

Worksite Safety Barrier Screens (WSBS)

RDN 06-12 A
March 2017

1. Purpose

This road design note (RDN) provides guidance on the requirements for the provision of Worksite Safety Barrier Screens (WSBS), commonly known as anti-gawking or anti-debris screens installed at worksites on declared roads in Victoria.

Screens are used at worksites to minimise visibility and help prevent distraction of construction activities to the travelling public, to protect workers in close proximity of passing traffic from flying debris and to provide a physical partition between worksite and roadway.

Screens are typically used on high speed roads or where safety barriers are used on heavily trafficked roads (generally volumes higher than 20,000 vehicles per day). Refer Code of Practice Worksite Safety – Traffic Management 2010.

2. Background

VicRoads does not currently maintain a list of accepted worksite safety barrier screens. Proprietary screens should only be adopted or developed by a project with due consideration of this RDN and an engineering assessment as required by AS/NZS 3845.1:2015 being undertaken.

WSBS are considered to be an attachment to a road safety barrier and as such are subject to provisions under AS/NZS 3845.1 Clause 2.5.5. As an attachment, a WSBS shall demonstrate by crash testing or by assessment as a modification that it is suitable. WSBS must not create an additional hazard, nor shall they modify the performance of the safety barrier system to which it is to be attached.

Screens may also be independently located behind the longitudinal barrier (i.e. freestanding), outside the limit of the dynamic deflection and may be combined with a Longitudinal Channelisation Device (LCD). The distance between screen and product shall be determined by a site specific risk assessment that considers the deflection distance. Crash testing of the screen in this circumstance is not required.

If a screen is attached to a safety barrier or is within the dynamic deflection zone or working width, then the conditions of use specified in this note shall be met.

3. Conditions of Use

3.1. Acceptance

VicRoads does not maintain a list of accepted worksite safety barrier screens. As such, it is ultimately the responsibility of the contract superintendent to review the project specific use of WSBS, with due consideration of this RDN, and provide approval for their use.

3.2. General

Desirable characteristics of a worksite safety barrier screen include the following:

- Is of adequate height (minimum 2m above the pavement) and opacity to function as a screen.
- Must have a smooth and visually uncluttered surface of uniform colour.
- All joints must be welded or similarly connected. Mechanical fixings such as pipe clamp, bolted joints, etc. are not to be used.
- Shall not comprise horizontal members that may dislodge and act as a spear.
- Does not adversely affect or alter the performance of the barrier system.
- Will not present an undue risk to workers and other road users during an impact, for example, by spearing/penetrating the vehicle passenger compartment.
- Performs in a predictable manner when impacted and does not shatter or create debris which would become a hazard to workers and/or road users.
- Is resistant to vandalism and vehicle damage.
- Is easy to repair.

- Screens and their supporting structures must be capable of accommodating all environmental loads imposed during normal operating conditions.
- Does not protrude or lean into the vehicle path, especially when subject to wind loading, including the effects of cyclic wind action and buffeting from passing vehicles.
- Considers the need for emergency access, e.g. a form of access gate in the screen.
- No advertising or corporate marketing may be applied to a visibility screen. A single corporate logo as per relevant Government signing guidelines and contract specifications may be applied in the upper right-hand corner of the visibility screen.

3.3. Specific Requirements

3.3.1. Crash Testing / Analysis

“Full scale crash testing provides the most robust evidence of the effectiveness of a modification.” (AS/NZS 3845.1:2015)

Full scale crash testing shall be conducted with the screen attached to the barrier, against the performance requirements of AS/NZS 3845; NCHRP 350 or MASH.

Crash testing and/or other analysis techniques shall demonstrate performance of the screen as per the below requirements:

- That the screen does not compromise the performance of the safety barrier system to which it is to be attached;
- That the screen does not itself pose a hazard when the barrier is impacted;
- Testing and /or analysis that includes the critical vehicle which under most circumstances would be considered to be the capacity vehicle for the relevant test criteria (i.e. MASH, NCHRP 350, etc.). For example, for a NCHRP 350 TL-4 rated barrier, the capacity vehicles would be test designation 4-12 (8000kg);
- Testing and analysis that includes a high centre of gravity vehicle, to effectively demonstrate the performance of the screen and potential interaction or mechanism for failure, in relation to vehicle roll allowance;
- Where the screen is within the vehicle roll allowance, that the screen does not itself pose an additional hazard and any effects on barrier working width are documented. Refer Section 3.3.7 for further guidance regarding working width;

NB: In reality, the type of impact conditions and distribution of vehicles on the road are broader than those used during crash testing. As such, users must recognise that taller vehicles will interact with the screen and any potential risk to workers must be mitigated or controlled.

- Impact tests on the screen attached to the barrier as described below;

Impact tests, with the WSBS attached to the safety barrier, should demonstrate that it will shield the worksite and not pose a hazard if struck by debris. It is VicRoads’ preference that such an impact test would consider the ability to restrain a mass of 100 kg (e.g. a tyre and wheel) at 80 km/h and 10° at critical impact points determined by the supplier. Where a lower energy impact test has been completed, this performance shall be considered during the selection of an appropriate product.

Notwithstanding these requirements, it is expected that worksite safety barrier screens will be independently mounted, i.e. will not be connected together across couplings between barrier units. Gaps between screens need to be minimal.

3.3.2. Horizontal Members

The erection of fencing with horizontal members within the clear zone or in any location where there is the possibility of impaling an impacting vehicle is expressly prohibited. Horizontal members are not permitted due to potential spearing effect they may pose.

3.3.3. Design to be Robust and Durable

Screens should be constructed from materials that are robust and durable. Screens should be demonstrated to be:

- Composed of materials that do not create a hazard, e.g. by shattering or disintegration into sharp edged fragments which would be a hazard to adjacent parties,
- Durable, e.g. are resistant to ignition by cigarettes or similar, or defacement by sharp implements, and
- Resistant to fatigue failure, e.g. due to cyclic wind loading including buffeting from truck movements.
- Rigid materials are not to be used unless it can be demonstrated that such material will not cause injury when impacted.
- Subject to the above, materials used should be appropriate for the design life of the screen.

3.3.4. Stability

Worksite safety barrier screens may destabilise the barrier system to which it is attached. The stability of a screen (and safety barrier) should be considered under all conditions at the worksite including the effect of buffeting by passing vehicles and the height of the screen.

WSBS should be designed to withstand design wind loads in accordance with AS5100.2 including reference to AS1170.2, without toppling, displacing or becoming detached from the barrier system to which it is attached.

3.3.5. Delineation

It is recommended that WSBS do not compromise the capacity of a barrier system to display delineation.

Consideration should be given to reflectivity of screen faces, with particular attention to headlight glare under wet conditions.

3.3.6. Installation and Maintenance

Screens should be maintained, removed or replaced when damaged or deteriorated through prolonged use. Contractors are encouraged to attend to damaged or deteriorated screens as soon as practicable. Any graffiti is to be painted over within 24 hours, or the screen replaced. In this regard, manufacturers should give consideration to ease of handling and installation, and method of removal in an emergency.

3.3.7. Working Width

Working width allows for both the dynamic deflection of the road safety barrier and the extra width to allow for roll of an impacting vehicle.

If a screen is attached to the barrier, it must be attached such that the vehicle would not normally interact with it, i.e. it is located outside the working width. Mounting the screen may affect the working width and this should be evaluated as per the crash testing and analysis requirements of this RDN.

Testing and/or analysis of the barrier and screen combination should carefully consider and document the effects on deflection so that worksites may adjust their work zones to provide the area required for the barrier and screen combination to perform as anticipated.

In addition to allowance for vehicle roll, screens shall be designed such that panels do not fall on any roadway if the barriers are impacted, or behind the barriers within the work area.

3.3.8. Sight Distance

Consideration shall be given to the effect of a screen on all relevant sight distance requirements, including stopping sight distance along the road. Consideration should also be given to the effect of a screen on sight distance of drivers of construction vehicles when entering the traffic stream from the worksite.

References

AS/NZS 3845.1: 2015: Road Safety Barrier Systems
 AS/NZS 5100.2: 2004 Bridge Design, Part 2: Design loads
 AS/NZS 1170.2: 2011 Structural design actions Part 2: Wind actions
 Road Design Note 06-04: Accepted Safety Barrier Products
 VicRoads product detail sheets.
 Roadside Design Guide (AASHTO, 2011)
 Traffic & Road Use Management Manual, 7.5 Anti-gawking Screens, Transport & Main Roads Queensland
 Code of Practice, Worksite Safety – Traffic Management, S351 31 August 2010, Road Management Act 2004.

Approved by



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Road Design Notes are subject to periodic review and may be superseded.

Road Design Note 06-12 – Revision Summary

Issue	Approved	Date	Amendment
06-12	M-RS&T	June2015	Minor change
A	M-SSD	Mar2017	See below
Improved:	Crash testing / Analysis		
Added:	Reference to AS/NZS 3845.1 2015. Acceptance.		
Removed:	Broad reference to anti-gawking		

Examples of Worksite Safety Barrier Screens

The following photographs show a variety of different attempts to provide WSBSs with comments in each case:

Examples of worksite safety barrier screens

*Note: Photos are for illustrative purposes only. Precast Concrete Barriers shown are not accepted for use in Victoria



Product is neat, tidy and effective. Note that vertical alignment is achieved by correct use of stabilising wedges inside the stanchion holes. Reflectivity of panel face may require attention as per section 3.3.5 above.



Product is distracting and poorly presented. Shade cloth solutions rarely result in an effective screen.



Timber panels need to be maintained, especially when installed for longer periods.



Temporary fence panels mounted on PCBs. Horizontal rails constitute a potential spearing hazard and are not permissible.



Temporary fence panels mounted on steel barrier system. It is unlikely that the method of mounting is approved by the barrier manufacturer and could compromise barrier performance. Horizontal rails constitute a potential spearing hazard and are not permissible.



Timber panels erected on PCBs. The vertical cover strips between panels present a potential hazard to road users.