

12-15-2015

## Dynamic Post Testing Review

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Lechtenberg, Karla A.; Reid, John D.; and Faller, Ronald K., "Dynamic Post Testing Review" (2015). *Civil Engineering Faculty Publications*. 105.

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# MID-AMERICA TRANSPORTATION CENTER

Report # MATC-UNL: 056

Final Report  
WBS:25-1121-0003-056

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## Dynamic Post Testing Review

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2015

A Cooperative Research Project sponsored by  
U.S. Department of Transportation-Research  
and Innovative Technology Administration

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*MATC Research Project Number 25-1121-0003-056*

*NDOR Research Project Number SPR-P1(13)M332*

# **DYNAMIC POST TESTING REVIEW**

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MwRSF Research Report No. TRP-03-328-15

December 15, 2015

## TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. TRP-03-328-15	2.	3. Recipient's Accession No.	
4. Title and Subtitle Dynamic Post Testing Review		5. Report Date December 15, 2015	
		6.	
7. Author(s) Lechtenberg, K.A., Reid, J.D., and Faller, R.K.		8. Performing Organization Report No. TRP-03-328-15	
9. Performing Organization Name and Address Midwest Roadside Safety Facility (MwRSF) Nebraska Transportation Center University of Nebraska-Lincoln 130 Whittier Research Center 2200 Vine Street Lincoln, Nebraska 68583-0853		10. Project/Task/Work Unit No.	
		11. Contract © or Grant (G) No. MATC No. 25-1121-0003-056 NDOR No. SPR-P1(13)M332	
12. Sponsoring Organization Name and Address Nebraska Department of Roads (NDOR) 1500 Nebraska Highway 2 Lincoln, Nebraska 68502  Mid-America Transportation Center (MATC) U.S. Department of Transportation Region VII University Transportation Center University of Nebraska-Lincoln 113 Nebraska Hall Lincoln, Nebraska 68588-0530		13. Type of Report and Period Covered Final Report: 2012 – 2015	
		14. Sponsoring Agency Code	
15. Supplementary Notes Prepared in cooperation with U.S. Department of Transportation, Federal Highway Administration.			
16. Abstract (Limit: 200 words) The objective of this research study was to compile a database of existing dynamic post testing conducted globally and located in many different research reports for use internally during future Midwest Roadside Safety Facility (MwRSF) research studies.			
17. Document Analysis/Descriptors Highway Safety, Crash Test, Roadside Appurtenances, Post, Impact Testing, Bogie Test, Surrogate Vehicle		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Springfield, Virginia 22161	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 15	22. Price

## **DISCLAIMER STATEMENT**

This report was completed with funding in part from the Federal Highway Administration, U.S. Department of Transportation (USDOT). The contents of this report reflect the views and opinions of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Mid-America Transportation Center (MATC) or the Federal Highway Administration (FHWA), U.S. Department of Transportation. This report does not constitute a standard, specification, regulation, product endorsement, or an endorsement of manufacturers.

## **ACKNOWLEDGEMENTS**

The authors wish to acknowledge several sources that made a contribution to this project:

(1) the Mid-America Transportation Center and (2) the Federal Highway Administration, U.S. Department of Transportation.

Acknowledgement is also given to the following individuals who made a contribution to the completion of this research project.

### **Midwest Roadside Safety Facility**

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### **Nebraska Department of Roads**

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John Perry, P.E., Nebraska Division Office  
Danny Briggs, Nebraska Division Office

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## **1 INTRODUCTION**

### **1.1 Background**

The Midwest Roadside Safety Facility (MwRSF) has utilized dynamic post testing during design phases of many projects. The dynamic post testing is located among many different research reports and is presented in different formats. Since previous research and development efforts have proven to be very helpful in other projects, there is a need to compile this extensive amount of data available to allow MwRSF researchers to easily utilize the data in order to compare the performance characteristics of different posts. Thus, creating a database from the existing dynamic post testing data is necessary.

### **1.2 Objective**

The objective of this research study was to compile a database of existing dynamic post testing conducted globally and located in many different research reports for MwRSF use internally during future research studies.

### **1.3 Scope**

The primary research objective was achieved through the completion of several tasks. First, the research effort will begin with a review of previous dynamic post testing conducted globally. During the literature review of dynamic tests, a database will be developed in order to compare the performance characteristics of different post types. Finally, the performance evaluation of the posts will be used during the concept development phase for a short-radius system for intersecting roadways.

## **2 DATABASE CREATION**

### **2.1 Literature Review**

Over 70 reports that contained information on component testing that included a post were reviewed. These reports included those written or published by the researchers of MwRSF as well as reports published by external researchers [1-75].

### **2.2 Database Compilation**

A database was created from the information gathered from the reports. Pull down menus were used within the database for some categories in order to help with consistency of the information reported. The information gathered included:

- General system category
- Publication year
- Report number
- Was a blackout used?
- General material of the post
- Post size
- Post material specification
- Was a soil plate used?
- Impact angle (0 degree = weak axis impact, 90 degree = strong axis impact)
- Type of test
- Test name(s)
- Test year
- Test month(s)
- Foundation type
- Soil type
- Load height in inches and millimeters
- Primary and secondary post lengths in inches and millimeters (primary is the first or only post impacted, secondary is the second post impacted if present)
- Primary and secondary post embedment depths in inches and millimeters (primary is the first or only post impacted, secondary is the second post impacted if present)
- Bogie number
- Accelerometer(s) used – sometimes multiple units were used
- Title of the report
- Names of the report authors
- Keywords (typically taken from the Technical Documentation Page in the report)
- Additional information deemed pertinent from the report
- Reason for testing

- Full-report reference
- Location of the reference within MwRSF

### **2.3 Final Product**

Excerpts from the database are shown in Figures 2 through 2. This database will be a living document that will be updated periodically with new post testing that has occurred both internally at MwRSF and externally at other crash test laboratories.

## Post Testing

Rev. 0 (11-21-13)

Category	Publication Year	TRP	Blockout	Post Material	Post Size	Material Specification	Soil Plate	Impact Angle	Static/Dynamic	Test Names	Test Year	Test Months	Foundation	Soil Type	Load Height in.	Load Height mm	Primary Post Length in.
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade D5-65	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 1D	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 1	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 2D	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 2	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	Douglas Fir Grade 1	No	90°	Dynamic	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade D5-65	No	90°	Static	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 1D	No	90°	Static	NA	1995	Oct	Sleeve	Concrete	24	610	72
Rigid Foundation	1995	TRP-03-60-96	No	Wood	6"x8"	SYP Grade 1	No	90°	Static	NA	1995	Oct	Sleeve	Concrete	24	610	72
Soil	1999	TRP-03-77-98	No	Steel	W6x9	NA	No	90°	Dynamic	Wisc-1-4	1998	May	Soil	350	21.6	549	72
Soil	1999	TRP-03-77-98	No	Steel	W6x16	NA	No	90°	Dynamic	Wisc-5-6, 8-11	1998	June, July, Dec	Soil	350	21.6	549	72
Soil	1999	TRP-03-77-98	No	Steel	W6x16	NA	No	90°	Static	Wisc-7	1998	June	Soil	350	21.6	549	72
Soil	1999	TRP-03-77-98	No	Wood	6"x8"	Southern Yellow Pine	No	90°	Dynamic	Wood-03-09	1998	Nov	Soil	350	21.6	549	72
Soil	1999	TRP-03-77-98	No	Wood	6"x8"	Southern Yellow Pine	No	90°	Static	Wood-01-02	1998	Nov	Soil	350	21.6	549	72
Soil	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	Yes	90°	Dynamic	CPB-1-4	2001	June	Soil	350	27	686	63
Soil	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	Yes	0°	Dynamic	CPB-5-7	2001	June	Soil	350	27	686	63
Soil	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	Yes	90°	Dynamic	CPB-8-9	2001	June	Soil	Native	27	686	63
Soil	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	Yes	0°	Dynamic	CPB-10-11	2001	June	Soil	Native	27	686	63
Rigid Foundation	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	Yes	90°	Dynamic	CPB-12-14	2001	June	Sleeve	Concrete	27	686	63
Rigid Foundation	2002	TRP-03-117-02	No	Steel	S3x7.5	A36 Steel	No	0°	Dynamic	CPB-15-17	2001	June	Sleeve	Concrete	27	686	63

**Figure 2.1. Excerpt from the Post Testing Database, Sheet 1 of 3**

Primary Post Length mm	Secondary Post Length in.	Secondary Post Length mm	Primary Embedment Depth in.	Primary Embedment Depth mm	Secondary Embedment Depth in.	Secondary Embedment Depth mm	Bogie Number	Accelerometers Used	Title	Authors	Key Words
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	38	965	NA	NA	4	NA	<i>Evaluation of the Effect of Wood Quality on W-Beam Guardrail Performance</i>	Rohde, Reid, Sicking	grading, guardrail posts, w-beam, post quality, age, moisture, location, static tests, bogie tests
1829	NA	NA	43	1092	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of Guardrail Posts Embedded in Soil</i>	Coon, Reid, Rohde	Grade B soil, NCHRP 350 strong soil, steel posts, wood posts, guardrail, highway safety, roadside appurtenances, crash test, bogie test
1829	NA	NA	43	1092	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of Guardrail Posts Embedded in Soil</i>	Coon, Reid, Rohde	Grade B soil, NCHRP 350 strong soil, steel posts, wood posts, guardrail, highway safety, roadside appurtenances, crash test, bogie test
1829	NA	NA	43	1092	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of Guardrail Posts Embedded in Soil</i>	Coon, Reid, Rohde	Grade B soil, NCHRP 350 strong soil, steel posts, wood posts, guardrail, highway safety, roadside appurtenances, crash test, bogie test
1829	NA	NA	43	1092	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of Guardrail Posts Embedded in Soil</i>	Coon, Reid, Rohde	Grade B soil, NCHRP 350 strong soil, steel posts, wood posts, guardrail, highway safety, roadside appurtenances, crash test, bogie test
1829	NA	NA	43	1092	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of Guardrail Posts Embedded in Soil</i>	Coon, Reid, Rohde	Grade B soil, NCHRP 350 strong soil, steel posts, wood posts, guardrail, highway safety, roadside appurtenances, crash test, bogie test
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund
1600	NA	NA	30	762	NA	NA	4	EDR-3	<i>Dynamic Impact Testing of S75x8.5 Steel Posts (Cable Guardrail Posts)</i>	Fating, Reid	weak steel posts, three strand cable barrier, bogie test, highway safety, roadside appurtenances, pooled fund

Figure 2.2. Excerpt from the Post Testing Database, Sheet 2 of 3

[illegible]

**Figure 2.3. Excerpt from the Post Testing Database, Sheet 3 of 3**

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