



August 17, 2007

In Reply Refer To:  
HSSD/SS-153

Mr. Jeff Tumlinson  
International FiberLok  
530 Jesse Street  
Grand Prairie, Texas 75051

Dear Mr. Tumlinson:

In your letters of June 4 and June 20 2007, you requested the Federal Highway Administration (FHWA) acceptance of your company's Fiberglass Sign Support Systems and Bolt Down Breakaway Slip Base Assembly for use on the National Highway System (NHS) under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." To support your request, you provided copies of the Texas Transportation Institute's (TTI) pendulum test reports entitled "Pendulum Testing of the International FiberLok Fiberglass Sign Support System."

### **Requirements**

Sign supports should meet the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features." The FHWA memorandum, "ACTION: Identifying Acceptable Highway Safety Features" of July 25, 1997, provides further guidance on testing requirements of sign supports and outlines procedures for pendulum testing and estimation of high-speed breakaway performance of sign supports from low-speed pendulum test results.

### **Product description**

Three International FiberLok Fiberglass Sign Support Systems were tested.

The 6 inches by 6 inches (152 mm x 152 mm) I-beam system consists of:

- The stub is a 6 inches by 6 inches (152 mm x 152 mm) steel I-beam slipbase.
- The sign support is a 6 inches by 6 inches (152 mm x 152 mm) fiberglass and steel composite I-beam sign support with an International FiberLok Bolt Down Breakaway Slipbase Assembly, standard bolt keeper plate, and the four 5/8 inch (117.5 mm) diameter slipbase bolts tightened to 37 ft-lb (5.1 kg-m).
- A standard 3/8 inch (9.5 mm) fuse plate.

The inclined 3 inches by 3 inches (76 mm x 76 mm) I-beam system consists of:

- The stub is an inclined 3 inches by 3 inches (76 mm x 76 mm) steel I-beam slipbase.
- The sign support is a 3 inches by 3 inches (76 mm x 76 mm) fiberglass and steel composite I-beam sign support with an International FiberLok Bolt Down Breakaway Slipbase Assembly, standard bolt keeper plate, and four 1/2 inch (114.3 mm) diameter slipbase bolts tightened to 37 ft-lb (5.1 kg-m).
- A standard 1/4 inch (6.4 mm) fuse plate.

The International FiberLok Bolt Down Breakaway Slipbase Assembly consists of:

- The stub is an 8 inches by 5 inches (203 mm x 127 mm), 18 lb/ft (26.2 kg/m) steel I-beam slipbase.
- The sign support is an 8 inches by 5 inches (203 mm x 127 mm), 18 lb/ft (26.2 kg/m) steel I-beam with an International FiberLok Bolt Down Breakaway Slipbase Assembly, standard bolt keeper plate, and four 5/8 inch (117.5 mm) diameter slipbase bolts tightened to 37 ft-lb (5.1 kg-m).
- A standard 3/8 inch (9.5 mm) fuse plate.

Sample drawings that show the design details of the International FiberLok Fiberglass Sign Support System and Bolt Down Breakaway Slipbase Assembly are enclosed. It is noted that bracing is added to the composite I-beams at the bottom of the sign support.

### **Test article installations**

The 6 inches by 6 inches (152 mm x 152 mm) I-beam system was installed with 57-1/2 inches by 24 inches by 3/4 inch (1460 mm x 610 mm x 19 mm) steel plated sign panel mounted at 7.6 ft (2.3 m) to the bottom of the sign panel. The 3 inches by 3 inches (76 mm x 76 mm) system was installed with a 48 inches by 48 inches by 5/8 inch (1219 mm x 1219 mm x 16 mm) plywood sign panel mounted at 7.6 ft (2.3 m) to the bottom of the sign panel. Both systems were mounted on a steel reaction plate. The Bolt Down Breakaway Slipbase Assembly with an 8 inch by 5 inch (203 mm x 127 mm) I-beam was installed with a 57 inches by 24 inches by 3/4 inch (1460 mm x 610 mm x 19 mm) steel plated sign panel mounted at 7.6 ft (2.3 m) to the bottom of the sign panel.

### **Testing**

The test article installations were tested at the TTI outdoor pendulum testing facility. The pendulum bogie was built according the specifications of the Federal Outdoor Impact Laboratory's (FOIL) pendulum, and the frontal crush of the aluminum honeycomb nose of the bogie simulated the crush of an actual vehicle. Tests with pendulums are acceptable for most breakaway supports with the exceptions of base bending or yielding supports. I agree that pendulum testing can be used on your company's Sign Support Systems as a surrogate for a full crash testing. In addition, TTI extrapolated the high speed performance from the low speed pendulum tests. I agree that the test articles appear to perform appropriately to make such high speed extrapolations. The high speed extrapolations yield acceptable change in velocity values.

In each of the three tests the supports slipped away from the base as designed and came to rest near the impact location. No damage was noted to the support or the slipbase casting in the test with the 6 inch I-beam system. In the test with the inclined 3 inch I-beam system, no damage was noted to the slipbase stub and there was a vertical hairline fracture on the impact face of the support. Results from testing the Bolt Down Breakaway Slipbase show the support slipped away

from the base as designed. For each of the three tests the entire systems could be reused after the impact. A summary of the test results are enclosed.

Based on the test results, I agree that the International FiberLok Fiberglass Sign Support Systems and the Bolt Down Breakaway Slipbase Assembly as described above meet the appropriate evaluation criteria for NCHRP 350 TL-3 devices. The I-beam sizes tested represent the minimum size acceptable for each mounting type. The maximum size acceptable is limited to the conditions and configurations stated in FHWA's previous acceptance letters, SS-25 and SS-36, addressing standard I-beam sign support sizes utilizing generic slipbases. This FHWA acceptance applies to Fiberlok's steel and fiberglass composite systems but is limited to bi-directional impacts on the Bolt Down Slipbase Assembly and the composite fiberglass system. Also, this FHWA acceptance limits the inclined base systems as crashworthy in one direction. These devices may be used at all appropriate locations on the NHS when selected by the contracting authority, and subject to the provisions of Title 23, Code of Federal Regulations, Section 635.411, as they pertain to proprietary products. This acceptance is based on the reported crash performance of your device and is not meant to address the limitations of testing or the systems' installation, maintenance, or repair characteristics.

### **Standard provisions**

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- This acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others this letter of acceptance designated as number SS-153 shall not be reproduced except in full. This letter and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- The International FiberLok Fiberglass Sign Support System and Bolt Down Breakaway Slipbase Assembly are patented products and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on

relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

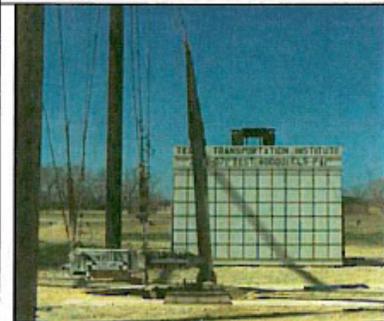
A handwritten signature in blue ink, appearing to read "George E. Rice, Jr.", is positioned above the typed name.

George E. Rice, Jr.  
Acting Director, Office of Safety Design  
Office of Safety

Enclosures



0.000 s



0.040 s



0.080 s



0.120 s

**General Information**

Test Agency..... Texas Transportation Institute  
 Test No. .... 400001-CLS P1  
 Date ..... 03-01-2007

**Test Article**

Type..... Single Slipbase Support  
 Name ..... Fiberlok Steel I-Beam Slipbase Sign Support  
 Installation Height (m)..... 2.1 m (7 ft)  
 Material of Key Element ..... Steel I-Beam

**Soil Type**..... Steel Reaction Plate

**Test Vehicle**

Type..... Bogie  
 Designation..... Pendulum  
 Test Inertia Mass ..... 839 kg

**Impact Conditions**

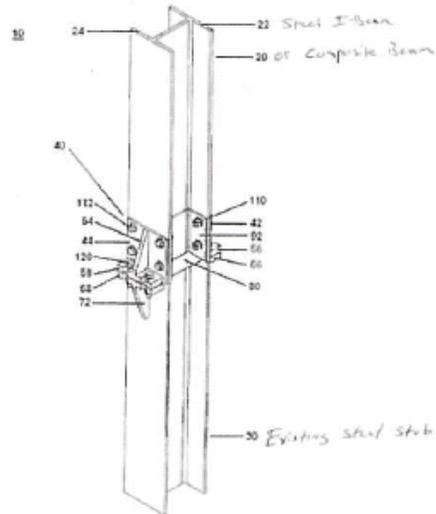
Speed ..... 34.8 km/h  
 Angle ..... 90 deg

**Occupant Risk Values**

Impact Velocity  
 Longitudinal direction..... No contact  
 Ridedown Accelerations  
 Longitudinal direction..... N/A

**Maximum Change in Velocity** ..... 0.9 m/s

**Predicted High-Speed Change in Velocity** ..... 3.3 m/s





0.000 s



0.048 s



0.096 s



0.144 s

**General Information**

Test Agency..... Texas Transportation Institute  
 Test No. .... 400001-CLS P2  
 Date ..... 03-01-2007

**Test Article**

Type..... Single Slipbase Sign Support  
 Name ..... FiberLock Fiberglass Slipbase Sign Support  
 Installation Height (m)..... 2.1 m (7 ft)  
 Material of Key Element ..... Fiberglass I-Beam

Soil Type..... Steel Reaction Plate

**Test Vehicle**

Type..... Bogie  
 Designation..... Pendulum  
 Test Inertia Mass ..... 839 kg

**Impact Conditions**

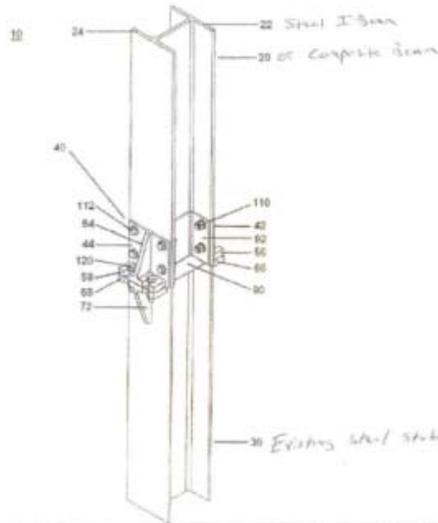
Speed ..... 34.8 km/h  
 Angle ..... 90 deg

**Occupant Risk Values**

Impact Velocity  
 Longitudinal direction..... No Contact  
 Ridedown Accelerations  
 Longitudinal direction..... N/A

Maximum Change in Velocity ..... 0.7 m/s

Predicted High-Speed Change in Velocity ..... 2.6 m/s

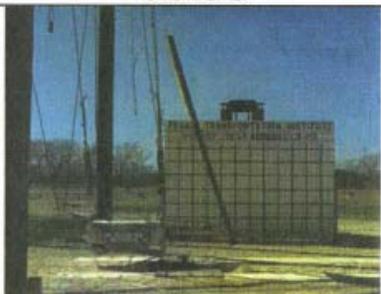




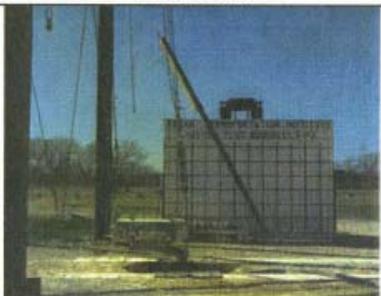
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0.040 s



0.080 s



0.120 s

**General Information**

Test Agency..... Texas Transportation Institute  
 Test No. .... 400001-CLS P3  
 Date ..... 03-01-2007

**Test Article**

Type..... Single Slipbase Sign Support  
 Name ..... FiberLock Slipbase Sign Support  
 Installation Height (m)..... 2.1 m (7 ft)  
 Material of Key Element ..... Fiberglass I-Beam

Soil Type..... Steel Reaction Plate

**Test Vehicle**

Type..... Bogie  
 Designation..... Pendulum  
 Test Inertia Mass ..... 839 kg

**Impact Conditions**

Speed ..... 34.6 km/h  
 Angle ..... 90 deg

**Occupant Risk Values**

Impact Velocity  
 Longitudinal direction..... No occupant contact occurred  
 Ridedown Accelerations  
 Longitudinal direction..... N/A

**Maximum Change in Velocity** ..... 0.7 m/s

**Predicted High-Speed Change in Velocity** ..... 0.6 m/s

