



U.S. Department
of Transportation
**Federal Highway
Administration**

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

March 8, 2005

In Reply Refer To: HSA-10/CC-88

Mr. Kaddo Kothmann
President
Road Systems, Incorporated
3616 Howard County Airport Road
Big Spring, Texas 79720

Dear Mr. Kothmann:

On December 20, 2004, you requested Federal Highway Administration (FHWA) acceptance of modified versions of your original Sequential Kinking terminal (SKT), your reduced-length Sequential Kinking Terminal (SKT-LITE), and your Flared Energy Absorbing Terminal (FLEAT). The modifications were needed to match these terminals, which were originally tested as standard W-beam terminals, to the higher Midwest Guardrail System (MGS) which was formally accepted as an National Cooperative Highway Research Program (NCHRP) Report 350 test level 3 (TL-3) barrier on March 1, 2005 (acceptance letter B-133). To verify continued crashworthiness of the new designs, the Midwest Roadside Safety Facility (MwRSF) conducted the following four tests:

- Report 350 test 3-30 with the FLEAT-MGS terminal (Test FLEAT-8)
- Report 350 test 3-31 with the SKT-MGS terminal (Test SMG-1)
- Report 350 test 3-34 with the FLEAT-MGS terminal (Test FLEAT-6)
- Report 350 test 3-35 with the FLEAT-MGS terminal (Test FLEAT-5)

To match the MGS barrier design, similar modifications were made to the original SKT, SKT-LITE, and FLEAT designs. These were the following:

- The nominal height to the top of the rail increases from 700 mm (27-5/8 inches) to 787 mm (31 inches). For the anchor posts 1 and 2, the upright posts are increased to 804-mm (31.65 inches) and 842 mm (33.4 inches), respectively. The stub posts to which posts 1 and 2 are bolted are 1829-mm (72-inches) long and must be driven full-depth to provide adequate anchorage.
- All breakaway posts after posts 1 and 2 can be the same configuration as those originally tested, but are driven only 1019 mm (40 inches) deep to match the increased rail height noted above.



- The initial W-beam rail element is increased in length from 3.81 m (12.5 feet) to 4.79 m (15.625 feet) so all rail splices within the terminals fall at mid-span between adjacent posts as with the MGS barrier proper.
- Non-routed wood spacer blocks throughout the terminal are increased from 203 mm (8 inches) to 305 mm (12 inches), again to match the offset blocks used with the MGS barrier.

The NCHRP Report 350 requires up to seven crash tests to determine the adequacy of a traffic barrier terminal at TL-3. However, since the original designs for attachment to standard W-beam guardrail remain crashworthy, only those tests that are likely to be affected by the design changes noted above are considered necessary. You successfully completed test 3-31 (head-on into the SKT-MGS with the 2000-kg pickup truck) and test 3-35 (20-degree impact with the pickup truck at post 3 with a FLEAT terminal). Also with a FLEAT terminal, you conducted the small car head-on test and the Critical Impact Point (CIP) test. Summary sheets for each of these tests are shown in Enclosure 1 to this letter. English-unit drawings for steel-post versions of each of the tested applications are shown in Enclosure 2. I understand that corresponding drawings for wood-post designs are available from you upon request, as well as metric-unit drawings for each of the design configurations.

The modifications to the SKT and FLEAT terminals described above are acceptable and both terminals remain TL-3 designs that can be used on the National Highway System (NHS) when connected to the MGS barrier. While the barrier itself is non-proprietary, your terminals are proprietary and remain subject to the conditions stated in Title 23, Code of Federal Regulations, Section 635.411 when used on Federal-aid highway projects, except exempt, non-NHS projects.

Sincerely yours,

/Original Signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

2 Enclosures