

TASK ANALYSIS WORKSHEET

Company: The Corporation of Delta

Department: Engineering Operations

Job Title: Road Marking

Date: September 25, 2003

Job Summary:

The Road Marking job involves performing the following tasks throughout the Delta area:

- marking roads (performed end of June to end of October) – *assessed*;
- installation of road reflectors or cat-eyes (performed from end of May to end of June) – *not assessed*; and
- placement of delineators (performed throughout the year) – *not assessed*.

Personal protective equipment include: safety boots and coveralls. During the assessment, two crew members were performing the Road Marking job.

N.B.:

- This assessment was based on a working population of males only.
- The Road Marking task that was assessed was of a short duration (~ 1 hour). Other more-intensive road marking tasks may require the use of other equipment / tools and performance of additional sub-tasks that were not captured during this assessment.

This task of marking roads includes the following sub-tasks:

1. Preparation of materials
2. Preparation of area to be painted
3. Paint area

Tasks & Description of Activities

1. Preparation of Materials

Steps involved:

- i. Position paint pail under gas powered paint sprayer (see picture below)
- ii. Flush paint through hose to get rid of thinner (thinner is fed through hose / gun overnight so paint does not harden)
- iii. Spray thinner at disposable area (at Worksyard)
- iv. Pour bag of glass beads into pail



Paint / Thinner Pails



Gas Powered Paint Sprayer



Paint Gun

2. Preparation of Area to be painted

Steps involved:

- i. Sweep area to be painted using broom
- ii. Position stencil over area to be painted



Stencil on side of trailer

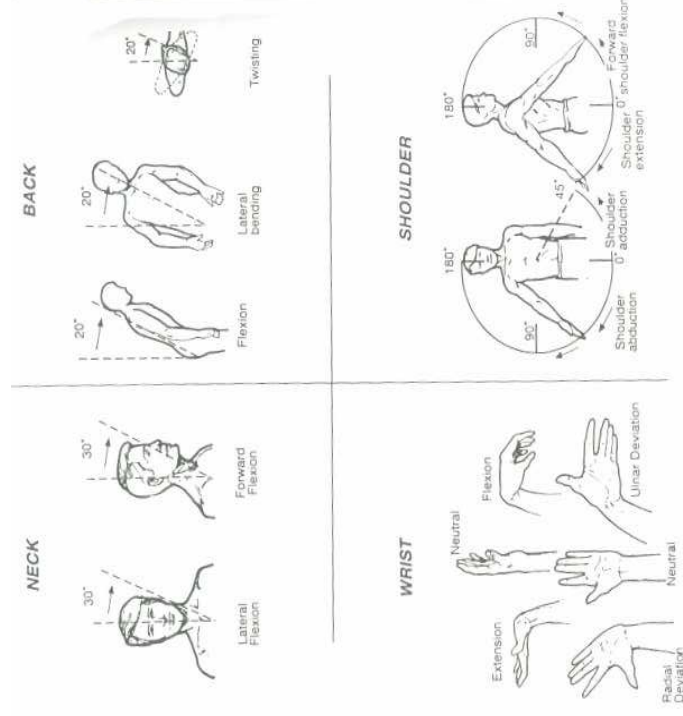
Tasks & Description of Activities**3. Paint area**

Steps involved:

- i. Turn on gas powered paint sprayer
- ii. Spray paint area to be marked
- iii. Move stencil as required
- iv. Sprinkle glass beads onto painted area
- v. Position cones around painted area
- vi. Wait for area to dry (~ 10 – 15 min)

Risk Factors considered:

- Joint posture: wrist, elbow, shoulder, neck, back, knees
- Awkward posture: reach, twist, bend, stoop, squat, climb, static, dynamic
- Force: lift, lower, carry, push/pull, pinch or power grip
- Repetition: frequency, duration
- Contact Stress
- Object weight, location, size, shape, handles, stability of load
- Work height, layout, seating, space
- Tool/equipment use
- Environment: layout, flooring, temperature, noise, light, glare, vibration
- Work Organization: recovery, schedule, workload, task variability, pace, PPE use, interruptions



Postures, WCB of BC

Department/Work Area: Engineering Operations, Roads Traffic	Occupation: Road Marking
Specific Location: Delta (assorted)	Contact Name:
Assessed By: F. Ismail	Assessment Date: September 25, 2003

Description of work area: Outdoor roadside urban and industrial park location.
Hours of Work/Shift Schedule: 7:00 a.m. to 3:30 p.m.
MSI signs / symptoms noted: none noted

Frequency percentages are based on NIOSH and Department of Labour guidelines.

Tasks for Ergonomics Risk Assessment (from Task Analysis worksheet):		Frequency / Duration of Task:	
1. Preparation of Materials		< 2 hours/day	0-33% of shift
2. Preparation of Area to be painted		< 2 hours/day	0-33% of shift
3. Paint Area		< 2 hours/day	0-33% of shift

The following tasks are described based on observations of the worker performing the tasks. Other workers may assume different body postures when performing the task.

Task	Risk Factors	Freq/Dur	Mag/Range	Assessment/Observations/Comments
1. Preparation of Materials	Awkward Posture: <ul style="list-style-type: none"> Right shoulder abduction 20° 	<2 hours / day 0-33% of shift	Dynamic (<30 sec.) <ul style="list-style-type: none"> right shoulder abduction 20° Reaches: <ul style="list-style-type: none"> Height of steps onto truck trailer – 21.5", 28.5" 	<ul style="list-style-type: none"> Slight abduction (20°) of right shoulder when spraying thinner at disposable area. <p>The dynamic nature and frequency and duration of the tasks do not exceed ergonomic guidelines for awkward postures (WCB Worksheet B). Able to pause and take mini-breaks as required.</p>
	Force: <ul style="list-style-type: none"> Lifting paint pails Lifting thinner pails Lifting glass beads bag 	< 2 hour /day 0-33% of shift	<ul style="list-style-type: none"> 31 kg wt. of full paint pail 18 kg wt. of full thinner pail 23 kg wt. of glass beads bag 	<ul style="list-style-type: none"> Weight of full paint pail – 31 kg. Height of pail off ground 14". Approx. usage: 4-5 pails. Weight of full thinner pail – 18 kg. Height of pail off ground – 14". Approx. usage: ½ - 1 pail. Weight of glass beads bag – 23 kg <p>Weight of full paint pails and thinner pails exceed ergonomic guidelines for one-handed lifting (Mital et al., 1993). The weight of the glass beads bag is acceptable based on 2-handed lifting and minimal horizontal reaching (WCB Worksheet B).</p>

Task	Risk Factors	Freq/Dur	Mag/Range	Assessment/Observations/Comments
2. Preparation of Area to be painted	Awkward Posture: <ul style="list-style-type: none"> ▪ Shoulder abduction up to 90° ▪ Forearm pronation ▪ Neck rotation 60° ▪ Neck flexion ▪ Stooping 	< 2 hour / day 0-33% of shift	Dynamic (<30 sec.)	<ul style="list-style-type: none"> ▪ While sweeping, assumes non-neutral postures – right shoulder abduction up to 90°, pronated forearms and neck rotation 60°/ flexion. ▪ Stooping to position stencil The dynamic nature and frequency and duration of the tasks do not exceed ergonomic guidelines for awkward postures (WCB Worksheet B). Able to pause and take mini-breaks as required.
3. Paint Area	Awkward Posture: <ul style="list-style-type: none"> ▪ Shoulder abduction 30° ▪ Stooping 	< 2 hours / day 0-33% of shift	Dynamic (<30 sec.)	<ul style="list-style-type: none"> ▪ Spray painting area – right shoulder abduction 30° ▪ Stooping while sprinkling glass beads onto painted area The dynamic nature and frequency and duration of the tasks do not exceed ergonomic guidelines for awkward postures (WCB Worksheet B). Able to pause and take mini-breaks as required.
	Force: <ul style="list-style-type: none"> ▪ Wt. of stencil 	60 sec duration 0-33% of shift (once per shift)	<ul style="list-style-type: none"> ▪ Wt. of stencil – 25 kg. 	<ul style="list-style-type: none"> ▪ Weight of stencil – 25 kg. Handled by 2 persons. 2-person lifting of stencil is within ergonomic guidelines (Mital et al., 1993).

SUMMARY

The risk identification and assessment for Road Marking job have identified some risk factors that exceed recommended guidelines. In general, the risk factors for the Sweeper Operator are related to manual material handling tasks.

New crew members who have not acclimatized to the physical demands of work may be at an increased risk of injury. All crew members are at a higher risk of injury in the morning hours when they may not be physically prepared or warmed up prior to performing physically demanding work. This was demonstrated in the Corporation of Delta's musculoskeletal injury (MSI) analyses (2001) report where 55% of MSI/WCB claims occurred in the AM.

Additionally, while not exceeding guidelines for the individual tasks, cumulative effects of awkward postures of the neck, back, shoulder and arm/wrist may increase the risk of injury (> 66% of shift when all activities or tasks are combined).

Recommendations for control of identified risk factors will focus on methods to minimize risk.

**Control Priority Note: 1 = recommended for implementation to reduce risk factors; 2 = optional, for consideration as a means of reducing risk factors; 3 = not for immediate action but for future consideration as appropriate.*

Risk Factor	Recommended Controls	Control Priority*	Responsible Person	Status
Endurance for physically demanding work	Maintain an increased level of fitness focusing on cardiovascular and muscular endurance and muscular flexibility. This is especially important for new workers who may not be acclimatized to the demands of work.	2	Employee	
Preparation for all physically demanding work	Develop a physical warm up program and train workers (through the use of certified fitness instructors) specific to the demands of the job. Workers should perform this warm up prior to the start of the day and before resuming work following >30 min. breaks. The duration of the warm up is less than 10 min. Micro stretches should also be performed following static, awkward postures e.g. neck and back bending.	2	Superintendent / Safety Dept.	
Force	<p>Ensure all tools and equipment are in good shape and repair. Static forces will increase if tools and equipment require more work or repetition of work due to poor maintenance including cleaning.</p> <p>One-handed lifting of full paint and thinner pails exceeds ergonomic guidelines. Consider the following:</p> <ul style="list-style-type: none"> ▪ Investigate the practicality of smaller pails to reduce the weights of the pails; and ▪ Instruct crew members to lift and carry the pails with two hands instead of one, thereby eliminating the one-handed lifting task 	1	Superintendent Employee	

Risk Factor	Recommended Controls	Control Priority*	Responsible Person	Status
Force (cont'd)	<p>Encourage crew members to use proper lifting techniques when lifting:</p> <ul style="list-style-type: none"> ▪ Use a 2-handed lift instead of 1-handed; ▪ Assess the load first – if possible, break the load down into several smaller loads if possible. It is more preferable to increase the number of lifts with lighter weight than to attempt a single lift with a much heavier weight. ▪ Do not overfill containers when transporting items from one area to another. ▪ Avoid side bending and twisting at all time. ▪ Keep the load directly in front, close to the body and between the feet if possible – keep the distance between yourself and the load to a minimum. ▪ Obtain a good grip on the item prior to lifting. ▪ Bend your knees and keep the natural curve in your back ▪ Lift up slowly (using your legs) and avoid jerky movements ▪ Keep the load directly in front and close to your body while carrying and turn the entire body as a unit to avoid twisting. 	1	Superintendent Employee	
Overall risk factors	Provide education related to identified risk factors and methods of working to reduce risk e.g. neutral joint positions, leg position, reduction of twisting, avoiding contact stress etc.	1	Superintendent	

References:

- WCB of BC, Worksheet A, Risk Identification and Worksheet B, Risk Assessment.
- Mital, Nicholson & Ayoub (1993), A Guide to Manual Material Handling

Prepared by: Farzana Ismail, February 1, 2004