

**SLOW**



## Guideline for Pedestrian & Traffic Management at Concrete Plants

November 2018

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## INTRODUCTION

### Purpose and Scope

This Guideline has been developed to assist industry to share information on pedestrian and traffic management at concrete plants.

Concrete plants, particularly those located in urban settings, are often situated on a constricted land area, with vehicles and pedestrians working in close proximity. This guideline identifies the different movements, and provides an overview of potential controls that could be used at sites to reduce the risk of incidents occurring and improve productivity at concrete plants.

Given that each site is designed differently, no single control will suit all sites. This Guideline provides practical options for controls depending on the layout, size and capacity of the site, whether it is a new or existing site. This Guideline has been designed to assist in defining the problem and provides a framework to implement appropriate controls to manage the risk at individual sites.

### Structure

Section 1 of this Guideline begins by outlining a number of common traffic movements, as well as general principles for managing traffic hazards at concrete sites. This section also includes the *Hierarchy of Control* which operators are required to adopt when implementing controls.

Section 2 outlines specific controls that can be implemented at sites. These are designed so that each site can implement the controls in a way that best suits the risk.

Lastly, an appendix at the back of this document which is a checklist that sites can use to identify both the types of traffic hazards at a site, as well as some common controls. The checklist is not designed to be comprehensive, but rather as a starting point to assist sites in identifying common and shared risks and hazards at sites.

### Definitions

This Guideline uses the following definitions from Safe Work Australia<sup>1</sup>:

- **Hazard** refers to a situation or thing that has the potential to harm a person/s. Hazards at work may include noisy machinery, a moving forklift, chemicals, electricity, working at heights, a repetitive job, bullying and violence at the workplace.
- **Risk** is the possibility that harm (death, injury or illness) might occur when exposed to a hazard.
- **Risk control** means taking action to eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising them so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.



<sup>1</sup> Safe Work Australia, *Identify, assess and control hazards* at <https://www.safeworkaustralia.gov.au/risk>

## SECTION 1 – GENERAL PRINCIPLES

### Types of Pedestrian & Traffic Movements

Given that all concrete plants do similar work, there are a number of common types of traffic movements. The difference between sites is in the number of movements, the risks associated with each movement, and effective controls for each.

**Pedestrians:** The risk to pedestrians walking on site is high at most concrete sites, including access to the site from the road, drivers collecting docket or taking breaks, and staff moving near and around site offices.

**Concrete Agitators:** As the primary vehicle moving through a concrete plant, agitators tend to have the greatest level of access to the site to load concrete, test slump, wash out, clean and park. Drivers who access the site on a daily basis or irregularly have different risk profiles.

**Cement Tanker:** These vehicles are often the largest to visit a concrete plant, and depending on the location of unloading, may interact with other vehicles and pedestrians on site. They often have limited visibility, and operate in areas close to other vehicle and pedestrian movements. They will often share driveway access to the site.

**Aggregate Trucks:** Most commonly in the truck and dog configuration, these vehicles are regular visitors to concrete plants delivering raw materials. Drivers of these vehicles often have limited visibility, traverse through other work areas and use common entrances/exits. This places these vehicles at an increased risk of incident with pedestrians or other vehicles.

**Heavy Mobile Equipment:** “Yellow” vehicles such as front end loaders and forklifts are common at concrete plants. These vehicles often have their own areas of operation, although many will interact with pedestrians and other vehicles passing through their work areas. These vehicles pose a risk to other vehicles and pedestrians.

**Light Vehicles:** At concrete plants, light vehicles are not the primary user of the roads, but may be used for deliveries. Access and parking for these vehicles poses a risk of accident.

**Delivery and Maintenance Vehicles:** Liquid admixture and other additive deliveries, routine maintenance vehicles, fuel delivery trucks, parcel/mail delivery trucks, cleaners and standard suppliers are vehicles that may enter concrete sites on regular basis. They will interact with other vehicles and pedestrians on site, and may have a set process when they come to site. Complacency for adherence to site access/ egress processes for non-routine workers can be an issue.

**Ad Hoc Visitors:** Access to the site is required on an ad hoc basis by suppliers, couriers, and non-routine maintenance staff. These people will arrive on site in a variety of light and heavy vehicles, and may require access around the site as pedestrians. Ad hoc visitors have an increased risk profile given they are not regular visitors.

### General principles

As a general principle, pedestrians are at a higher risk of accident from an interaction with a vehicle, with injury a likely outcome from any negative interaction. While vehicle to vehicle interactions also have a high degree of risk, the lack of protection for a pedestrian means that ensuring controls for them should be given the highest priority.

As per the *Hierarchy of Control*, priority should be given to controls that eliminate risk where this is reasonably practicable. Sites should undertake a process of continuous monitoring and review of the effectiveness of controls and in doing so, new and innovative ways of managing traffic and pedestrian flows can be achieved.

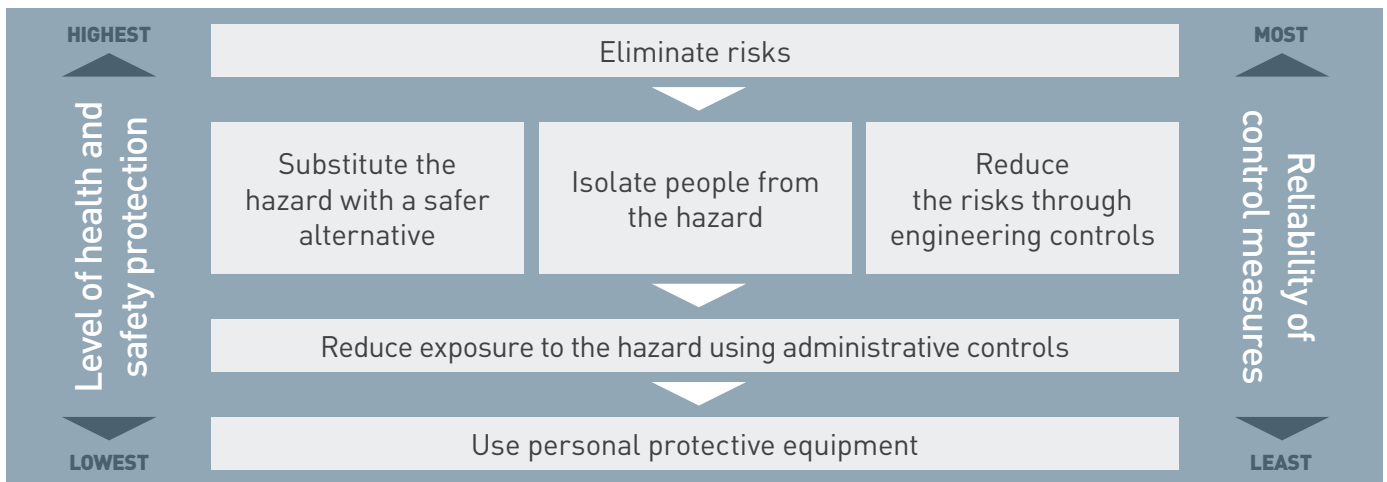
The use of technology to manage risks offers opportunities at concrete plants (such as digital dockets, or safety sensors). Equally, engineering and design solutions can also provide helpful options to separate different traffic flows. While each site will differ, there are opportunities on all sites to find innovative solutions that provide effective controls.

Heavy vehicle deliveries occur throughout the day at concrete batch plants and it is important to ensure that traffic management procedures are easy to understand for delivery drivers, contractors and visitors to site. To avoid any risk of confusion, it is best to use clearly identifiable traffic management rules and signage that is consistent with other sites.

Sites can reduce risk and drive positive behavioural change by reviewing work design, equipment and practices:

- **Work design:** Plants are designed to suit the local land conditions, but where possible the design of a concrete plant should take into account how pedestrians and vehicles interact, with a focus on innovative ways to minimise interaction between different modes.
- **Work equipment:** Regular maintenance of vehicles, including safety features can assist in preventing an incident.
- **Work practices:** Clear policies around pedestrian and traffic movements at sites through induction, refresher training, clear signage and physical barriers, will assist in ensuring everyone entering and working at the site has an understanding of the basic principles.

## Hierarchy of Control



Once a hazard or risk is identified, it is fundamental that it is controlled as far as is reasonably practicable. For pedestrian and traffic management, it means that each type of interaction should have the identified hazards and risks addressed. This is achieved through a variety of methods, with elimination being the highest form of control. Safe Work Australia<sup>2</sup> has identified three levels of health safety protection. While there are no right answers to any one situation, the hierarchy of control can help to guide which approach is appropriate to the situation.

Safe Work Australia controls need to be implemented in a way that is reasonably practicable. Safe Work Australia note that deciding what is reasonably practicable to protect people from harm requires taking into account and assessing all relevant matters including:

- the likelihood of the hazard or risk occurring;
- the degree of harm that might result from the hazard or the risk;
- knowledge about the hazard or risk;
- ways of eliminating or minimising the risk; and
- the availability and suitability of ways to eliminate or minimise the risk.



## SECTION 2 – CONTROLS

This section outlines a range of interactions that pedestrian and vehicles might have at a concrete site. These situations are not exhaustive in type and other interactions might be possible. The options presented are suggestions to mitigate risk and may not be the best solution for all site situations.

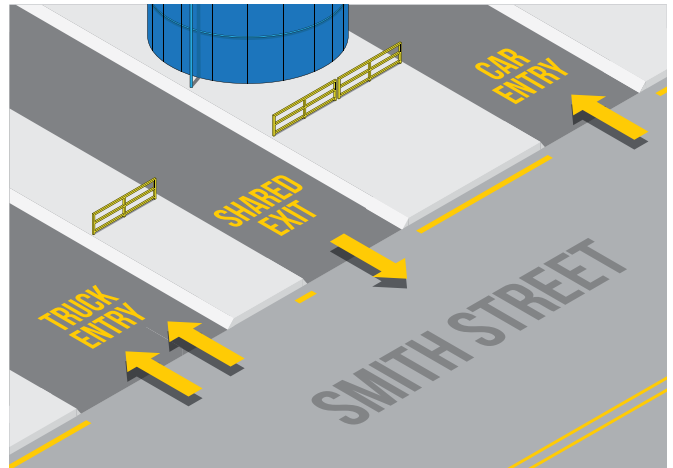
### Entrance and Exit

#### Overview

The design of entrance/exits from site will affect the control. Some sites will have separate entrances/exits, and others will be shared with other vehicles and/or pedestrians. Critically, considering how pedestrians enter and exit a site can assist to reduce incidents.

#### Options

Where the site has the available space, separate entrances and/or exits for different vehicles can assist to reduce the risk of incident through isolation. Where this is not possible due to a single entry, or limited size of the site, the use of signs and other administrative controls can assist to create safe movements.



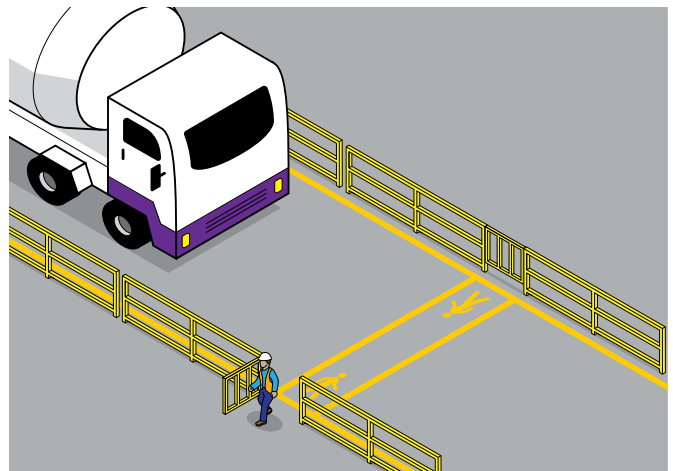
### Gates

#### Overview

Road crossings are a source of risk for pedestrians, as these areas provide the opportunity for interaction between pedestrians and vehicles.

#### Options

These risks could be managed through the use of gates to control pedestrian movements across trafficable areas. Where gates open inwards towards the pedestrian, they assist to slow people on foot and to check for traffic. Defining the 'right of way' between pedestrians and vehicles can also assist to ensure clarity around movements. Signage on gates can be helpful to promote site specific protocols while rotating beacon lights, activated upon opening of gate/s, could also provide increased visibility for vehicle operators.



### Barriers

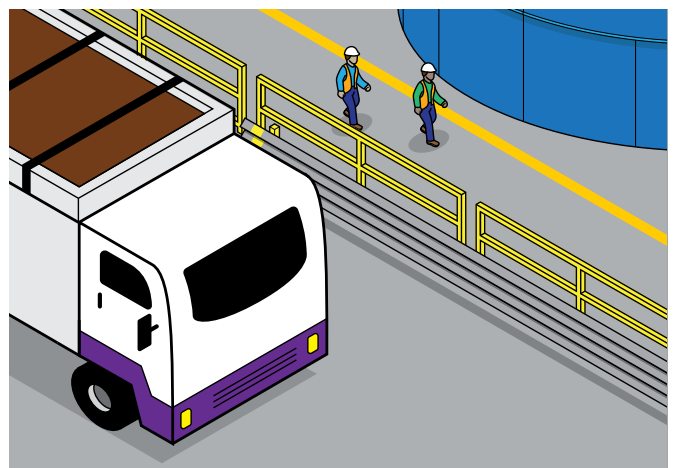
#### Overview

Physical barriers reduce the risk of incident between pedestrians and vehicles, and between different vehicles. There are a number of types of barriers, such as fixed concrete barriers and bollards, temporary plastic bollards, moveable traffic cones, and painted lines.

#### Options

Fluorescent colours on the barriers can assist to make them visible, and provide greater visibility of the barrier area. The type of barrier used will depend on the site situation, the risk factor, and the available spacing.

In zones of high pedestrian traffic such as office entry/exit, barriers can be used to protect against people walking out into traffic flows.



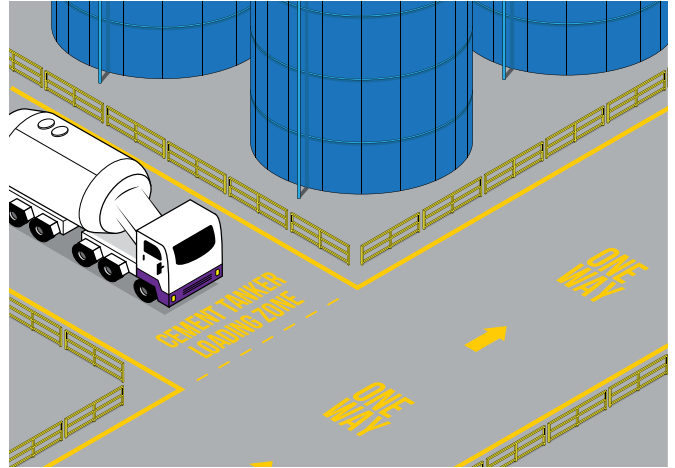
## Road Markings

### Overview

Markings on the road have the objective of assisting vehicles and pedestrians to stay within a designated area. This includes footpaths, vehicle direction markings, and zoning of the site for different types of movements.

### Options

Direction markings on the road are an easy and visible way to signal to drivers the right of way. Different colours can be used to delineate different areas (eg, for pedestrians, or vehicle only areas). Using the right type of material for the terrain and weather is important to minimise maintenance and ensure they remain visible and clear.



## Signage

### Overview

The use of signs for vehicle operators and pedestrians can assist to determine what movements are acceptable at a site, as well as increase visibility to help enforce site specific standards. This can also assist those who are not regular visitors to a site to be aware of the local conditions.

### Options

Standard road signs have the advantage of being easily recognised, while customised road signs might provide the specificity for individual site movements. The decision on type of sign to use will depend on the setting.



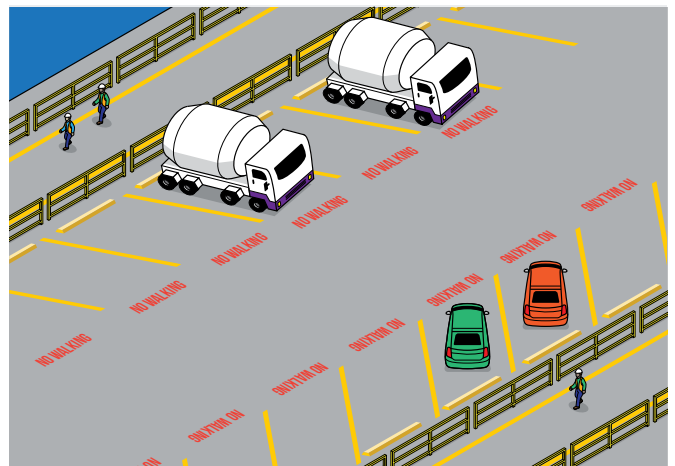
## Parking

### Overview

Parking is required for different types of vehicles, and is both a way to manage risk (through clearly delineating parking areas), but also a risk area given the increased risk of pedestrian/vehicle incident.

### Options

Creating separate parking bays for different types of vehicles can reduce risk of interaction between vehicles. Parking controls can be implemented in collaboration with road marking controls. Parking for light vehicles near to the site office can reduce pedestrian movements. Depending on the layout and design of the plant, consider the 'First Move Forward' principle by requiring reverse parking only on site as this can assist to minimise incidents. Wheel bumps stops at the end of parks also help to mitigate against unintended vehicle movements.



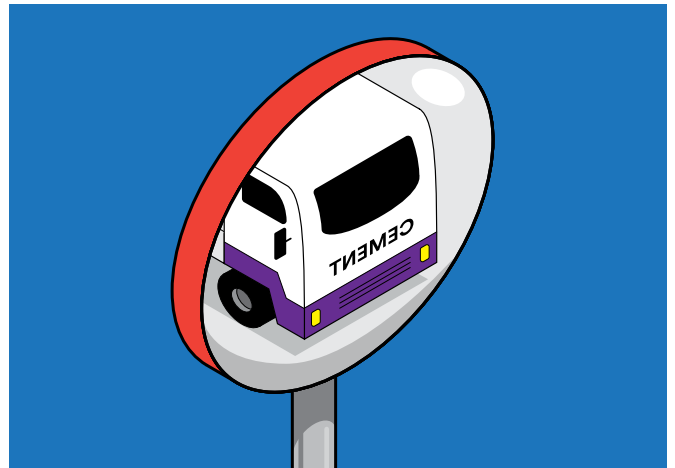
## Mirrors

### Overview

The use of convex mirrors around sites can increase visibility. These can assist at corners or blind spots to reduce the risk of an incident between pedestrian/vehicles or vehicle/vehicle.

### Options

Take into account the size and position of mirrors to ensure they are appropriate for the setting.



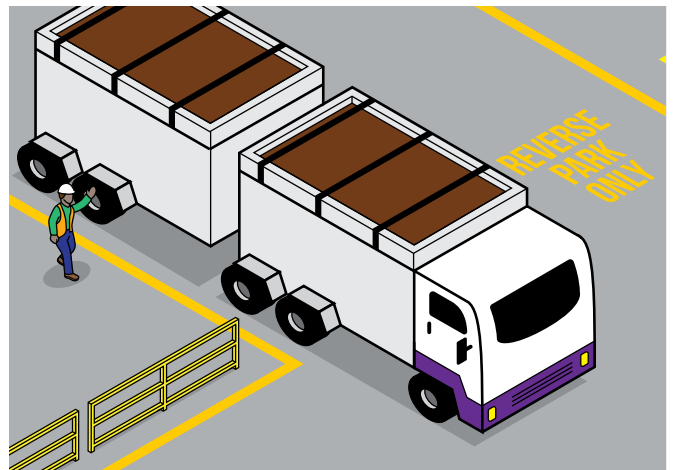
## Communications

### Overview

Positive communication between vehicle operators, pedestrians and site staff is crucial in managing risk where there is the possibility of interaction between people and vehicles, as well as vehicle to vehicle interaction.

### Options

Positive and acknowledged two way communication (direct and radio) can be standardised to avoid the risk of miscommunication between parties. Examples include acknowledged eye contact and hand signals between people on foot and vehicle operators to reduce the likelihood of an incident. The use of slogans such as "when in doubt do not move" can also be useful to minimise the risk of harm.



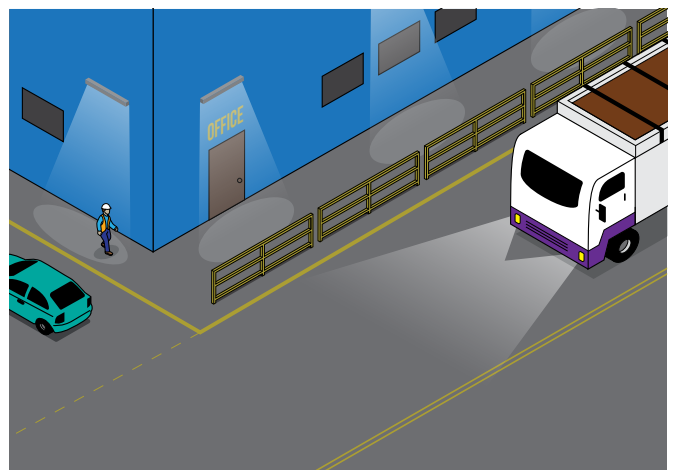
## Lighting

### Overview

Lighting used in poorly lit areas or during night/dawn/dusk working hours can significantly increase visibility for both vehicle operators and pedestrians.

### Options

Automatic low-light activated lights for use in and around the plant can assist the sites visibility and minimise power usage. Lights positioned at specific locations, such as loading area will assist with visibility when working at night and during periods of low lights. Warning lights indicating when specific activities are being undertaken on site or when people or vehicles enter restricted areas can also be used to mitigate risk of interactions.







## APPENDIX – SITE CHECKLIST

SCOPE OF MOVEMENTS	Y/ N	COMMENT
Do pedestrians interact with vehicles on site?		
Do concrete agitators interact with any other vehicle when loading?		
Do concrete agitators interact with any other vehicle when accessing the slump stand?		
Do concrete agitators interact with any other vehicle during wash out and cleaning?		
Is there a separate entrance for different vehicles?		
Do cement tankers and aggregate trucks have a clearly defined unloading space?		
Do cement tanker and aggregate truck drivers need access to the office?		
Is the area in which heavy mobile equipment operated defined and known to other vehicle operators on site?		
Do light vehicles have a separate entrance and parking?		
Is non-routine vehicle entry effectively managed at the site?		

HAZARD IDENTIFICATION	Y/N	ACTION
Do pedestrians have to cross where vehicles pass?		
Are pedestrians at risk of interaction with any form of vehicle?		
Are vehicles at risk of having uncontrolled movements?		
Are traffic movement procedures clear and known to all users?		
Is there a need to restrict certain forms of vehicles, or pedestrians from areas of the plant?		
Is the path for access the office clearly marked and safe for aggregate truck, cement tanker and other delivery truck drivers?		
Do vehicles queue in a way that could create a risk of interaction, for example crossing walkways or restrict the movements of other vehicles?		
Are routes wide enough to separate vehicles and pedestrians?		
Are there high potential interaction points that require a specific control?		
Are pedestrian routes designed so pedestrians will not take short cuts?		
Are contractors and visitors sufficiently inducted and supervised at site?		



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