

Road Environment Safety Update



24

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Wire rope safety barrier crash test

Introduction

Wire Rope Safety Barriers (WRSBs) are non-rigid systems comprising a number of tensioned wire ropes, supported on frangible posts. Upon impact, WRSBs deflect more than other barrier types, resulting in relatively less vehicle damage and occupant injury. WRSBs are more forgiving to vehicle occupants when performing their function of containing and redirecting vehicles which have left the roadway, or travel lane in the case of median application.

In New South Wales, barrier systems need to be assessed in accordance with the Australian/ New Zealand standard AS/NZ 3845 'Road Safety Barrier Systems'. This standard only requires the testing of straight installations even though international design standards specify that the WRSB can be installed on curve radius as low as 200m. However there had been no crash test conducted to assess the effect on the convex side at this curvature.

The RTA has undertaken the first crash test on a section WRSB installed on a 200m radius curve. This Road Environment Safety Update provides results of the WRSB crash test.

Wire rope safety barrier crash test

The world's first WRSB crash test on a 200m radius was conducted by the RTA in September 2003. The test involved a 1600kg test vehicle impacting the convex side of the WRSB at an impact speed of 80km/h and an impact angle of 25°. The test parameters were representative of the 'worse case' conditions for likely crash events on high speed roads. The assessment criteria of Australia/ New Zealand standard AS/NZ 3845 'Road Safety Barrier Systems' test 2-11 were used to evaluate the performance of the barrier.



Figure 1 – Test vehicle positioned at an impact angle of 25° to the convex side of the wire rope safety barrier

Wire Rope Safety Barrier Crash Test

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GM Road Safety Strategy

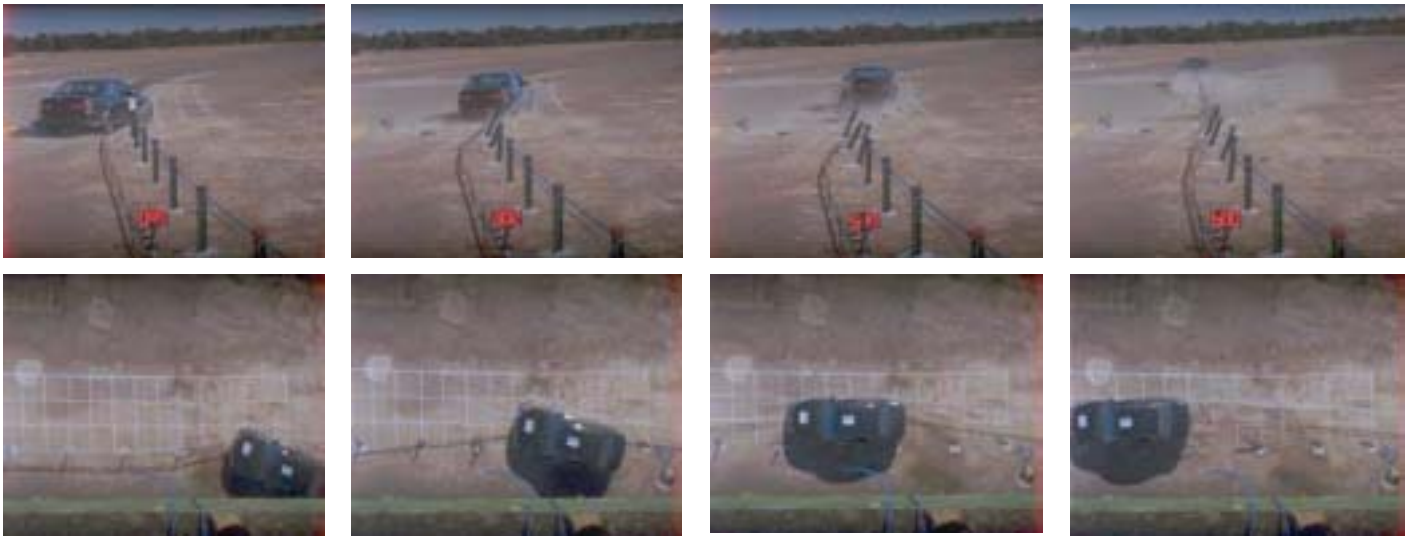


Figure 2 – Wire rope safety barrier crash test on a 200m radius curve

The redirective qualities of the WRSB were successful during the crash test with the WRSB containing and redirecting the test vehicle with minimal occupant risk. In the test, the vehicle was restricted to a 2m envelope and only exceeded a 1m envelope for a period of less than one second. The angle of the vehicle was corrected within 0.5 seconds of impact. The vehicle remained upright during and after the collision. The occupant impact velocity and ridedown accelerations were within the 12m/s and 20g limits as specified in AS/NZ 3845.

After the impact, the test vehicle's trajectory did not intrude into adjacent traffic lanes. The permanent deformation of the WRSB was 0.82m. The detached elements did not show potential for penetrating the occupant compartment or present an undue hazard to other traffic or pedestrians. Under these test conditions, the WRSB met all of the crash test assessment criteria of AS/NZ 3845.

The vehicle damage was restricted to relatively minor panel damage and the occupant space underwent no deformation. The vehicle would have been drivable after the test.



Figure 3 – Test vehicle after crash test

The performance of the WRSB on a 200m radius curve indicates that this device offers valuable safety solutions to crash prone curved road sections where the installation a WRSB might have been previously considered inappropriate.

References

For the design and installation of WRSB, the following references are recommended:

- RTA Road Design Guide Section 6 – Safety Barrier for Roads and Bridges
- Technical Direction TD96/6 – Guidelines for the Application of Wire Rope Safety Barriers

Further design details may be obtained from the Road Design Policy & Standards Manager.



Further information:



Road Safety Design and Management Program Manager Tel: 9218 6405
Road Design Policy & Standards Manager Tel: 8814 2194



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