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Plans for Crash-Tested Wood Bridge Railings for Concrete Decks

Michael A. Ritter
USDA Forest Service


Ronald K. Faller
University of Nebraska - Lincoln, rfaller1@unl.edu

Paula D. Hilbrich Lee
USDA Forest Service

Barry Thomas Rosson
University of Nebraska - Lincoln

Sheila Rimal Duwadi
Federal Highway Administration

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Abstract

As part of a continuing cooperative research between the Midwest Roadside Safety Facility (MwRSF); the USDA Forest Service, Forest Products Laboratory (FPL); and the Federal Highway Administration (FHWA), several crashworthy wood bridge railings and approach railing transitions have been adapted for use on concrete bridge decks. These railings meet testing and evaluation criteria outlined in National Cooperative Research Program (NCHRP) Report 350, *Recommended Procedures for the Safety Performance Evaluation of Highway Features*, and include a glued-laminated timber (glulam) rail, with and without a curb, at Test Level- 2 (TL-2), a glulam rail with curb at TL-4, and a glulam curb rail for low-volume roads at TL-1. In adapting the railings from a wood deck to a concrete deck, the critical consideration was railing attachment to the deck. A comparable connection was obtained by an analysis of maximum loads measured by field instrumentation during crash testing or by equating the ultimate capacity of connections used on the wood deck to those required for a concrete deck. 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 Wood Bridge Railings for Concrete Decks

Michael A. Ritter, Research Engineer¹
 Ronald K. Faller, Research Engineer²
 Paula D. Hilbrich Lee, General Engineer¹
 Barry T. Rosson, Associate Professor²
 Sheila Rimal Duwadi, Research Structural Engineer³

¹USDA Forest Service, Forest Products Laboratory

²Midwest Roadside Safety Facility, University of Nebraska-Lincoln

³Federal Highway Administration, Turner-Fairbank Highway Research Center

Introduction

Cooperative research between the Midwest Roadside Safety Facility (MwRSF); the USDA Forest Service, Forest Products Laboratory (FPL); and the Federal Highway Administration (FHWA) has resulted in the development of several crashworthy bridge railings for wood bridge decks (Faller et al. 1992). These railings involve both wood and steel systems and include crashworthy approach railing transitions. Criteria for evaluation and testing of these railings were originally based on requirements given in National Cooperative Research Program (NCHRP) Report 230, *Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances* (NCHRP 1981). Starting in 1993, criteria were based on NCHRP Report 350, *Recommended Procedures for the Safety Performance Evaluation of Highway Features* (Ross et al. 1993). In accordance with FHWA policy, those railings found acceptable under the NCHRP 230 criteria are also considered as meeting the requirements of NCHRP Report 350 without further testing. Given the success of the wood bridge railing development and crash testing, interest was expressed at the national level to adapt several of the wood bridge railings to concrete decks. These drawings include four railings that meet NCHRP 350 requirements and were adapted for concrete deck use. They include a glued-laminated timber (glulam) rail, with and without a curb, at Test Level 2 (TL-2), a glulam rail with curb at TL-4, and a glulam curb rail for low-volume roads at TL-1. In adapting the railings from a wood deck to a concrete deck, the critical consideration was railing attachment to the deck. A comparable connection was obtained by an analysis of maximum loads measured by field instrumentation during crash testing or by equating the ultimate capacity of connections used on the wood deck to those required for a concrete deck. For the convenience of the user, full drawing sets are provided in customary U.S. and S.I. units.

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 M133 Preservatives and Pressure Treatment Process for Timber
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Comments

Address comments on these drawings to the Wood Transportation Structures Team, Forest Products Laboratory, One Gifford Pinchot Drive, Madison, WI 53705-2398. <http://www.fpl.fs.fed.us/wit/>

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