

Working Near Traffic: A Surveyor's Perspective

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ABSTRACT

Working on or near main roads can be a risky activity. This paper concentrates on the use of the Traffic Control at Worksites Manual for surveying activities as a method of identifying and managing risk. The manual assists in ensuring that the workforce is able to work safely in the vicinity of road users and their vehicles and work site plant. All Roads & Maritime Services (RMS, ex-RTA) projects, including contractors and local government, are required to comply with the manual. However, it is also applicable for anyone responsible for the safety of their workforce who need to work near traffic. This paper provides an introduction to the available training options, risk assessment techniques, relevant sections for surveying activities, typical Traffic Control Plans (TCPs), documentation and signage requirements.

KEYWORDS: OHS, WHS, surveying, traffic, safety.

1 INTRODUCTION

The new Work Health & Safety (WHS) legislation has re-enforced the duties of care as stated in the previous Occupational Health & Safety (OHS) legislation. The main drivers are: the employer must ensure the health, safety and welfare of its employees, contractors, visitors and the public at its work sites – consultation with the workforce on safety matters, risk assessment by all organisational members and documentation of all assessments and safety measures implemented.

One of the biggest potential hazards facing surveyors is working in or near traffic. One of the best sources of material to provide guidance and manage this risk is the Roads & Maritime Services' Traffic Control at Worksites Manual (RMS TC@WM 2010). The current version is number 4, issue 2 with the first issue appearing in the 1980s. The manual is heavily weighted towards controlling risk in the construction and road maintenance areas.

This paper aims to provide surveyors with some of the experiences gained by Roads & Maritime Services (RMS) surveyors over several decades. Their daily activities of trying to conduct surveys on motorways, freeways, tollways, highways (HW), main roads (MR), secondary roads (SR), tourist roads (TO), bridges, viaducts, transitways (TW), and even cycleways (2012)! Figure 1 gives several examples of common worksites.



MR 258 Wombeyan Caves Road



HW 2 Hume Highway near Campbelltown



HW 4 – Snowy Mountains Highway



M4 Motorway – viaduct near James Ruse Drive

Figure 1: Some of the worksites for RMS surveyors.

2 DEFINITIONS

The TC@WM is under the control of Traffic Management experts and one of the most confusing areas is understanding what is meant by some of the terminology. Table 1 lists some of the most common terms that are used throughout the manual and this paper (Reference Section 2.3 TW@WM 2010).

Table 1: Definitions of work sites.

Intermittent work	Work which is undertaken on travel lanes, in gaps in traffic, without obstructing traffic and without compromising the safety of the workers. Intermittent work may be planned or unplanned.
Short-term work	Work requiring traffic control during work taking less than or equal to one work shift and where traffic control is not required when the work is complete and where road conditions are returned to normal when the shift ends.
Long-term work	Work requiring traffic control and taking longer than one work shift and where some form of traffic control must remain when the site is left unattended and may lead to operate both day and night.
Mobile work	Work which entails work vehicles moving continuously along the roadway at speeds significantly lower than other traffic.

Spotter	A person whose sole responsibility is to watch out for and warn workers of approaching traffic. The spotter shall remain within sight and hearing distance of the worker(s) (generally within 2 m). An advanced spotter may also be required and is to be within sight or radio contact at all times.
Traffic Control Plan (TCP)	A diagram showing signs and devices arranged to warn traffic and guide it around, past or, if necessary, through a work site.
Average Daily traffic volume (ADT)	The total traffic volume during a stated period, divided by the number of days in that period. Treatment of hazards may differ between ADTs of less than or greater than 3,000 vehicles.
Road Occupancy Licence (ROL)	Allows for a specified road space to be used for purposes other than transport. Licences for major roads are issued by the RMS Planned Incident Unit of the Transport Management Centre. The approval process may take up to 14 days and there is no guarantee of approval. For council roads, application is to be made to the local council authority.

3 RISK ASSESSMENT

3.1 Risk Control

A hierarchy approach to managing risk exists with the optimum being to eliminate the hazard. Table 2 (RMS Part 7 2012) lists these controls, with personal protective equipment as the least affective.

Table 2: Hierarchy of control measures.

CONTROLLING RISKS	
Elimination	Get rid of the hazard out of the workplace. This is the best option, if it can be done.
Substitution	Use something less hazardous. For example water based chemicals rather than solvent based ones.
Isolation	Use barriers to shield or isolate the hazard. For example guards on machines, enclosures for noisy machinery.
Engineering controls	Design and install equipment to counteract the hazard.
Administrative controls	Arrange work to reduce the time people are around the hazard.
Personal protective equipment	Have people wear protective equipment and clothing while near the hazard. For example ear plugs or face masks.

Safe
Place

↑

Safe
Person

WHS best practice controls are those that are above purely administrative controls – where a ‘tick and flick’ mentality may degrade the effectiveness of the systems in place. RMS surveyors have been eliminating the risk of surveying on the roadway by using technologies such as reflectorless EDM, close range photogrammetry, terrestrial and mobile laser scanning. Night surveys are being increasingly used as a substitution for daytime surveys. Road occupancy and lane closures are an engineering solution to lessen the risks.

3.2 Training and Certification

Qualifications in traffic control are a necessary option to assist in controlling risk when working near traffic. Knowledge gained can be applied to working near major roads, busy minor roads, construction sites, mining sites and large infrastructure developments. Table 3 is

a summary of the five qualifications in traffic control. Each qualification is ‘stand alone’. A person may be required to have multiple qualifications to satisfy workplace needs. All qualifications expire after 3 years and retraining is required to maintain currency.

Table 3: Summary of traffic control qualifications.

Qualification (and colour)	Description	Course duration
Traffic Controller (blue card)	Personnel required to control traffic with a stop/slow bat. Able to control traffic at a roadwork/construction site.	1 day
Traffic Controller (grey card)	Personnel required to control traffic with a stop/slow bat. Unauthorised to control traffic at a roadwork/construction site. For example, security personnel.	1 day
Apply Traffic Control Plans (yellow card)	Personnel required to set up and close down signs and devices at work sites with Traffic Control Plans.	1 day
Select/Modify Traffic Control Plans (red card)	Personnel required to select and make minor modification to existing (standard) Traffic Control Plans to suit the work location.	2 days
Design & Inspect Traffic Control Plans (orange card)	Personnel required to design new Traffic Control Plans, produce major upgrades of standard plans or perform inspections of work sites.	1 day

Most of the training focuses on short or long term site treatment, usually for construction purposes. Intermittent works are only covered briefly, which is unfortunate as most of surveying activities are adequately covered by these measures.

3.3 Site Specific Risk Assessment

RMS requires that a risk assessment is to be undertaken at all worksites and when circumstances change. All hazards at a project site are identified and analysed using a matrix system – based on WorkCover documentation and shown in Table 4 (RMS policy 2.0 2012). All of the hazards during the planning, setting up, operating, changing and dismantling of a Traffic Control Plan are listed. Appropriate control measures are developed to mitigate those risks. A monitoring system is required to assess the suitability of the adopted control measures.

Risk rating system analyses the potential hazard, without controls in place, by assessing the consequences and the likelihood of the hazard occurring. RMS uses a 1 to 6 scale with:

- 1 – High risk:** immediate action is required
- 2 – Significant risk:** important to do something about this hazard as soon as possible
- 3-4 – Medium risk:** risk control measures are required
- 5-6 – Low risk:** manage by routine procedures

In line with best practices, RMS Surveyors conduct a residual risk rating value after developing the controls measures. This is a reality check that the proposed controls do, in fact,

reduce the risk to the workers. Depending on the analysis of the risks at the site, intermittent, short term, long term or mobile systems may be appropriate. There are no hard and fast rules.

Table 4: RMS risk assessment reckoner.

RISK ASSESSMENT RECKONER	LIKELIHOOD - how likely is it to happen and how often?			
	Very Likely could happen at any time VL	Likely could happen some time L	Unlikely <i>could</i> happen, but rare U	Very Unlikely <i>could</i> happen, but probably never will VU
CONSEQUENCES – How bad is it likely to be?				
Extreme - Kill or cause permanent disability or ill health K	1	1	2	3
Major – Long term illness or serious Injury S	1	2	3	4
Moderate – Medical attention and several days off work M	2	3	4	5
Minor – First aid needed F	3	4	5	6

4 THE MANUAL IN DETAIL

4.1 Estimating Average Daily Traffic (ADT) Flow (9.15 TC@WM)

ADT is used throughout the manual to determine the amount of minimum controls that are required to be in place. ADT figures and maps for many roads are available from the RMS internet site (2012). Alternatively, an estimate may be calculated using Table 9.3 of the TC@WM (2010), which is reproduced in Table 5.

Table 5: Calculating estimated ADT.

NUMBER OF VEHICLES PASSING IN 5 MINUTES	CALCULATION	ESTIMATED ADT
8 or more vehicles	16hrs x 96 vehicles = 1536	> 1500
7 vehicles	16hrs x 84 vehicles = 1344	> 1000 but ≤ 1500
6 vehicles	16hrs x 72 vehicles = 1152	> 1000 but ≤ 1500
5 vehicles	16hrs x 60 vehicles = 960	> 300 but ≤ 1000
4 vehicles	16hrs x 48 vehicles = 768	> 300 but ≤ 1000
3 vehicles	16hrs x 36 vehicles = 576	> 300 but ≤ 1000
2 vehicles	16hrs x 24 vehicles = 384	> 300 but ≤ 1000
≤ 1 vehicle	16hrs x 12 vehicles = 192	< 300

Table 9.3 Calculating estimated ADT

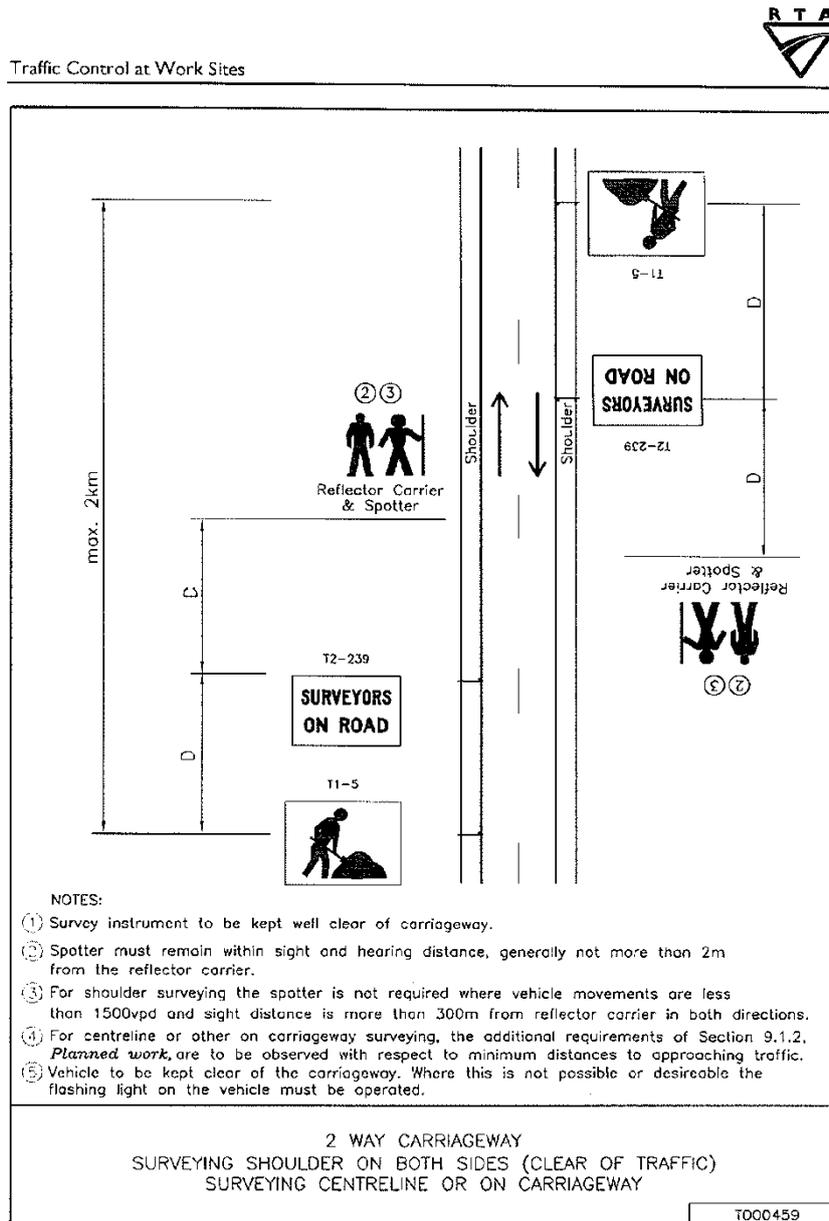
NOTE: Traffic must be counted in both directions to determine the total traffic volume per 5 minutes

4.2 Common Intermittent TCPs Suitable for Surveying

Reference: Traffic Control at Worksites Manual (TC@WM 2010). Refer to section 9.14 for general requirements.

4.2.1 TCP 459 Intermittent Work 2 Way Carriageway

RMS surveyors use this TCP for conducting detail surveys adjacent to the roadway, see Figure 2, reproduced from the Traffic Control at Worksites Manual (TC@WM 2010). The instrument is usually greater than 3 metres clear of the traffic lane.



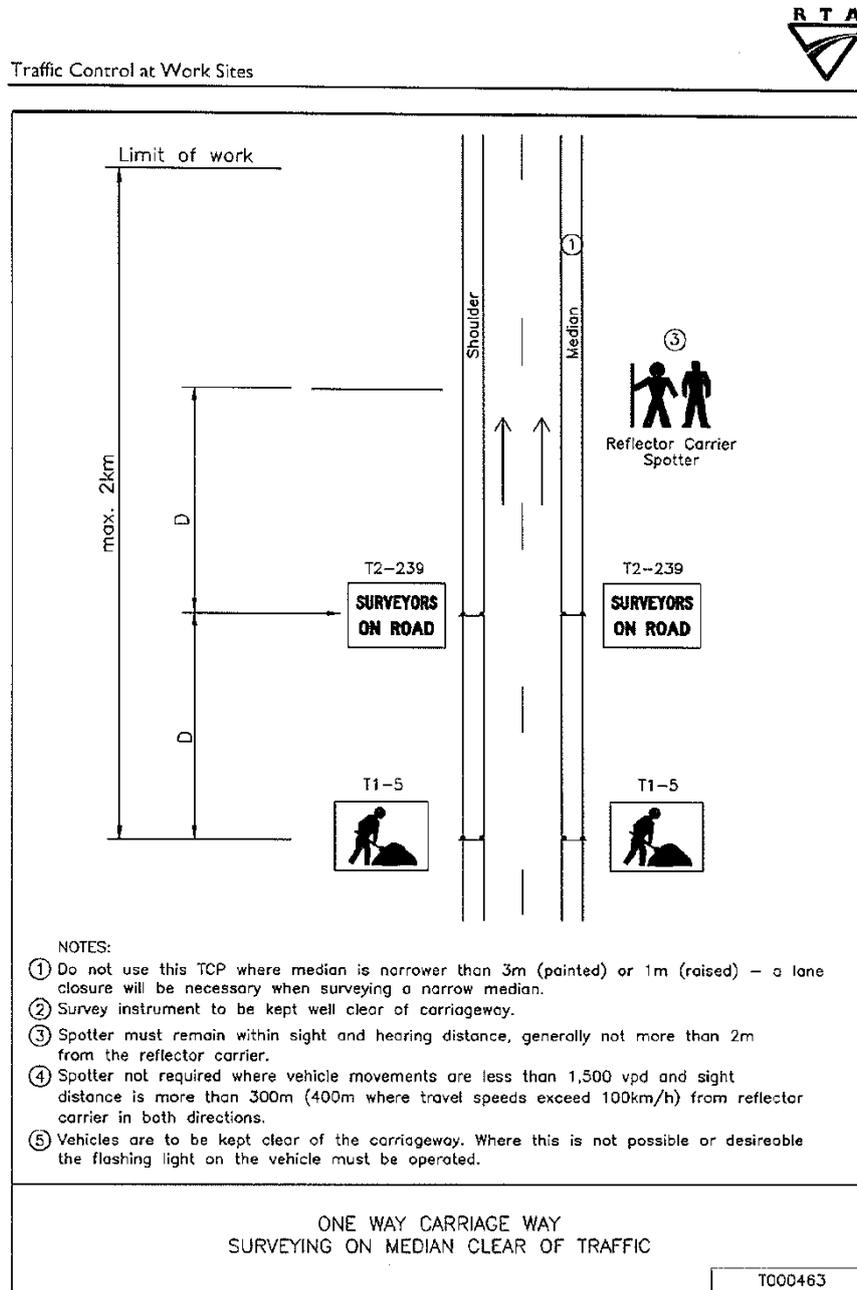
TCP 459

June 2010
 Issue 1

Figure 2: TCP 459.

4.2.2 TCP 463 Intermittent Work 1 Way Carriageway – Surveying on Median

RMS surveyors use this TCP (TC@WM 2010) for detail surveys or investigation surveys in wide medians – see Figure 3. The instrument is usually greater than 3 metres clear of the traffic lane. The sign T-239 ‘Surveyors on Road’ is included as it is promoting the profession and indicates to drivers that there are workers on foot in the area, when they may be expecting big earth moving equipment.



TCP 463

June 2010
 Issue 1

Figure 3: TCP 463.

4.3 Safe Traffic Gaps for Intermittent Work (9.1.2 TC@WM)

When playing in the traffic, RMS surveyors rely on understanding safe gaps in traffic with the activity usually taking less than 10 seconds. These are detailed in Table 6. An escape route needs to be developed and agreed upon before commencing work.

Table 6: Safe gaps related to speed zones.

ROAD SPEED ZONE (D) km/h	MINIMUM SIGHT DISTANCE (m)	
	WITH A LOOKOUT PERSON (spotter* to be generally within 2 m) (10 secs travel time or 3Dm)	WITHOUT A LOOKOUT PERSON (20 secs travel time or 6Dm)
40	120	240
50	150	300
60	180	360
80	240	480
90	270	540
100	300	600
110	330	660

* - In addition, consider using an advanced spotter with radio contact.

4.4 Using Traffic Control Cones as Delineation Devices (3.3.3 TC@WM)

The recommended heights of safety cones are shown in Table 7. A reflective band is required for night usage.

Table 7: Traffic cone sizes.

Size	Usage
300 mm	Pedestrian control only
450 mm	Urban & rural roads (< 70 kph)
700 mm	All other roads (> 70 kph)

4.5 Size of Signage (3.2.2 TC@WM)

Generally, standard signs are available in two different sizes designated as (A) and (B). Table 8 is a summary of the main features. As well, sizes (C) and (D) may be used to emphasise the message. The dimensions of the sign relate to the type of sign. These can be found on the RMS traffic signs and sign design specifications website (2012).

Table 8: sign sizes defined by proximity to traffic and zone speed.

Sign	Offset up to 90 km/h	Offset up to 110 km/h
A	8 metres or less	4.5 metres or less
B	Greater than 8 metres	Greater than 4.5 metres

Size B may be appropriate for expressway type roads or for added emphasis.

4.6 Static Work Requirements (3.6 TC@WM)

Safe clearances between workers and through traffic at static work sites (RMS, 2010) is summarised in Table 9. Intermittent and low impact works as well as mobile works are exempt from these requirements.

Table 9: Safe clearance at static sites.

Greater than 6m (Sec 3.6.1)	3 – 6m (Sec 3.6.2)	Closer than 3m (Sec 3.6.3)	1.2 - 3m (Sec 3.6.3)	Closer than 1.2m	Actions
✓					If visible to motorists, place Workers sign (T1-5) in advance of work area.
	✓	✓	✓		Place Workers sign (T1-5) in advance of work area.
	✓	✓	✓	✓	Vehicle mounted warning device (Sec 3.3.9).
	✓				If traffic volume (vpd) > 10,000 seek approval to temporarily restrict speed to 80 km/h.
		✓	✓		Refer to Section 3.6.3 – safety barriers, delineation and containment fencing and possible speed restriction &TCP.
				✓	Refer to Section 3.6.4 – safety barriers, delineation and containment fencing and possible speed restriction &TCP.

5 DOCUMENTATION

RMS surveyors have third party Quality Assurance (QA) accreditation. QA systems are notorious for generating paperwork. This can consist of documentation for procedures, work instructions, guides, forms, checklists, templates, etc. A yearly induction into the Surveying WHS system includes a work instruction for the section, site induction checklist (signed daily), checklist for working near traffic (intermittent or short term), generic Safe Work Method Statement (SWMS), RMS risk reckoner, a guide (being extracts of RMS policies, procedures and TC@WM) and RMS WHS tip sheets.

Appendix E of the TC@WM (2010) has a number of checklists that may assist in defining the hazards and implementing safety controls. The checklists are: Safety Inspection, Roadwork Speed Zones, Traffic Controllers, Portable Traffic Signals, Flashing Arrow Signs, Variable Message Signs, Signs and Devices, End-of-Queue, Working on Foot Near Plant, project Vehicle Movement Plan (VMP), Miscellaneous (intermittent, mobile and other works), Daily checklist for Short term work sites and Weekly checklist at Long Term work sites. These may assist other organisations to develop their specific documentation.

6 CONCLUDING REMARKS

Worker safety is a primary concern of the RMS surveying discipline. Our prime objective is to ensure that personnel have safe systems of work to ensure that they arrive home safely every night. Our system for working adjacent to traffic is just one of many systems developed to meet our objective.

Traffic control training is essential to help understand and manage the risks and requirements of having a safe workplace. Even with the limited exposure to mobile and intermittent work within the courses, they are still highly recommended. Refresher training every three years is mandatory.

For efficiency and risk management, RMS surveyors have a rule of thumb, if traffic controllers are required for a project, RMS surveying will usually sub-contract this activity to registered providers. This ensures that the most skilled worker for a task is used. However, before starting fieldwork, all proposed systems are discussed, agreed upon and documented. Qualifications of the sub-contractors are examined and documented.

The governing committee of the TC@WM can be approached to make amendments to the manual. It is hoped that government surveying entities will group together to review, develop and promote more surveying specific TCPs to be included in the manual. The economic and safety benefits are obvious.

The information contained in this paper is provided as general information and is not to be relied on for specific projects. It is a distillation of the RMS surveying discipline extensive systems and is solely the opinion of the author, and is not to be construed as representing the opinions or views of RMS.

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