



U.S. Department
of Transportation

**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

April 9, 1996

Refer to: HNG-14

Mr. Roger C. Kellison
President
Kelken Construction Systems
436 Cerrillos Road
Suite A
Santa Fe, New Mexico 87501

Dear Mr. Kellison:

Your March 4 letter to Mr. James H. Hatton requested the Federal Highway Administration's (FHWA) acceptance of a precast concrete F-shape barrier and proprietary anchorage system that attaches the barrier to a bridge deck with grouted, high strength bolts. In support of your request, you referenced a 1988 crash test into a precast New Jersey shaped profile that was similarly anchored. In that test, an 18,000-pound (8000-kilogram) single-unit truck impacted the test barrier at approximately 50 mph (80 km/h) and 15 degrees. The barrier consisted of 15-foot (4750-mm) and 20-foot (6100-mm) lengths of the New Jersey barrier, each having a base width of 19 inches (500 mm) and a height of 34 inches (860 mm). Each segment was bolted to a simulated bridge deck with 1-inch (25-mm) diameter high-strength Kelibond anchors on 2-foot (610-mm) centers, and there was no connection between adjacent segments. This installation met the evaluation criteria for a PL-2 railing, as defined in the 1989 AASHTO "Guide Specifications for Bridge Railings."

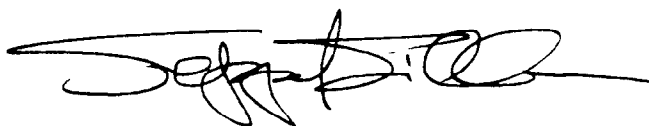
Since the 34.5-inch (880-mm) tall F-shaped barrier for which you requested FHWA acceptance has the same base width as the tested design, 20-foot (6100-mm) long segments, and added reinforcing steel across the joints to provide barrier continuity, we will accept the F-shape shown in Enclosure 1 as a PL-2 barrier (and consequently, as a NCHRP Report 350 Test Level 4 barrier) without additional testing. As requested, we will also accept minor variations in cross section if an analysis similar to the July 1995 analysis by Mr. Maurice E. Bronstad that you included with your request is done to determine if a closer bolt spacing or additional barrier reinforcement is needed. We note that the crash test on the New Jersey shape did not test the open joint between barrier segments. While Mr. Bronstad's analysis indicates the design is adequate, it also shows that the segment ends are the weakest points in the system. Therefore, analysis of changes to the barrier cross section must include a check on the adequacy of the segment ends. In all cases, the bridge deck design must also be checked to ensure that it can carry the dynamic loads resulting from vehicle impacts.

Our acceptance is limited to F-shape concrete barriers that are approximately 34.5 inches (880 mm) high since no tests have been run on the taller 42.5-inch (1080-mm) precast, bolted system for which you also requested acceptance, nor did you include an engineering analysis of the taller barrier. The height of the taller F-shape implies a PL-3 or NCHRP Report 350 Test Level 5 capability and thus a much different loading requirement.

Because your deck anchoring system is proprietary, its use on Federal-aid highway projects, except exempt, non-National Highway System projects, is subject to the conditions set forth in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is Enclosure 2.

A copy of this letter will be sent to FHWA field offices for information. Any questions should be directed to Mr. Richard Powers at (202) 366-1320.

Sincerely yours,



Seppo I. Sillan, Acting Chief,
Federal-Aid and Design Division

2 Enclosures

Federal Highway Administration
HNG-14:RPowers:366-1320:gm:4-5-96:KELLISON
copies to:
HPD-1 HNG-1 HNG-10 HNG-14
Reader, 3128 File, 3128
RAs HFL HHS-10 HSR-20 HNG-20

Supplement to Geometric and Roadside Design Acceptance Letter B-5