

Proximity to W-Beam Barriers to Batter Hinge Point

SBTA 17-002



Preamble

Space in the road corridor is premium. To maximise space for other infrastructure and landscaping, the proximity of the post to the batter hinge point is often reduced during the design process, without evidence or justification through crash testing. Best practice ensures that the vehicle remains on the verge, that there is no damage to the batter following an impact, that the embankment provides adequate support to resist the impact loads, and that adequate space is available to provide a safe space for road workers undertaking maintenance activities.

This Technical Advice provides commentary and work towards a harmonised approach by Road Agencies regarding the proximity of w-beam barriers to batter hinge points.

Audience

- Road agencies
- Installation designers.

Background

Austrroads Safety Barrier Assessment Panel (ASBAP) receives submissions from Proponents seeking closer proximity of w-beam barriers to batter hinge points. ASBAP has provided advice to Proponents indicating that issues such as constructability, performance of the product, impact on posts and space behind batter for workers need to be addressed.

Proximity of posts to batter hinge points is not consistent across Australian and New Zealand Road Agencies because public domain and proprietary products are subject to varying acceptances.

Commentary

The preference is for the distance to the hinge point be sufficient to accommodate the barrier's design deflection and provide adequate lateral support for the system and the errant vehicle.

Where the distance between the adjacent traffic lane and the hinge point is restricted, it may be possible to consider placing the barrier closer to the hinge point rather than changing the width of the shoulder. Moving the barrier closer to the hinge point may have the following effects:

- Increases the risk of the barrier failing if its lateral support is insufficient.
- Reduces the ease of access for maintenance crews to inspect and reconstruct the barrier.
- Increases the risk that an errant vehicle will become unstable on the shoulder or has a less stable redirection.
- Increases the risk of embankment slope damage by an impact and increased repair difficulty.

Moving the barrier closer to the road:

- May increase the number of impacts with the barrier.
- May reduce the opportunity for drivers to stop on the shoulder, clear of the traffic lane, or for other users such as cyclists to use the shoulder.

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These issues affect the barrier's performance, vehicle stability, integrity of footings and embankment slope stability and therefore must be considered to meet jurisdictions' safety in design requirements for safe operation of the network.

Where the distance between the barrier and the embankment hinge point is reduced below the tested deflection due to site constraints, a design exception report that demonstrates acceptable risk in relation to safety performance is required.

The required level of performance of the barrier system should take local jurisdictional requirements into account. The proposed footing or anchorage must be at least equivalent to that used during compliance testing to adequately resist lateral or longitudinal forces in the barrier system as well as post rotation or post pull out. This design may involve the use of other treatments to ensure that there is sufficient lateral support for the barrier system. The design should also consider the soil conditions, especially where barriers are proposed on existing road embankments.

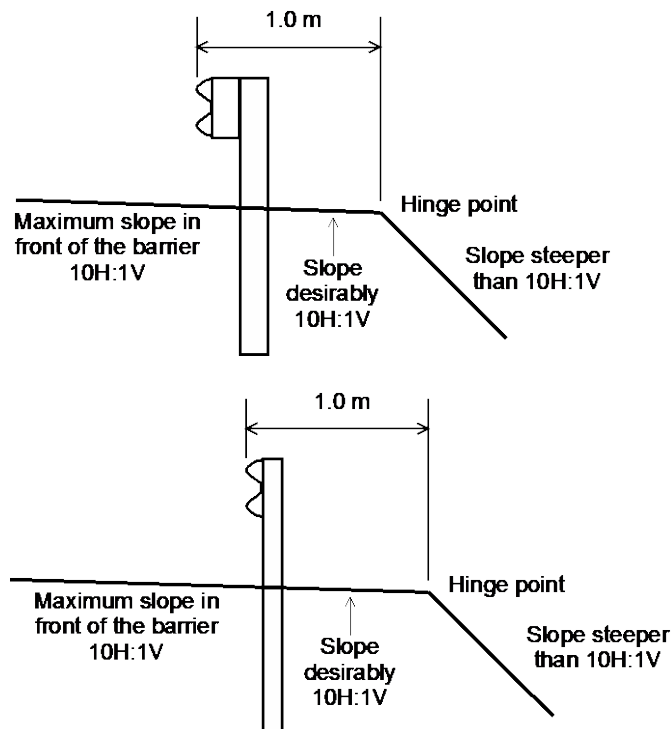
The design exception report should include a risk assessment noting that maintenance of the barrier and the area behind the barrier may be difficult to access and appropriate maintenance procedures should be considered and documented. The report should assess the possibility of an embankment slope being degraded through erosion.

Recommendation

W-beam barriers should be installed with sufficient distance to hinge points that allow a vehicle to remain upright and stable during impact.

For w-beam barriers, with and without a blockout, it is recommended that the face of these barriers should be a minimum of 1.0 m from the hinge point of batters steeper than 10H:1V as shown in Figure 1.

Figure 1: Minimum distance between w-beam safety barrier face and hinge point



In very constrained locations where this cannot be accommodated (e.g. mountainous terrain) specific road safety barrier products have been developed and demonstrated performance through full-scale crash testing. Designers should refer to their jurisdictional acceptances and processes for more information.

Amendment Record

Amendment no.	Amendment	Date
-	New Technical Advice Note	August 2017
1	Wording update and inclusion of mountainous terrain commentary	December 2023
