difficulty with driving and operating the rotary riding mowers; the static grip, compression and vibration of the weed eater; and using the Pogo and bucket for litter pick up.
4. Post-whiplash and other neck problems may have difficulty with this position.
5. People with hip and lower extremity injuries may have difficulty climbing on and off the rotary riding mower (one step approximately 60 centimetres from the ground); performing the Pre-trip Inspections and with the considerable walking (grass, wet grass, side hill, asphalt, concrete, mud, dirt, shale, etc.) required when weed eating.

Prepared By: Jeffrey J. McGinn, Kinesiologist

May 14, 1999



Summary of Stresses

Metabolic Stresses

The aerobic energy systems will provide the major source of energy for the Parks Trim Crew in all tasks described. This position alternates between a sedentary (drive and operate the rotary riding mower) to moderate energy requirement (weed eat and clean the work site, backpack blower and litter pick up around the park, sports field, boulevard, etc). It is not likely that the anaerobic energy system will be required to provide energy for the Parks Trim Crew.

Structural Stresses

Spine – the sedentary nature of this work on the rotary riding mower can place significant passive loads on the spinal structures. Prolonged sitting increases disc compression forces alone. A flexed spine sitting posture requires no activity from the torso musculature, but increases asymmetrical disc compression, passive stretch on the posterior ligaments and disc fibres. This forward flexed posture can also contribute to disc integrity problems over time as well as decondition the torso support musculature. The bouncing, jarring and vibration encountered when driving and operating the rotary riding mowers are significant and will increase the asymmetrical compressive forces to the discs. Wearing (shoulder harness) and operating the weed eater for extended periods will increase asymmetrical spinal disc compression; static tension through the torso musculature and the dynamic (flexion, extension, rotation, and lateral flexion) movements while loaded.

Shoulders and Neck – due to the static positions required and the frequent reaching for the steering wheel, hand controls of the rotary riding mowers, the muscles in the rotator cuff (especially right) and the upper trapezius and scalene muscles of the neck, maintain significant and often constant static load. Also, if the Parks Trim Crew is too low in the mower seat with respect to the steering wheel and hand controls, the load on the neck and shoulders is increased as the arms must be lifted and held in a static position to operate the rotary riding mower. Extended use of the weed eater will increase the static tension and compressive forces on the shoulder joint complex and the muscles that attach the shoulder and cervical spine. Prolonged shoulder depression and compression will negatively affect the proper functioning of the shoulder joint complex and increase thoracic kyphosis.

Upper Extremity– Serious risk of injury to the shoulders, elbows and hands will result from



poor sitting posture and an improperly adjusted seat when operating the rotary riding mower. The Upper Extremities are primarily used in a static concentric movement pattern and impingement and inflammatory injuries to the are likely. Static grip forces required to operate the weed eater will increase the risk of overuse type injuries to the hand, wrist, forearm and elbow.

Hips and Lower Extremities – prolonged sitting when operating the rotary riding mower is likely to shorten the hamstring muscle group of both legs. This in turn will pull the pelvis under the body, preventing the Parks Trim Crew from sitting on the sit bones (Ischeal

Tuberosity), and promote the undesirable forward flexed spinal posture. Slip and fall injuries while getting on or off (one step to 60 centimetres) of the rotary riding mower are increased during wet weather or wet working conditions. These same conditions increase the risk of slip and fall injuries when operating the weed eater.

Insect Stings - the Parks Trim Crew is at risk for injury because of stinging insects. Injuries can range from localized swelling of the sting site to death from anaphylactic shock.

Flying Debris – The weed eater kicks up rocks, glass and other debris that can puncture or become imbedded in the skin or eye(s). This same debris can be thrown from the chute on the rotary riding mower whether the chute guard is in place or not.

INTERVENTIONS

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

1. Encourage the Parks Trim Crew to alternate, on a regular basis, between operating the rotary riding mower and the weed eater. This will decrease the time spent in any one position passive flexion while sitting or static grip and shoulder compression from the weed eater) and increase movement.
2. Install an adjustable seat (air ride suspension, seat pan depth, height adjustment and forward seat pan tilt) on all of the Parks rotary riding mowers. This will allow the Parks Trim Crew to adopt a neutral sitting posture (hip angle, spine, shoulders, elbows and wrists) which will decrease the risk of injury to the spine and upper extremities.
3. Teach the Parks Trim Crew how to set up the seat to achieve a neutral sitting posture.
4. Encourage the Parks Trim Crew to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.
5. Ensure that all weed eaters are equipped with a double shoulder harness that will dissipate the compressive forces over both shoulders.
6. Investigate the use or existence of a weed eater shoulder harness that will also dissipate the force to the hips.

PJDC-Trim Crew

Referral: Lana Ho			Organization: City of Burnaby						Title: Trim Crew		
Dept.: Engineering			Division: Parks						Contact: Mel Booth		
PHYSICAL DEMANDS			R E Q 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			32	<1-11	weed eater, litter, gas can, tail gate, shovel, rake	
	Lifting - Knuckle to Waist	X	B				X	32	<1-11	weed eater, litter, gas can, tail gate, shovel, rake	
	Lifting - Waist to Shoulder	X	B		X			32	<1-11	weed eater, litter, gas can, tail gate, shovel, rake	
	Lifting - Over Head										
	Carrying - With Handles	X	B				X	20	11	weed eater, gas can, Pogo, 20-L bucket	
	Carrying - Without Handles	X	E		X			32	<3	rake, broom, traffic cones, push mower	
	Pushing - Upper Extremity	X	B				X	10	<5	mower hand controls, weed eater, close tail gate	
	Pushing - Hip/Leg Assist	X	B				X	32	<5	foot pedal on mower, weed eater use	
	Pulling - Upper Extremity	X	B				X	10	<5	hand controls on mower, weed eater use	
	Pulling - Hip/Leg Assist	X	B		X			32	11	tools, equipment from truck box	
	Reach - Shoulder or Above	X	B		X			32	11	access tools, equipment in truck box	
	Reach - Sho. or Above ext.										
	Reach - Below Shoulder	X	B				X	32	<1-11	operate mower, weed eater, other tool use	
	Reach - Bel. Shoulder ext.	X	B		X			32	<1-11	carry weed eater, tools, open/close trailer tailgate	
E N R G Y P O S T U R E M O B I L I T Y	Handling	X	B				X	32	<1-11	weed eater, mower controls, tools	
	Gripping	X	B				X	32	<1-11	weed eater, mower controls, tools	
	Fine Finger Movements	X	E					max	low		
	Aerobic (percent)	X					100	sit to drive/operate riding mower, walk to operate weed eater			
	Anaerobic (percent)										
	High Energy Expenditure										
	Low Energy Expenditure	X					X	sit to drive/operate riding mower, walk to operate weed eater			
	Neck - Static Flexion	X					X	operate riding mower and weed eater, other tools, etc.			
	Neck - Static Neutral	X					X	sit, walk, stand to operate mower, weed eater and other tools			
	Neck - Static Extension						X	poor sitting posture on riding mower			
	Neck - Rotation	X	E				X	shoulder check on riding mower, weed eater use			
	Throwing										
	Sitting	X					X	on riding mower, switch off with partner during day			
	Standing	X					X	on grass concrete, asphalt			
	Walking	X					X	several kilometres per day on grass concrete, asphalt			
Running/Jumping											
Climbing - Arms and Legs	X			X			on and off the riding mower, in/out of the back of the pick up				
Climbing - Legs Only	X		X				weed eat or tool use on hills, ditches, etc.				
Bending/Stooping	X			X			Pre-trip inspection, weed eater use, tools use				
Crouching	X			X			Pre-trip inspection, adjust attachments, connect attachments				
Kneeling	X			X			Pre-trip inspection, adjust attachments, connect attachments				
Crawling	X			X			Pre-trip inspection,adjust attachments, connect attachments				
Twisting	X					X	drive/operate riding mower, weed eater use				
Balancing											
G E N E R A L	Traveling	X			X		to work site in Burnaby on urban roads in pick up truck				
	Work Alone						2 on Trim Crew, mow or weed eat alone				
	Interact with Public	X		X			in traffic, parks, sports field, boulevards				
	Operate Equip/Machinery	X					X	Kubota, X-mark, Toro riding mower, weed eater, blower			
	Irregular/Extended Hours							Monday-Friday, 0700-1530, no OT			

* 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			partner on Trim Crew, supervisor, public	
	Hearing - Other Sounds	X					X	engine performance on mowers, weed eaters, blowers	
	Vision - Far	X					X	cut grass with riding mower and weed eater	
	Vision - Near								
	Vision - Colour	X			X			traffic lights when driving truck in traffic	
	Vision - Depth	X					X	drive/operate mower, weed eater, blower	
	Perception - Spatial	X					X	drive/operate mower, weed eater, blower	
	Perception - Form								
	Feeling (Tactile)	X					X	operate hand controls on mower	
	Reading								
W O R K E N V I R O N M E N T	Writing								
	Speech	X			X			partner on Trim Crew, supervisor, public	
	Inside Work	X			X			in cab of pick up driving between job sites	
	Outside Work	X					X	spring, summer and fall everyday regardless of weather	
	Hot Conditions >25 deg. C	X		X				spring, summer, fall	
	Cold Conditions <10 deg.C	X		X				spring, summer, fall	
	Humid	X		X				possibly in wet weather conditions	
	Dust	X		X				possibly when cutting or trimming around dry areas	
	Vapor Fumes	X					X	diesel fumes from mowers, oil/gas mixture for weed eater	
	Hazardous Machines	X					X	riding mowers, weed eaters	
	Proximity to Moving Object	X					X	plastic line on weed eater	
	Noise	X					X	engine noise from riding mower, weed eater. Blower	
	Electrical Hazard								
	Sharp Tools	X					X	plastic line from weed eater	
	Radiant/Thermal Energy	X					X	heat from engine/exhaust on mower, weed eater, sun burn	
	Slippery Conditions	X		X				wet grass	
	Vibration and Related	X					X	jarring/compression/vibration on mower, vibration from weed eater	
	Chemical Irritants	X		X				fertilizer	
	Organic Substances	X						decaying grass, dog feces	
	Medical Waste	X		X				discarded needles, condoms	
	Blood Products								
	Congested Worksite								
	Lighting - Direct	X					X	day light, sun light	
	Lighting - Indirect	X					X	day light	
	Lighting - Adjustable								
	Lighting - Fluorescent								
	Lighting - Incandescent								
	Lighting - Shadows etc.	X		X				depends on time of day and location	

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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.

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