

March 14, 2003

HSA-10/B112

Ronald K. Faller, Ph.D., P.E.
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P.O. Box 880601
Lincoln, NE 68588-0601

Dear Dr. Faller:

In your letter dated October 24, 2002, you requested formal Federal Highway Administration acceptance of a steel strap "tie-down" system designed to limit the deflection of temporary concrete barrier when used on a bridge deck or in other locations where the barrier's normal design deflection would not be tolerable.

The proposed design was tested using a total of sixteen 3.8-m long sections of the Iowa pin and loop F-shape barrier that was formally accepted as an NCHRP Report 350 barrier at test level 3 (TL-3) in Mr. Dwight A. Horne's October 10, 1997 letter (acceptance letter B-41). These barriers were set 305 mm from the outside edge of the simulated bridge deck. The "tie-down" system consisted of a trapezoidal-shaped 6.4-mm thick A36 steel strap at each barrier joint through which the connecting pin between adjacent barrier segments is inserted. This strap, shown in the enclosure to this letter, was then attached to the concrete bridge deck with two 19-mm diameter x 57-mm long ISO Class 8.8 bolts set into 19-mm diameter Red Head drop-in anchors. These anchors were embedded 81mm into the concrete deck. Eleven tie-down straps were used. The test vehicle impacted the barrier 1.2 upstream of the gap between segments 8 and 9. At that point, there were four strap anchors upstream of the impact point and seven anchors downstream. The first three joints upstream of the impact and the last downstream joint were not anchored. Thus, the impact point was approximately 30 m downstream from the approach end of the test installation and approximately 14 m downstream from the first strap anchor

As noted in your August 16, 2002 report entitled "Development of a Tie-down System for Temporary Concrete Barriers", the design was successfully tested to NCHRP Report 350 TL-3. Dynamic deflection of the barrier was 960 mm, with one segment deflected over the edge of the bridge deck and the two adjacent segments partially deflected over the edge. However, the pin and loop connections and the intact tie-down straps along the rest of the barrier segments held the deflected segments in place on the bridge as desired. Two tie-down straps in the immediate impact area were pulled out of the deck and three adjacent straps showed extensive deformation, as did several of the connecting pins and barrier loops. However, none of the barrier pin and loop connections failed. Impacts closer to the unanchored segments at either end of the bridge can be expected to result in larger lateral barrier deflections.

Based on staff review and recommendations, I agree that the tested design satisfies NCHRP Report 350 evaluation criteria at TL-3 and that this design may be used on the

National Highway System to limit the deflection of temporary concrete barriers located on a concrete surface.

Sincerely yours,

(original signed by Michael S. Griffith)

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

Enclosure

Temporary Barrier Tie-Down Strap Concept – ITD-1

