



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

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

December 6, 2005

In Reply Refer To: HSA-10/WZ-212

Mr. Brent Short, President
Flex Safe, Inc.
60 Catherine Street
Boston, Massachusetts 02131

Dear Mr. Short:

Thank you for your letter of April 28, 2005, requesting the Federal Highway Administration (FHWA) acceptance of your company's Flex Safe Barricades as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing conducted by E-TECH Testing Services and video of the tests. You requested that we find these devices acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Introduction

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices are those lightweight devices which are to be self-certified by the vendor, Category II devices are other lightweight devices which need individual crash testing but with reduced instrumentation, Category III devices are barriers and other fixed or heavy devices also needing crash testing with normal instrumentation, and Category IV devices are trailer mounted lighted signs, arrow panels, etc. for which crash testing requirements have not yet been established. The second guidance memorandum was issued on August 28, 1998, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This later memorandum lists devices that are acceptable under Categories I, II, and III.

A brief description of the devices follows:

The Flex-Safe Barricade consists of a carbon steel tubing linkage that unfolds into an A-frame like barricade. It supports a nylon "messaging" banner which extends lengthwise across the top of the barricade at a nominal height of 900 mm. The barricade linkage is made from 22 mm diameter 22 ga (0.760 mm) SAE08 welded carbon steel tubing which is powder coat painted. The linkage is fastened together with 1/4" – 20 (6.4 mm) SAEJ1061 ASTM 788 zinc-plated carbon steel fasteners and extend out to a nominal width of 2.2 m. Stamped carbon



steel spreader hinges (galvanized 3.17 mm x 19.05 mm x 457.2 mm) at each end of the linkage lock the barricade in the extended position. A set of folding auxiliary “guide rails” comprised of 19 mm schedule 40 PVC pipe are snap fitted to the top and bottom of the barricade to complete the assembly. Each barricade has a mass of 8.2 kg.

Testing

Full-scale automobile testing was conducted on your company’s devices. Two stand-alone examples of the device were tested in tandem, one head-on and the next placed six meters downstream turned at 90 degrees, as called for in our guidance memoranda.

The tests are summarized in the table below.

NCHRP Report 350 Test 3-71		
Test Number	57-0264-001	
Sign Stand Tested	Head-on	End-on
Weight of Tested Stand	8.2 kg	8.2 kg
Mounting heights	900 mm	900 mm
Flags? Lights?	None	none
Mass of Test Vehicle	838 kg	
Impact Speed	103.2 km/hr	101.1 km/hr
Velocity Change	0.58 m/sec	
Extent of contact	Debris rode up windshield	Debris rode up windshield
Windshield Damage	None	None
Other notes	No damage to vehicle	No damage to vehicle

Upon impact the barricade broke up harmlessly with portions going up the windshield and passing over the car without causing any damage.

Findings

The results of the testing met the FHWA requirements and, therefore, the devices described in the various requests above and detailed in the enclosed drawings are acceptable for use on the NHS under the range of conditions tested, when proposed by a State. Additional evaluation and/or crash testing will be required should you wish the FHWA acceptance for your barricades when they are linked together to form a longitudinal channelizing barricade. We expect that the safety performance will be satisfactory from the standpoint of the occupants of the errant vehicle, but the deflection and “whipping” effect of unsecured barrier ends.

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

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, or 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 WZ-212 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 Flex-Safe Barricade is a patented device and is considered "proprietary." The use of proprietary work zone traffic control devices in Federal-aid projects is generally of a temporary nature. They are *selected by the contractor* for use as needed and removed upon completion of the project. Under such conditions they can be presumed to meet requirement "a" given below for the use of proprietary products on Federal-aid projects. On the other hand, if proprietary devices are *specified by a highway agency* for use on Federal-aid 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 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, a copy of which is enclosed.
- 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,

/original signed by/

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

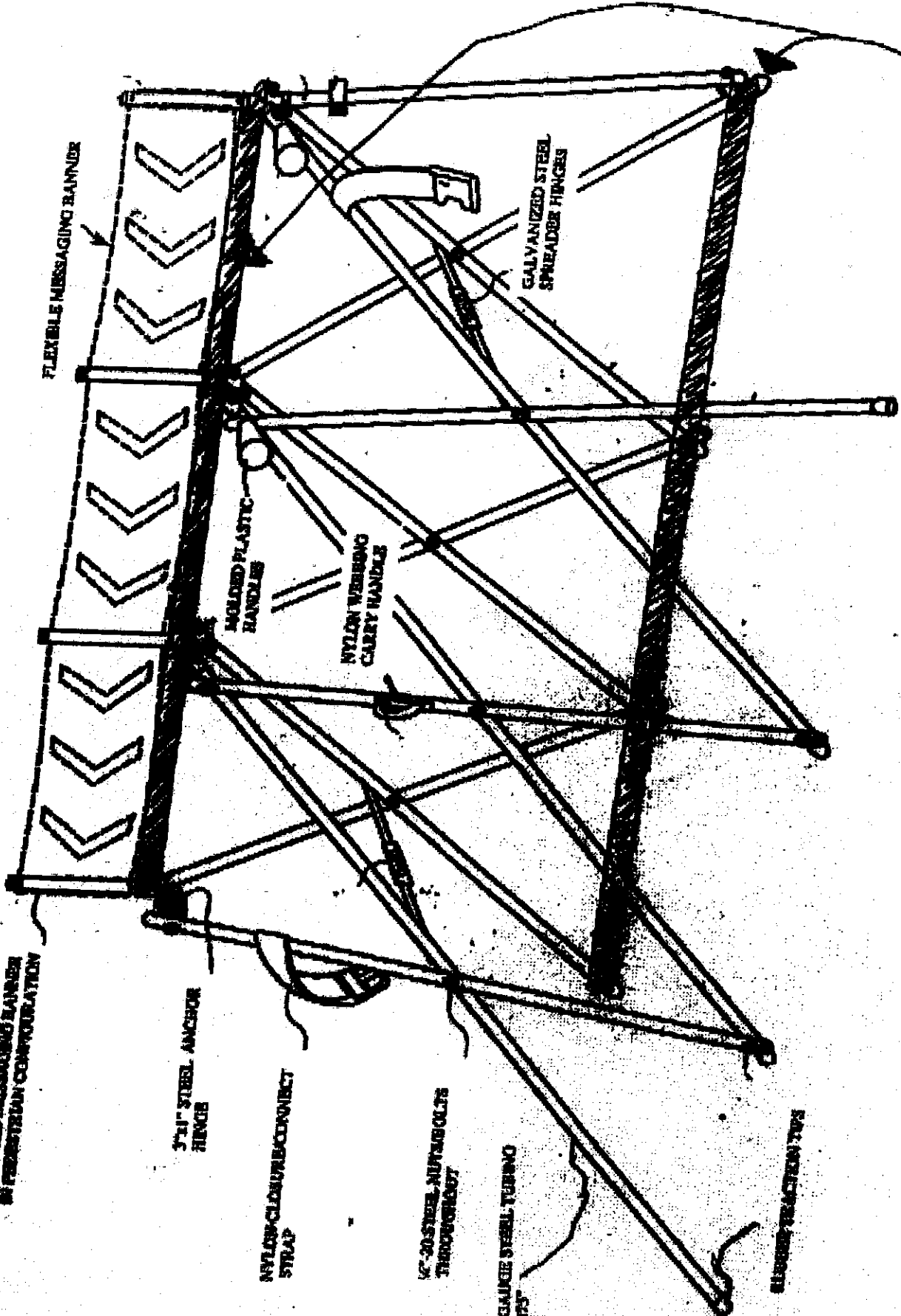
Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:11/29/05

File: h://directory folder/artimovich/WZ212-FlexSafetyFin.doc

cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N.Artimovich, HSA-10)

100 LB STEEL POSTS FOR
SUPPORTING MESSAGING BANNER
IN FERRITINUM CONSTRUCTION



FLEXIBLE MESSAGING BANNER

MOLDED PLASTIC
HANDLES

NYLON WEBBING
CARRY HANDLE

GALVANIZED STEEL
SPREADER HINGES

5/8\"/>

NYLON CLOSURE CONNECT
STRAP

1/2\"/>

LIGHT-GAUGE STEEL TUBING
4\"/>

FLARED TUBING TOP

TWO OPTIONAL 2\"/>