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PROFESSIONAL RECOMMENDATION MEMORANDUM

Project Name: Engineering Support Services and Recommendations for Roadside Safety Issues/Problems for Member States

Sponsor: Roadside Safety Pooled Fund

Task 18-08: Concrete Barrier Height Transition

DATE: March 02, 2021

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Overview/Problem Statement

Transitioning from different concrete barrier heights is sometimes needed in roadside safety barrier systems. Transitioning to different barrier heights requires a sloped top surface between the two different shapes. This sloped surface, if too steep, can result in undesirable crash performance with respect to MASH Test Level 3. The research team has performed a literature search for this topic. The results from the search are as follows.

Midwest Roadside Safety Facility, Research Report No. TRP-03- 208-10, “Development of a Temporary Concrete Barrier to Permanent Concrete Median Barrier Approach Transition” (1) - MwRSF researchers stated in this report, “To prevent vehicle snag and instabilities, changes in barrier heights and/or lateral offsets were transitioned gradually.” Barrier height changes have previously been designed and successfully crash tested with vertical slopes up to 5:1. Based on this research, a height transition of 1.0(V):5.0(H) or flatter is recommended.

Texas A&M Transportation Institute, Roadside Safety Pooled Fund, Research Report No. 405160-34, “Transition Design for Anchored to Rigid Barrier” (2) - The objective of this research was to develop and crash test a transition barrier design that can be used to transition from the pinned-down F-shape temporary concrete barrier placed on concrete to a permanent concrete single slope barrier. The F-shape temporary concrete barrier was anchored to the concrete pavement. The transition was developed to meet MASH Test Level 3 criteria,

using an existing 32-inch tall pinned-down anchored F-shape temporary concrete barrier design connected to a 42-inch tall single slope rigid concrete barrier. A 1.0(V):4.8(V) (10 inches high over 48 inches long) height transition steel bracket was used to transition the 32-inch tall F-shape to the 42-inch tall single slope barrier. In *MASH* Test 3-21, the transition for the anchored temporary concrete barrier placed on concrete transitioning to the rigid single slope concrete barrier contained and redirected the 2270P vehicle. The crash test was performed in the immediate concrete height transition area. The crash test performed on the transition met all the requirements of *MASH* Test 3-21. Photos of the transition are shown in Figure 1. A photo of the transition after *MASH* Test 3-21 was performed is shown in Figure 2.



Figure 1 – Photos of the Height Transition for MASH Test Level 3 (Test 3-21)



Figure 2 – Photos of the Height Transition After MASH Test 3-21

Summary and Recommendations

Based on the search of the literature presented herein, all barrier height transitions (transitions from lower top to taller top barrier heights) should be at approximately 1.0(V):5.0(H) or flatter.

References

1. Wiebelhaus, M.J., Terpsma, R.J., Lechtenberg, K.A., Reid, J.D., Faller, R.K., Bielenberg, R.W., Rhode, J.R., and Sicking, D.L., *Development of a Temporary Concrete Barrier to Permanent Concrete Median Barrier Approach Transition*, Research Report No. TRP-03-208-10, Midwest Roadside Safety Facility, University of Nebraska-Lincoln, Lincoln, Nebraska, July 15, 2010.
2. Sheikh, N.M., Menges, W. L., *Transition Design FOR Pinned-Down Anchored Temporary Barrier to Rigid Concrete Barrier*, Test Report No.: 405160-34-1, Texas A&M Transportation Institute, Roadside Safety Pooled Fund, College Station, Texas, November 2012.