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

Michael A. Ritter
Ronald K. Faller
Steve Bunnell
Paula D. Hilbrich Lee
Barry T. Rosson



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 (MwRSF); 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

Michael A. Ritter, Research Engineer¹
 Ronald K. Faller, Research Engineer²
 Steve Bunnell, Civil Engineer (retired)³
 Paula D. Hilbrich Lee, General Engineer¹
 Barry T. Rosson, Associate Professor²

¹USDA Forest Service, Forest Products Laboratory

²Midwest Roadside Safety Facility, University of Nebraska-Lincoln

³USDA Forest Service, National Forest System, Engineering

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

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- 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

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- A36 Standard Specification for Structural Steel
- A47 Standard Specification for Ferritic Malleable Iron Castings
- A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 lbs/in² Tensile Strength
- A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 kips/in² Minimum Tensile Strength
- A722 Standard Specification for Uncoated, High-Strength Steel Bar for Prestressing Concrete

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Comments

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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