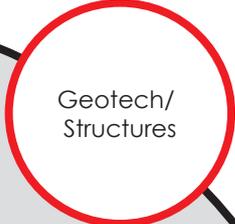




Caltrans Division of Research,
Innovation and System Information

Research



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Project Title:

Compliance Crash Testing of the Caltrans Type 26 Bridge Rail (732SW)

Task Number: 2181

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Crash Testing the Revised Type 26 Bridge Rail

A taller version of the Type 26 pedestrian barrier rail meets crash testing guidelines

WHAT IS THE NEED?

Since 1973, Caltrans has used the Type 26 bridge rail throughout California along routes with pedestrian walkways and posted speed limits of 45 mph or less. The bridge rail is a vertical, reinforced concrete wall on a sidewalk with a steel-tubular pedestrian handrail or chain link fence on top. Over the decades, the Type 26 has functioned well, however it has never been crash tested. A project to assess its crashworthiness was initiated in the early 2000s but redirected to test a higher priority structure. When testing was ready to be restarted, the Federal Highway Administration (FHWA) had released new guidelines, the Manual for Assessing Safety Hardware or MASH 09. Because the Type 26 would likely not meet the more stringent MASH criteria, Caltrans developed a taller and stronger version, called the Type 732SW. The sidewalk is also wider to comply with Americans with Disabilities Act (ADA) requirements. Caltrans then needed to determine whether the Type 732SW met the crash-testing guidelines.

WHAT WAS OUR GOAL?

The goal was to verify the crashworthiness of the Type 732SW bridge rail for use on California highways and local roads.

WHAT DID WE DO?

To test whether the 732SW bridge rail met MASH 09 Test Level 2 for longitudinal barriers, Caltrans built a test section at the Caltrans Dynamic Test Facility in West Sacramento. MASH 09 Test Level 2 consists of two crash tests: an 1,100-kilogram (kg) car at 70 kilometers per hour (km/h) and a 25-degree impact angle, and a 2,270-kg pickup truck at 70 km/h and a 25-degree impact



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angle. All vehicles had standard equipment and front-mounted engines. To ensure that the barrier is strong enough to withstand higher speed impacts, the pickup truck test was conducted at Test Level 3 (100 km/h and a 25-degree impact angle). MASH 09 recommends that crash test performance be assessed according to three factors: structural adequacy, occupant risk, and vehicle trajectory. The researchers video-recorded each crash test and analyzed the data.

WHAT WAS THE OUTCOME?

The results of the Test Level 3 pickup crash test and the Test Level 2 car crash test were within the limits of the MASH 09 guidelines. Occupant risk was acceptable. Damage to the bridge rail was mostly cosmetic, with no structural damage to warrant immediate repair, if any. For all tests, the vehicles were in good condition, free of major body damage and not missing structural parts. The researchers submitted the videos and report to the FHWA for federal-aid eligibility to use the Type 732SW on California highways requiring Test Level 2 bridge rails with pedestrian traffic. FHWA approved the Type 732SW by providing a federal-aid eligibility letter on May 6, 2016.

WHAT IS THE BENEFIT?

The upgraded Type 732SW bridge rail is safer and more crashworthy than its predecessor and is ADA compliant. It meets federal guidelines, making it eligible for federal aid.

LEARN MORE

To view the complete report:
www.dot.ca.gov/research/researchreports/reports/2015/CA15-2181_FinalReport.pdf

IMAGES



IMAGE 1: Type 732SW bridge rail



IMAGE 2: Pickup test impact



IMAGE 3: Close-up of the 732SW barrier after a test