

Temporary Safety Barriers

WSG 001

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This document provides guidance to practitioners on the use of temporary safety barriers at worksites. Works on roads or road reserves involve many different activities such as construction, plumbing connections, tree planting and pruning, unloading vehicles and repairing roads.

What is a temporary safety barrier?

Temporary safety barriers are installed at worksites along roadways to protect workers from passing traffic and vehicle occupants from hazards within the worksite.

The Worksite Safety - Traffic Management Code of Practice (2010) defines safety barriers as barriers which:

- Physically separate the work area and the travelled way,
- Will inhibit penetration by an out-of-control vehicle; and
- Will have vehicle redirection properties.

What is required by law?

The Occupational Health and Safety Act 2004 requires employers to provide the safest practicable workplace.

The Worksite Safety - Traffic Management Code of Practice 2010 (The Code) and Australian Standard 1742.31 provide practical guidance for different control measures which can be used to provide a safe roadside worksite.

Where a safety barrier is used, it shall meet or exceed the requirements in The Code and Australian Standards 1742.3 and AS/NZS 3845.1:2015.

Temporary safety barriers are an important safety measure discussed in The Code, however, should not be used as the stand alone protection mechanism in respect to traffic management.

The Code outlines various other protection mechanisms that should be used in conjunction, including:

- Temporary speed limits,
- Static and variable message signing,
- High visibility clothing; and
- Temporary traffic lights.

When all protection mechanisms are used in appropriate combination, the worksite will achieve the highest level of safety for workers.

When should I use a safety barrier?

Safety barriers should be used when:

- There is potential for workers or roadwork plant to be struck by passing traffic,
- There is potential for passing traffic to impact hazardous objects or deep excavations within the worksite,
- There is potential for a vehicle to impact a worksite structure and cause collapse,
- The safety risk to pedestrians or cyclists will be increased.

Barriers may be particularly useful in situations where:

- Long term works are being undertaken and physical separation between the worker and the traffic will minimise the risk of injury for both parties,
- It is desirable to keep the speed limit of passing vehicles higher to allow greater traffic volumes to pass the worksite,
- It is not possible to close a lane to provide increased clearance between workers and traffic.

The Worksite Safety - Traffic Management Code of Practice states that "safety barrier protection should be considered where practicable for worksites adjacent to moving traffic".

While an increased clearance to traffic or reduced speed limit will reduce the likelihood of impact, physical separation is preferred to minimise the risk of injury when an incident occurs.

The Code provides general guidance for clearances between traffic and workers, road type and speed limit both with and without a safety barrier installed.

Clearance to Traffic (metres)	Road Type	Worksite Speed Limit (km/h)*	
		Without Safety Barrier	With Safety Barrier
Within 1.2 m	All	40	80*
1.2 m to 3.0 m	Local Traffic Road	60*	Speed limit
	Collector Road or Rural Arterial 'C' Road	60*	Speed limit
	Secondary Road or Rural Arterial 'A' and 'B' Road	40	80*
	Arterial Road (urban area) or Rural 'M' Road	40	80*
3.0 m to 6.0 m	Freeway (urban)	40	80*
	Local Traffic Road	60*	Speed limit
	Collector Road or Rural Arterial 'C' Road	60*	Speed limit

Extract from **Worksite Safety – Traffic Management Code of Practice (2010), Table 5 – Guide to the Selection of Worksite Traffic Management Speed Zones Long Term Works.**

What do safety barriers look like?

Safety barriers may be permanent or temporary and may be made of various materials including concrete, steel and plastic.

VicRoads Road Design Note 06-04 – Accepted Safety Barrier Products contains a list of barrier products accepted for use on Victorian Roads. This list contains both permanent and temporary products as well as longitudinal barriers and end treatments. Where the end of a barrier can be impacted by traffic, an accepted end treatment/terminal is required.

Accepted products have been crash tested with various vehicles in specific configurations. It is crucial to install the barrier as it was crash tested to ensure the product will work as intended. Most products require interconnection and some are pinned to the surface to reduce deflection.

Do different barriers provide different levels of protection?

Yes. There are several different levels to which barrier suppliers may test their product. Essentially, the speed and size of passing vehicles are considered when choosing a test level.

Common test levels adopted for temporary barriers are:

Test Level	Speed used for crash test purposes	Vehicle weight for crash test purposes
TL-1	50 km/h	820 kg & 2000 kg
TL-2	70 km/h	820 kg & 2000 kg
TL-3	100 km/h	820 kg & 2000 kg
TL-4	100 km/h	820 kg & 2000 kg 8000 kg
	80 km/h	

The above crash testing conditions are based on NCHRP Report 350 which includes test levels from TL-1 through to TL-6.

When selecting a safety barrier for use on a road, the road type, speed, vehicle mix, worksite conditions and layout need to match the barrier design and installation requirements.

Temporary Barrier Types

Concrete Longitudinal Barriers



Freestanding concrete barriers typically have less deflection than other freestanding barrier types and require less development length to achieve the desired deflection.

Concrete barrier units can be interconnected.

Barrier ends are considered a rigid hazard for vehicles and must be protected.

Steel Longitudinal Barriers



Freestanding steel barriers will have greater deflection than freestanding concrete, but can be more manageable on site.

Steel barrier units can be pinned to reduce deflection and must be interconnected.

Barrier ends are considered a rigid hazard for vehicles and must be protected.

Plastic Longitudinal Barriers



Freestanding plastic barriers have the greatest deflection.

Plastic barrier units cannot be pinned and must be filled with water to function properly.

To achieve the expected deflection, a minimum development length is required. Vehicle impacts near the terminal will deflect more than specified.

Crash Cushions / Impact Attenuators



Crash cushions must be pinned to the ground surface.

Crash cushions will redirect vehicles from the nose and can be used to shield the worksite

Crash cushions can be attached to longitudinal barriers to eliminate the need for development length and provide the expected deflection from the nose.

Plastic End Terminals



Plastic end terminals protect the longitudinal barrier end but do not shield the worksite.

Plastic end terminals cannot be pinned and must be filled with water to function properly.

Plastic end terminals are gating and will allow a vehicle to pass through when impacted on an angle.

How do temporary safety barriers function?

When an errant vehicle strikes a temporary safety barrier, the barrier acts to redirect the vehicle away from the worksite.

Temporary safety barriers will have some deflection when they are struck; that is to say that at the point of contact the barrier will be pushed, or bend, backwards to some extent. This softens the impact for the vehicle occupants, however may create a hazard for workers or pedestrians close to the back of the safety barrier. This area is known as the “No-Go zone”, in which there should not be any workers or pedestrians.

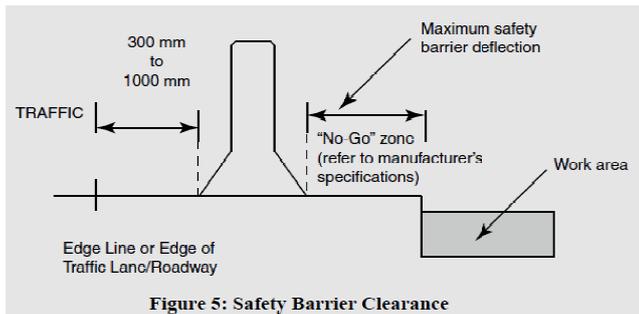


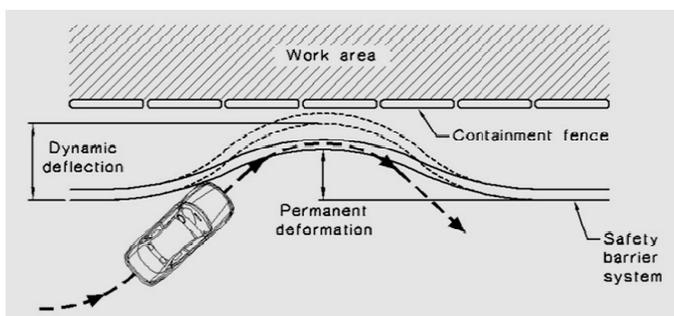
Figure 5: Safety Barrier Clearance

Extract from Worksite Safety – Traffic Management Code of Practice (2010), Figure 5: Safety Barrier Clearance.

Barrier deflection is measured during controlled crash testing and will vary based on the barrier type, total length, number of pins and impact conditions. The effectiveness of a temporary safety barrier is dependent on the system being installed appropriately and the ability to smoothly deflect, because rarely does a real life impact replicate that of a crash test.

When workers or pedestrians may stand close to the back of a barrier, a barrier product that allows for small deflection should be selected. Products that are heavier or can be pinned to the surface will have significantly lower deflection.

In situations where there is a risk of workers, plant or pedestrians encroaching into the “no-go zone”, a Longitudinal Channelising Device (Containment Fence), should be considered to indicate the no go zone.



Extract from AS 1742.3-2009 Part 3: Traffic control for works on roads, Figure 3.5.

How do temporary barrier end treatments function?

End treatments are designed to reduce the severity of a head on impact into the barrier end and will either absorb energy or allow an errant vehicle to pass through (gating). They are not required to redirect vehicles away from the worksite.

Plastic end treatments, for example, will allow an impacting vehicle to pass through the terminal and as such a sufficient “No-Go zone” is critical for the vehicle to stop safely.

What is the difference between a ‘Longitudinal Channelising Device’ and a safety barrier?

A Longitudinal Channelising Device (LCD), also known as a “containment fence”, is simply a barricade that provides a physical and visible separation of a work area or travelled way. It does not provide protection from an errant vehicle and is not able to redirect a vehicle away from the hazard/work area.

LCDs are tested to ensure they are not hazardous when impacted and each unit shall be marked “NOT A SAFETY BARRIER” in letters at least 100mm high.

Unless necessary, plastic safety barriers should not be used as LCDs as they provide a false sense of security for the pedestrian or worker, thinking the device will protect them from an errant vehicle.



The barrier in this photo does not provide redirective capability and can be used as a LCD only.

Who should design and install a safety barrier?

Before commencing any works on a road, the appropriate consent needs to be obtained. The traffic management controls installed at a worksite may need to be agreed by negotiation with the coordinating road authority.

The use of temporary safety barriers on VicRoads declared roads requires a Memorandum of Authorisation (MoA) to be lodged and approved by the relevant VicRoads Regional office.

As a part of the MoA, VicRoads will require a traffic management plan (TMP) to be prepared by a pre-qualified consultant. The TMP shall include the barrier layout which ensures the barrier is designed by a competent person; in accordance with VicRoads detail sheets and the Suppliers' documentation. This is critical in situations where the barrier cannot be designed exactly in accordance with product requirements hence a site specific assessment is required.

The barrier needs to be installed by personnel with suitable experience.

How do I know if the safety barrier is set up correctly?

Safety barriers should be set-up in accordance with the TMP and installed in accordance with the Suppliers manual and/or VicRoads acceptance conditions. Installations that are not in accordance with the TMP, are the responsibility of the installer and/or worksite manager.

Detailed installation instructions can be obtained from the Supplier when a barrier is purchased or hired and VicRoads acceptance conditions can be found on the VicRoads website.

The barrier should:

- Be in good condition;
- Be accepted for use on RDN 06-04;
- Be certified as meeting the test level (TL) needed for the installation (either noted on the barrier or documentation on site confirming compliance);
- Have the required 'no-go zone' behind it (so that if an out-of-control vehicle struck the barrier at the design speed the deflection would not strike workers or pedestrians). This distance varies between barriers;



Deflection of BarrierGuard 800 into the "no-go zone"

- Be interconnected as per the Supplier's instructions (this can include the use of vertical pins and/or wire ropes);
- Contain or exceed the minimum number of interconnected barrier units needed in order to form a safety barrier;
- Be water filled, if required as part of its design;
- Be sited on an appropriate base material (level, compacted, correct surface type, etc. As per the Product

Detail Sheets). Some barrier designs also require the barrier to be connected to the pavement;

- Be properly positioned relative to other obstacles (such as kerb and channel which may make a vehicle launch over a barrier), or excavations;
- Be properly positioned relative to passing traffic. Traffic should not be closer than 300 mm from the barrier (this is extended to one metre in an ideal layout); and
- Have appropriate end treatments installed to protect vehicles in the event of a "head on" collision.

Users are advised that information published by Suppliers (e.g. on their websites or advertising/promotional material) may not always reflect the actual variants accepted or conditions for use. VicRoads RDN 06-04, and information contained within the VicRoads Product Acceptance Conditions and detail sheets shall take precedence over information published by the Supplier.

What if I can't meet the required barrier specifications for my site?

Temporary safety barriers may not perform as intended if designed or installed incorrectly. Whilst non-conforming layouts (e.g. shorter lengths) may be required in certain situations, it is recommended that advice is sought from the product supplier, pre-qualified consultant or other road safety professionals to understand the effect on performance.

There may be situations where a non-conforming barrier layout is preferable to mitigate risk rather than omit the barrier entirely. This decision should be made by a pre-qualified designer and shown on the TMP.

What if my barrier is too short?

When a compromised length of temporary barrier is used, an errant vehicle may miss the barrier and enter the worksite. The barrier may also deflect more than expected when impacted causing the barrier to enter the worksite. The need for a reduced length should be identified in the development of the Traffic Management Plan (TMP) and advice sought before the TMP is finalised. When a reduced length is adopted, other mitigation methods such as reduced speeds, barrier pinning or an increased 'no-go-zone' may help to mitigate effects to barrier performance.

What if my barriers don't interconnect?

In the event of a collision, all of the individual safety barrier units need to be interconnected so that their combined mass is able to smoothly redirect an errant vehicle. If barrier units are not interconnected, the risk of a vehicle entering the worksite or being snagged is greatly increased. The decision to not interconnect barrier units is not condoned.

Currently, all temporary safety barriers approved for use in Victoria shall be interconnected.

What if my plastic barrier is not filled with water?

Plastic safety barriers that are not filled with water, or are installed incorrectly, do not provide sufficient mass to redirect a vehicle and are not considered to be safety barriers. Unless specifically documented on the TMP in conjunction with alternative risk mitigation, this increased risk is not justified and is not condoned.

VicRoads is aware that some systems may require the first unit of the safety barrier to be empty. This would be acceptable.

What if my barrier does not have an approved end treatment?

All temporary barriers currently approved for use in Victoria can be fitted with an approved end treatment. These approved end treatments can be found in VicRoads Road Design Note 06-04.

In the case where a site does not allow enough space or conditions for an approved end treatment, advice should be sought from the product suppliers and other road safety professionals to understand potential performance during an end impact and how to mitigate risk. Mitigation methods such as reduced speeds, bollards, increased offset and delineation may help to reduce the risk of the barrier installation.

Can safety barriers be attached with Worksite Safety Barrier Screens?

Screens are used at worksites to help prevent distraction of construction activities to the travelling public and to protect workers in close proximity from debris.

Worksite safety barrier screens are considered to be an attachment and as such are subject to provisions under AS/NZS 3845 clause 2.3.13. Screens are required to be demonstrated by crash testing or modelling/engineering analysis that they do not create additional hazards and do not modify the performance of the safety barrier system to which it is to be attached.



The screen in this photo shows an example of a worksite safety barrier screen.

VicRoads does not currently maintain a list of accepted worksite safety barrier screens and proprietary screens should

only be adopted by a project with consideration to VicRoads Road Design Note 06-12 – Worksite Safety Barrier Screens.

Worksite safety barrier screens must be assessed on a project-to-project basis, and should not be used based on previous assessments or work site use.

Where can I obtain further information?

Guidance material with references to safety barriers include:

- The Worksite Safety – Traffic Management Code of Practice (2010). Available at: <http://www.gazette.vic.gov.au/gazette/Gazettes2010/GG2010S351.pdf>
- Australian Standard AS 1742.3 Manual of Uniform Traffic Control Devices – Traffic Control for Works on Roads may be purchased from Standards Australia. More details from www.standards.com.au
- Australian Standard AS/NZS 3845.1 Road Safety Barrier Systems and Devices – Road Safety Barrier Systems may be purchased from Standards Australia. More details from www.standards.com.au
- Australian Standard AS/NZS 3845.2 Road Safety Barrier Systems and Devices – Road Safety Devices may be purchased from Standards Australia. More details from www.standards.com.au
- VicRoads Road Design Notes including RDN 06-04 – Accepted Safety Barrier Products and RDN 06-12 – Worksite Safety Barrier Screens Available at: <https://www.vicroads.vic.gov.au/business-and-industry/design-and-management/design-standards-and-manuals/technical-publications-az>
- VicRoads working within the road reserve information including Memorandum of Authorisation forms: <https://www.vicroads.vic.gov.au/business-and-industry/design-and-management/working-within-the-road-reserve>
- WorkSafe SWAT newsletters and bulletins: <http://www.worksafe.vic.gov.au>
- WorkSafe's Advisory Service can be contacted on 1800 136 089. This Advisory Service acts as a central contact point for WorkSafe Victoria services, including assistance with general OHS enquiries and receipt of reports about unsafe worksites.

Appendices

Appendices may be developed and included in future revisions of this document to provide additional guidance on specific worksite types and complex case studies. If you have any comments or suggestions, please provide them to tem@roads.vic.gov.au for consideration in the next revision.