Internal Traffic Management Plans

Does your project have an Internal Traffic Management Plan? If not you should seriously consider developing one. Plant and vehicle incidents and particularly those involving reversing over pedestrians are the highest risk area in road construction, with at least five reversing fatalities reported in recent times.

An Internal Traffic Management Plan (ITMP) is a process used to safely coordinate the interaction between pedestrians (workers and public), construction plant, delivery trucks and incidental visitors in the work space of a road construction work zone.

In the United States they are referred to as Internal Traffic Control Plans (ITCP). Approximately half of their fatal injuries to workers in a road construction site involve backing/reversing construction vehicles, with dump trucks being the most common vehicle. This compares to thirty percent traffic related fatalities on road construction sites so is clearly their highest risk area, as it is here in Australia.

The U.S. National Institute of Occupational Health and Safety (NIOSH) sponsored research to prove the applicability of the ITCP concept to paving operations on freeway work zones. In 2005 the U.S. Federal Government Regulations subsequently required ITCP Plans for all work zones and it is recommended that it becomes part of the Site Safety Plan (OHS Coordination Plan).

Similar Plans have been used previously on VicRoads major project sites combined with UHF radio communications. However, the fundamental principles are applicable to all roadwork sites (including smaller sites) for internal traffic management.

Recent Experience in the USA

The Labourers Health and Safety Fund of North America (LHSFNA) reported recently that: Work zones are noisy, busy and often congested with heavy equipment and workers on foot. Large, backing vehicles have wide blind spots behind them in which a pedestrian is invisible to the vehicle's operator. Backup alarms often break or malfunction, and even when they work properly, they are often lost in the din and distraction of site noise. They just are not effective enough. Between 2005 and 2010, backovers killed almost 360 workers.

With new technology such as wireless video cameras and the use of spotters, there is no reason that operators should back up blind. A few states (WA, VA) now have requirements that are more protective.
LHSFNA raised this issue on a national level, and on March 28, 2012, the Occupational Health and Safety Administration (OSHA) issued a Request for Information on how the agency could change its rules to better prevent backovers. The Fund developed and designed the 14-page Internal Traffic Control Plans booklet that provides guidance for establishing separation of vehicles and workers in work zone operations. The booklet now carries the NIOSH and OSHA Alliance logos as well as the endorsements of the National Asphalt Pavers Association (NAPA) and the American Road and Transportation Builders Association (ARTBA).

The Fund is also a proponent of video and radar systems that alert vehicle operators when someone is behind. These systems are increasingly effective and affordable.

OSHA, is aware of employee safety risks in and fatal reversing incidents by vehicles and equipment (all industries), and is requesting information from the public on these risks. Their recent RFI requests information that will assist the Agency in determining what steps, if any, it can take to prevent injuries and fatalities in this area.

The analysis of data also provided a context for these fatal reversing incidents:

- Eight of the deceased workers were using cell phones when the reversing incident occurred.
- Twenty-one fatalities involved vehicles with no driver.
- Twenty-five of the victims were acting as spotters for the vehicles that backed over them. (Editor note in many of the incidents, employers were using spotters to comply with the existing reversing-related standards).

One area in which reversing incidents are a significant concern are incidents that occur in highway work zones. Road construction workers routinely work in close proximity to mobile equipment and construction vehicles, which exposes them to struck-by hazards on the job site. For example, flaggers and other workers on foot are at risk because they may not be visible to equipment operators or motorists. Other highway workers are at risk because they routinely work in conditions of low visibility, low lighting, inclement weather, noise, or in congested areas with high traffic volumes.

The 2010 highway work zone study, “Fatal Occupational Injuries at Road Construction Sites, 2003-07,” found that, of the 639 fatal workplace injuries on road construction sites between 2003 and 2007, 101 (15.8%) involved backing vehicles or mobile equipment. Additionally, the study found that dump trucks caused 60 of these fatal reversing incidents. An earlier study found that 51% of workers killed by backing vehicles while on foot occurred within the confines of a highway work zone (“Building Safer Highway Work Zones: Measures to Prevent Worker Injuries from Vehicles and Equipment”).

The U.S. National Institute for Occupational Safety and Health (NIOSH) compiles case studies of worker fatalities in its Fatality Assessment and Control Evaluation (FACE) reports. An OSHA review of 25 construction-related reversing fatalities described in these reports indicates that, in 15 of these fatalities, the backup alarm on the vehicle was functioning properly, suggesting that backup alarms may not be sufficient to prevent reversing incidents.

In the FACE reports, NIOSH recommended that employers:

- Ensure that procedures for backing vehicles safely are in place for mobile construction vehicles;
- Designate a spotter to direct vehicle backing (Editor note: spotters are significantly implicated in fatalities);
- Train workers on the specific duties they are to perform during backing manoeuvres;
Train workers to recognize equipment blind areas;
Ensure that drivers are in communication with workers who are on foot near the vehicle;
Implement and enforce procedures that minimize exposure of workers on foot moving construction vehicles and equipment;
Provide personal protective equipment and high-visibility clothing, and require use;
Install after-market devices (e.g., cameras, radars, and ultrasonic devices) on construction vehicles and equipment to monitor workers on foot in blind areas.

Editors note: While earth moving vehicles such as dump trucks cause the majority of reversing incidents, mobile plant cause reversing injuries and fatalities as well.

**Mandate Internal Traffic Management Plans on VicRoads Projects**
The U.S. experience and the principles of their ITCP are definitely applicable to road construction projects in Victoria. The movement of powered mobile plant on site is classified as a high risk in the OHS Regulations and the hierarchy of safety controls apply. Dump trucks are also responsible for many of the reverse over incidents to they need to be included in the controls even though they may not fit the definition of plant understood by some.

A step in the right direction would be to mandate ITMP within OHS Coordination Plans as is done in America – the legislative obligations are there already.

**The fundamental principles for setting up an effective ITMP are:**
- Isolate workers and other pedestrians from mobile plant and vehicles.
- Reduce the need to back up.
- Limit vehicle access points to work zone.
- Coordinate truck and mobile plant movements.
- Provide signs within the work zone to give guidance to pedestrian workers, equipment and trucks.
- Design buffer spaces to separate pedestrian workers from errant vehicles and work zone equipment.
- Inform all on-site personnel and workers of ITCP provisions.

In accordance with the OHS Regulations 2007 in Victoria the presence of mobile plant operations on site are classified as high risk construction work. Dump trucks also present similar risks as earthmoving plant and all have been implicated in fatalities and serious injuries in Australia. The regulations require that the high risk hazards be identified and controlled through the hierarchy of safety controls, and that Safe Work Method Statements be produced which identify the hazards and adequately describe effective controls.

Our industry is not dissimilar to above ground mining operations in respect to the hazards presented by mobile plant and other vehicles. Safe Work Australia has produced a draft model code of practice for Roads and Other Vehicle Operating Areas for the mining industry which may be found at:

Examples of the isolation of pedestrians from mobile plant and other vehicles on recent current VicRoads major projects are shown on the following pages:
**M80 Project – Leighton Section**

Leighton introduced their Pedestrian No Go Zones on the M80 Project early in 2011 and is to be congratulated for this initiative. It was the first highly visible ITMP to be introduced on a VicRoads Project. It was highlighted in the August 2011 edition of this newsletter.

The concept had origins in the Mining Industry where they are sometimes called “Red Zones”. It does require compliance with behavioural controls, just as drivers are required to do on public roads but the system does isolate plant operations from pedestrians and gives the lead plant operator authority to give permission to other vehicles to enter the zone and pass other plant.

Plant is required to stop all movement and rest the booms in the case of excavators pending the safe passing by plant and vehicles authorised to pass / enter the area. If it is necessary for a pedestrian to enter or approach plant they must seek permission over the radio and machines will be stopped until they are sighted and if necessary given permission to come closer.

All permissions and instructions must be confirmed over the radio before entering the Red Zone. Some areas are made Pedestrian No Go Zones where pedestrian entry is completely prohibited. Appropriate signage is then displayed.

---

**General Warning Sign** – Also a reminder to contact the Lead Plant Operator by Radio and wait for permission to enter. Details of the radio frequency and name of the lead operator are provided on the adjacent Leighton Safe Notice Board. They are not provided if the area has been declared an absolute ‘Pedestrian No Go Zone’
Details are not provided when an area has been declared an absolute pedestrian No Go Zone. An example of this sign is shown on the next page.

Pedestrians Not Authorised to enter certain CONSTRUCTION VEHICLE ONLY AREAS.
Special Plant Maintenance Bays are evident throughout the site to prevent pedestrians involved in activities such as refuelling being struck by passing mobile plant or vehicles.

*Example of a typical Plant Maintenance Area*

**Williams Landing Project Abigroup**
This project at Laverton is isolated from the general public to a significant degree but has restricted pedestrians from plant operating areas where the northern ramp for the Palmers Road Bridge extension over the railway line is under construction.

*Pedestrian No Access Zone for Mobile Plant Area.*
Narre Warren Cranbourne Road Berwick BMD
Working in a residential area always presents a challenge for road construction with respect to the separation of mobile plant and other construction vehicles from the public.

BMD have just commenced the duplication of the Narre Warren Cranbourne Road at Berwick in an area where access to businesses and residences need to be maintained and effective isolation of construction plant and vehicles from the public is necessary. They together with VicRoads South Eastern Projects are seeking more effective isolation between mobile plant and vehicles to achieve compliance with expectations in this area.

Temporary public access is always required and on this project they will be established to a high standard of surfacing to accommodate disabled persons, elderly and those with need for wheeled walkers and prams. The new public access paths have been well delineated and signed.

High security type fencing has been deployed on site to better contain and separate the public from road construction plant and vehicles. This is more effective than Para webbing or Bunting Flags in the containment of pedestrians and is less prone to weather damage.

The photographs and captions following illustrate the provisions in place at this time:

Public walkway on right behind security fence construction area on left
Danger Construction Site Signs displayed frequently on security fence.

A motorised wheel chair passes over the temporary walkway without difficulty – the surfacing will be further sealed.
Current works includes hydro excavation of service proving prior to excavation permits being completed before any ground penetration on site.

**Justification for 15 tonne GVM TMAs**

The Queensland Department of Main Roads has provided a revised version of their document justifying their position for Truck Mounted Attenuators (TMAs) to be a minimum of 15 tonne gross vehicle mass (GVM). 15 tonnes GVM has been adopted as the minimum for their fleet of TMAs.

**15 Tonne Gross Vehicle Mass (GVM) Requirement for TMA Host Vehicle**

Critical to the development of a TMA that affords protection to the public, the road workers and the TMA operator is the selection of the host vehicle. The vehicle must be appropriate for the use that is intended and also comply with all legislative requirements.

There are a number of requirements that affect the selection of the host vehicle. A discussion of critical requirements follows.

**Minimum tare mass**

For acceptable impact performance, minimum tare mass requirements for host vehicles are set by the manufacturers of impact attenuators. The two currently available impact attenuators have minimum host vehicle tare mass requirements of 7.3 tonnes (Safe Stop) and approximately 9.07 tonnes (20,000 lbs) (Scorpion).

The host vehicle tare mass is the mass of the truck with all the components necessary for operation as a TMA except the impact attenuator fitted.
**Weight Distribution**
To enhance the effectiveness of the Automatic Impact Braking System (AIB) the rear axle/s should carry a significant proportion of the total TMA mass.

**Use of Ballasting**
The use of ballasting is discouraged. The mounting points of all attachments to a TMA host vehicle are required to withstand a force of twenty times the mass of the attachment. While the attachment of the ballasting to the truck body may meet this requirement, the attachment of the body with ballast to the chassis is unlikely to meet the twenty times mass requirement without significant modification to the mounting points on both the body and to the truck chassis.

**Chassis Size and Strength for Impact Attenuator Mounting**
Under impact the loads imposed on an impact attenuator are transferred through the mounting assembly into the chassis of the truck. The truck chassis must be of a size that allows mounting of the impact attenuator in accordance with the manufacturer’s specifications. The truck chassis must also be of sufficient strength to absorb applied loads without significant failure or distortion.

**Conclusion**
It is considered that TMA host vehicles with a manufacturer’s gross vehicle mass (gvm) rating of at least 15 tonnes will meet the above critical requirements.

Vehicles with a lesser gvm rating are unlikely to meet all or possibly any of the above critical requirements.

**Victoria’s Position and 15 tonne GVM TMAs Used by VicRoads**
In Victoria TMA operators have been using TMAs for line marking operations for a number of years. In more recent years (since 2006) they have been deployed for the protection of short term works (construction or maintenance). They are operated by a majority of private operators and at least 40 units currently used throughout the state, with access to others from interstate as necessary. The operators have followed the supplier / manufacturer attenuator host vehicle mass recommendations, which in turn should follow crash testing and U.S. Federal Highway approvals for use on their national highway system. Most units are currently around 10.4 tonne GVM with ballast.

Victoria has not mandated 15 tonne TMAs as the minimum GVM at this time, but has no objections to them being used by operators in consultation with their workforce and in consideration of their operating environments. For example VicRoads Road Services are operating 15 tonne GVM TMAs on high speed roads and on rural interstate freeways where impacts by heavy trucks could be expected.

The minimum required in Victoria at this time is 10.4 tonnes GVM. Reflecting the minimum requirements of the U.S. Federal Highway Administration based on crash testing criteria and attenuator supplier / manufacturer recommendations. Note that the U.K. Highway Agency requires that TMAs are between 10 and 15 tonnes.
VicRoads 15 tonne TMA protecting line marking crew.
Latest Truck Driver Drug Testing Shock

Victoria Police recently released the results of drug testing for truck drivers conducted by the heavy vehicle unit so far this year.

1 in 8 drivers tested returned a positive result compared to 1 in 17 last year,

By comparison 1 in 29 truck drivers tested positive in 2007-8, and 1 in 45 when drug testing first commenced.

This is of obvious concern given that truck drivers are more frequently testing positive than in the past. The Police are now conducting more frequent and focused testing and this may explain this increase of drug-impaired truck drivers.

Amphetamine use is particularly concerning. Drivers believe it helps them stay awake and more alert, but in actual fact it just makes them a really high risk on the roadways.

A month-long blitz will be conducted during May.

Drug taking by any driver increases the risk to other road users and of course to those who work on or adjacent to roads for construction or maintenance purposes.

It further reinforces the need for the physical protection of road workers via barriers or TMAs in preference to bollards, speed reduction and lane closures on their own. If these controls are practical they should be applied as required by the OHS Regulations 2007.

Workers Exposed to Unknown Substance on Roadwork Site

Five road workers received medical treatment for nausea – after being exposed to a clay-like material at a Pacific Highway road construction site near Port Macquarie NSW. The State Government has announced an independent inquiry into the incident.

The union was concerned for any workers who may have been or still could be exposed to potentially lethal or carcinogenic materials. Workers will not be returning to site until they are certain that their health and safety can be guaranteed.

Sites which are known to have been used as rubbish tips are cause for concern and on VicRoads major project sites Occupational Hygienists are engaged to investigate and monitor the sites. They also recommend work practice controls based on the known risks in these environments.

WorkSafe Victoria has developed an Industry Standard for Contaminated Construction Sites which should be followed before works are conducted on sites such as old rubbish tips where contamination could be expected.

A copy of this standard may be obtained from:


Worksite Site Safety Update is produced monthly by VicRoads Major Projects Division to communicate industry safety information and initiatives within VicRoads and to our contractors. It is also circulated via the WorkSafe Safety Soapbox to industry. The content reflects civil road construction and maintenance safety and includes works conducted on or beside operational roads. The editor may be contacted at: michael.rose@roads.vic.gov.au