

Second Quarter 2005 Progress Report
Midwest Roadside Safety Facility
Mid-States Regional Pooled Fund
July 25, 2005

YEAR 12

Development of a Guardrail Treatment at Intersecting Roadways-Year 3

After discussion at the April Pooled Fund meeting, a design change was developed to eliminate the trigger mechanism in front of the rail system. Bogie testing of the new anchor system was completed and information regarding the change was distributed to the States and found acceptable to the majority. A full-scale test of the modified system is planned for the third quarter.

Portable Aluminum Work Zone Signs

The bogie testing for this project has been completed. A submission to FHWA seeking approval was sent and received approval. Polivka, K.A., Faller, R.K., Holloway, J.C., and Rohde, J.R., *Safety Performance Evaluation of Minnesota's Low-Height, Temporary Rigid Panel Sign Stand*, Final Report to the Midwest State's Regional Pooled Fund Program, Transportation Research Report No. TRP-03-129-03, Project No. SPR-3(017)-Year 12, Sponsoring Agency Code RFPF-02-04, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, January 23, 2003.

Single-Faced Concrete Barrier

Faller, R.K., Sicking, D.L., Larsen, J., Rohde, J.R., Bielenberg, R.W., and Polivka, K.A., *TL-5 Development of 42- and 51-In. Tall, Single-Faced, F-Shape Concrete Barriers*, Final Report to the Midwest State's Regional Pooled Fund Program, Transportation Research Report No. TRP-03-149-04, Project No. SPR-3(017)-Year 12, Project Code: RFPF-02-04, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, April 30, 2004.

MGS W-Beam to Thrie-Beam Transition Contingency 2000P Test and Additional 820C Test

In response to a recent letter, the pooled fund states have elected to fabricate a 10 gage welded asymmetrical thrie-beam section for full-scale testing. We are currently having this section fabricated and hope to test this MGS transition late in the third quarter.



Three-Strand Cable Median Barrier

After a significant discussion of all of our cable projects currently in the pooled fund, this project has been significantly modified. These changes include a new attachment for the cable to post connection, employing tension to reduce deflections, and to develop anchorage for the tensioned system. During this quarter we have designed and tested a series of alternative post connections and plan to perform dynamic testing during the third quarter. We are also working on design of foundation systems for the tensioned four-cable system. This work represents the completion of the work under this project year. Future work will be funded in Year 14.

Year 13

Generic W-Beam Guardrail with Curb

Polivka, K.A., Faller, R.K., Sicking, D.L., Reid, J.D., Rohde, J.R., Holloway, J.C., Bielenberg, R.W., and Kuipers, B.D., *Development of the Midwest Guardrail System (MGS) for Standard and Reduced Post Spacing and in Combination with Curbs*, Final Report to the Midwest State's Regional Pooled Fund Program, Transportation Research Report No. TRP-03-139-04, Project No. SPR-3(017)-Years 10, and 12-13, Project Code: RPFP-00-02, 02-01, and 03-05, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, September 1, 2004.

Open Railing Mounted on New Jersey Concrete Barrier (2'8")

Currently, there is not additional funding for further development so our plan is to report on the two unsuccessful tests and look for recommendations during the next year's annual meeting.

Evaluation of Rigid Hazards in Zone of Intrusion

The third and final full-scale test in this project, a luminarie pole mounted on the concrete deck behind the barrier was performed on 3/3/05. The interaction of the single axle truck and the luminarie pole were incidental, but maximum intrusion over the barrier occurred before the vehicle reached the pole. All salient criteria were satisfied. In review both TL-3 and TL-4 tests of a luminarie pole mounted on the top of a 32" single slope barrier and behind that same barrier successfully passed full-scale testing with the qualification that the impact condition for the pole mounted behind the rail was not "worst case". A report for this study will be initiated.

Three-Cable Guardrail

Based on responses from the States, we are going to proceed with this test utilizing an offset distance of 48" from a 1.5:1 slope and 4' post spacing.

Non-proprietary Guardrail System – Additional Test

Polivka, K.A., Faller, R.K., Sicking, D.L., Reid, J.D., Rohde, J.R., Holloway, J.C., Bielenberg, R.W., and Kuipers, B.D., *Development of the Midwest Guardrail System (MGS) for Standard and Reduced Post Spacing and in Combination with Curbs*, Final Report to the Midwest State's Regional Pooled Fund Program, Transportation Research Report No. TRP-03-139-04, Project No. SPR-3(017)-Years 10, and 12-13, Project Code: RPFP-00-02, 02-01, and 03-05, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, September 1, 2004.

Kansas Temporary Barrier Redesign and Test

Polivka, K.A., Faller, R.K., Rohde, J.R., Holloway, J.C., Bielenberg, B.W., and Sicking, D.L., *Development and Evaluation of a Tie-Down System for the Redesigned F-shape Concrete Temporary Barrier*, Final Report to the Midwest States Regional Pooled Fund Program, Transportation Report No. TRP-03-134-03, Project No. SPR-03(017)-Year 13, Sponsoring Agency Code RPFP-03-06, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, Lincoln, NE, August 22, 2003.

System for Stiffening New Guardrail System

Polivka, K.A., Faller, R.K., Sicking, D.L., Reid, J.D., Rohde, J.R., Holloway, J.C., Bielenberg, R.W., and Kuipers, B.D., *Development of the Midwest Guardrail System (MGS) for Standard and Reduced Post Spacing and in Combination with Curbs*, Final Report to the Midwest State's Regional Pooled Fund Program, Transportation Research Report No. TRP-03-139-04, Project No. SPR-3(017)-Years 10, and 12-13, Project Code: RPFP-00-02, 02-01, and 03-05, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, September 1, 2004.

YEAR 14

Development of a Four-Strand, High-Performance Cable Barrier

A revised description of this project, based on discussion at the April Pooled Fund Meeting, will be submitted with the Year 16 proposal.

Evaluation of Transverse Culvert Safety Gate

Full-scale testing is anticipated late in the 3rd or early in the 4rd Quarter of 2005. We are currently designing a 20' X 20' culvert grate system which will be tested on a 3:1 slope.

Flare Rates for MGS W-Beam Guardrail

The first full-scale test with a 2000P vehicle was performed on May 24th. The system was constructed at a nominal flare of 13:1. As shown in the sequential photos below, the vehicle was safely redirected with all salient criteria being satisfied. Based on the actual impact angle of the vehicle with the system, and the relatively high velocity of the impacting vehicle, the effective impact severity in this test reflects a system with a flare of approximately 8.4:1. Based on this result, a second test is planned for early in the 3rd Quarter. This second test will utilize a 7:1 flare rate.



Approach Slopes for W-Beam Guardrails Systems

Based on the result of our simulation study and feedback from States we will initially test an MGS system located 5' from travelway on an 8:1 slope. This offset distance was deemed critical during the simulation study, so success at this offset would indicate that locating an MGS system at any distance from the travelway on an 8:1 or flatter slope would be acceptable. This test is anticipated late in the 3rd Quarter. If this test is successful, a steeper slope will be investigated.

Concept Development of a Bridge Pier Protection System for Longitudinal Barrier

The literature review for this project has been completed. We are currently anticipating sending this design to the States for review in the 3rd Quarter. We plan on constructing and testing this system early in the 4th Quarter.

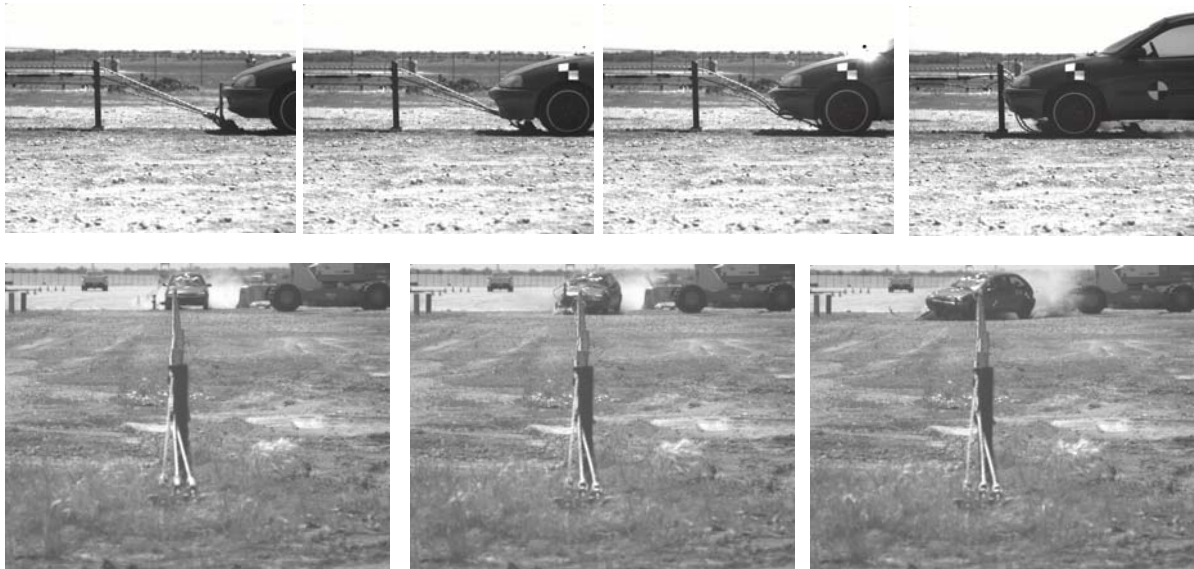
YEAR 15

New TL-5 Median Barrier and Anchor

The literature review for this project is nearing completion. Design and subsequent requests for review from Pooled Fund States is anticipated in the 3rd Quarter.

Retest of the Cable End Terminal

A full-scale test of the modified system was performed on June 8th. This system incorporated the cable release lever utilized on previous systems, but utilized 5 additional slip-base posts downstream of the terminal. As shown below the system performed well, but the car achieved a pretty significant roll angle prior to landing to rest on its tires. All salient criteria were met and test was deemed a pass.



Long Span Design for the MGS Guardrail System

No progress to date.

Midwest Guardrail System on Breakpoint of a 2:1 Slope

No progress to date.