

Temporary Road Safety Barriers on Tight Radii

SBTA 23-002

Preamble

Temporary road safety barriers are tested longitudinally to demonstrate adequate redirective and occupant performance. However, due to real world site conditions, temporary road safety barriers are often required to be deployed around tight curve radii at intersections and access points which is not represented by the crash tested scenario.

This Technical Advice is intended to discuss the likely modified performance and the residual risk that should be considered and understood during temporary barrier installation design.

Audience

- Road agencies
- Road designers.

Commentary

Site Scenario

Temporary road safety barriers are frequently installed around tight radii to accommodate intersections and access points (generally radii under 50 m). Installation on these radii can be managed differently by different systems including, using the available 'play' within the joints between adjacent units, deploying shorter length units, or using bespoke wedges as shown in Figure 1. The deployment of these barriers around tight radii can result in potential impact angles which are well above the tested scenario.

Figure 1: Typical tight radii deployment



Differences to the Crash Tested Scenario

Road safety barriers are not tested on curved alignments, nor are they tested at impact angles greater than 25°. Therefore, there is some uncertainty on how a barrier may behave during a high angle impact and what that might mean for occupant outcomes.

Simulations can be used to better understand barrier performance without undertaking full scale crash testing. Simulations of freestanding barriers undertaken at 60 km/h and impact angles up to 90° have demonstrated that while vehicle containment is likely, occupant risk values are peaked and nearing the maximum thresholds specified in the American Association of State Highway and Transportation Officials (AASHTO) *Manual for Assessing Safety Hardware* (MASH).

Residual Risks

Simulations have demonstrated that impacts greater than 60 km/h on tight radii may result in occupant risk values that exceed the thresholds given in MASH.

As a result of this demonstrated risk, it is noted that the use of tight radii is most suitable for roads with operating speeds less than or equal to 60 km/h. Barrier units should be freestanding and the area immediately behind should be free of any hazards or features that may interfere with barrier performance.

When deployed on roads with higher operating speeds, a risk assessment should be undertaken to clearly establish the need for the use of the tight radii installation and to understand the likelihood of high angle impacts. It is likely that mitigations will be required to ensure the overall net safety benefit is realised. Mitigations may include:

- Adequate lateral offset
- Geometry and sight distance that is adequate for the operating speed
- Delineation of the barrier units if street lighting is not available.

Where the location of a tight radii cannot be managed, a reduction in speed to 60 km/h should be considered to mitigate impact severity.

Recommendation

It is recommended that the deployment of temporary road safety barriers on tight radii is limited to use in environments with an operating speed of 60 km/h or less.

Where deployment in higher operating speed is unavoidable then it shall be purposely considered, and a risk assessment undertaken to identify mitigations to ensure the likelihood and consequence of high angle impacts can be appropriately managed.

References

AASHTO (2016) *Manual for assessing safety hardware*, 2nd edn, American Association of State Highway and Transportation Officials, Washington, DC, USA

Amendment Record

Amendment no.	Amendment	Date
-	New Technical Advice Note	December 2023