Plans for Crash-Tested Bridge Railings for Longitudinal Wood Decks on Low-Volume Roads

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Abstract

The plans for crashworthy bridge railings for low-volume roads were developed through a cooperative research program involving the USDA Forest Service, Forest Products Laboratory (FPL); the Midwest Roadside Safety Facility, University of Nebraska-Lincoln (MeRSF); and the Forest Service, National Forest System, Engineering. Three railings were developed and successfully tested in accordance with National Cooperative Highway Research Program (NCHRP) Report 350 Test Level 1 requirements. The fourth system was developed for a lower test level based on criteria developed by the Forest Service for single-lane bridges on very low-volume roads. For the convenience of the user, full drawing sets are provided in customary U.S. and S.I. units.

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Plans for Crash-Tested Bridge Railings for Longitudinal Wood Decks on Low-Volume Roads

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Introduction
Since 1989, the USDA Forest Service, Forest Products Laboratory (FPL), and the Midwest Roadside Safety Facility, University of Nebraska-Lincoln (MwRSF) have worked in cooperation to develop crash-tested bridge railings for timber bridge decks. This research originally focused on Performance Level 1 (PL-1) and Performance Level 2 (PL-2) railings as outlined in the AASHTO Guide Specifications for Bridge Railings (AASHTO 1989), but was expanded as a cooperative effort with the Federal Highway Administration (FHWA) to include Test Level 2 (TL-2) and Test Level 4 (TL-4) railings in accordance with Recommended Procedures for the Safety Performance Evaluation of Highway Features (NCHRP Report 350) (Ross and others 1993). Although this research resulted in numerous railing systems for bridges on primary or secondary highways, there were no railings developed specifically for low-volume roads (Ritter and others 1995). Since most timber bridges are located on low-volume roads, the Forest Service, National Forest System, Engineering, identified a need to develop crashworthy timber bridge railings designed specifically for low-volume applications.

These plans reflect the results of a cooperative research project between FPL, MwRSF, and the Forest Service, National Forest System, Engineering, to develop four crashworthy bridge railing designs for low-volume applications. Three of the railings were developed and successfully tested in accordance with NCHRP 350 TL-1 requirements (Ross and others 1993). The fourth system was developed for a lower test level based on criteria developed by the Forest Service for single-lane bridges on very low-volume roads. For the convenience of the user, full drawing sets are provided in customary U.S. and S.I. units.

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Specifications


M111 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
M133 Preservatives and Pressure Treatment Process for Timber
M168 Wood Products
M180 Corrugated Sheet Steel Beams for Highway Guardrail
M232 Zinc Coating (Hot-Dip) on Iron and Steel Hardware


A325 Standard Specification for Structural Steel
A47 Standard Specification for Ferritic Malleable Iron Castings
A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 lbf/in
2 Tensile Strength
A325 Standard Specification for Carbon Steel Bolts, Steel, Heat Treated, 120/105 kips/in
2 Minimum Tensile Strength
A722 Standard Specification for Uncoated, High-Strength Steel Bar for Prestressing Concrete


References


Address comments on these drawings to the Wood Transportation Structures Team, USDA Forest Products Laboratory, One Gifford Pinchot Drive, Madison, WI 53705-2398.

http://www.fpl.fs.fed.us/wit/

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