U.S. Department
of Transportation
Federal Highway
Administration

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

December 1, 2004

In Reply Refer To: HSA-10/WZ-195

Dr. Ron Faller, Research Assistant Professor
Midwest Roadside Safety Facility
University of Nebraska – Lincoln
527 Nebraska Hall
P.O. Box 880529
Lincoln, Nebraska 06588-0529

Dear Dr. Faller:

Thank you for your letter of October 22, 2004, requesting Federal Highway Administration's (FHWA) acceptance of the Intellistrobe Portable Traffic Control Signal System as a crashworthy traffic control device for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing you conducted, and video of the tests. You requested that we find these devices acceptable for use on the NHS under the provisions of 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 device follows:

The device's base is Grade 3003 aluminum and measures 36.25 inches tall by 12 inches deep and 16 inches wide. The wall thickness is 0.0875 inch. Hinged, extendable legs are used to level the device and to provide stability. The upper portion of the aluminum legs is 1.5 inches square and 24 inches long. The lower part is steel and measures 1.0 inches square and 16.5 inches long.

The vertical upright support is 2.0 inch square, Grade 3003 aluminum tubing with 0.125 inch wall thickness. It is 12 inches long and is welded to the base unit. The vertical mast is 1.5 inch square Grade 3003 aluminum tubing with 0.125 inch wall thickness. It slides inside the 2.0 inch support and is fastened in place with a 3.0 inch long keeper pin. The signal head assembly is a plastic case housing two 12-inch diameter LED lamps.

The height to the top of the signal base is 37.25 inches, and the height to the top of the signal head is approximately 135 inches. The weight of the base plus battery is 93 pounds while the mast with signal head weighs 19 pounds.

Testing

Bogie testing was conducted on the Intellistrobe devices, with one system being struck in each impact.

The tests are summarized in the table below:

	Intellistrobe portable traffic control signal system		
Test Number	IS-2	IS-3	IS-5
Version Tested	Initial	Initial	Redesigned
Orientation	End on	Head on	Head on
Mounting heights – to top	135 in	135 in	134.5 in
Weight of Tested Stand	112 pounds	112 pounds	120 pounds
Mass of Bogie	2467 pounds		
Impact Speed	98.0 km/hr	99.3 km/hr	100.7 km/hr
Velocity Change	1.2 m/s	1.2 m/s	1.3 m/s
Extent of contact	None in windshield area	Portion of leg impacted windshield	None in the windshield area
Other notes	Acceptable performance	Windshield contact led to redesign	Acceptable performance

This crash-testing program used a hard-nosed bogie vehicle of a mass larger than the standard 820C test vehicle. There are significant constraints involved in using such a non-standard testing device, some of which are:

1. The potential vehicle velocity change must be considered insignificant.
2. The crush characteristics of an automobile bumper must not be expected to have a significant affect on the trajectory of the test article.
3. The profile of the bogie vehicle must be configured to replicate the outline of a production vehicle. The MwRSF bogie was configured to replicate the outline of a Geo Metro, a vehicle commonly used in testing of work zone devices.
4. No part of the test article may intrude into the windshield area of the vehicle after impact.

In the present testing, test IS-3 resulted in a portion of a leg break loose and contacting the windshield area of the bogie vehicle. Upon redesign of the leg attachment and running of a retest, test IS-5, the device performed satisfactorily as the legs remained attached to the base cabinet.

Findings
The results of the testing met the FHWA requirements and, therefore, the portable traffic control device described above and detailed in the enclosed drawings is acceptable for use on the NHS under the range of conditions tested, when proposed by a State.

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

- Our 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 WZ-195 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 Intellistrobe portable traffic control signal 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. These provisions do not apply to exempt non-NHS projects. 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,

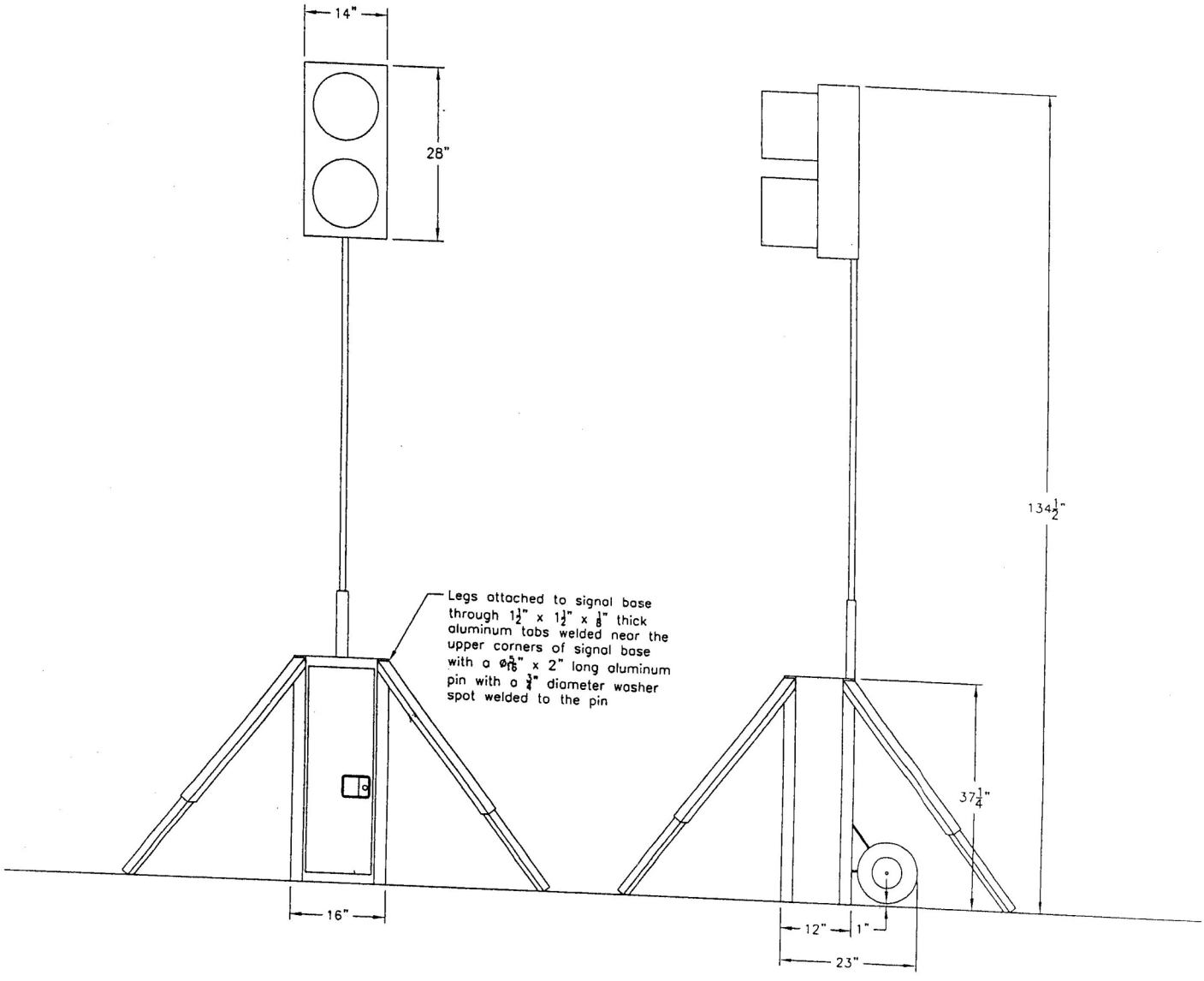
/Original Signed by H. Kalla/

~for~

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

Enclosures

FHWA:HSA-10:NArtimovich:tb:x61331:11/29/04
File: h://directory folder/artimovich/WZ195-IntellistrobeFIN
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N.Artimovich, HSA-10)


14"
28"
Legs attached to signal base through 1½" x 1½" x ⅛" thick aluminum tabs welded near the upper corners of signal base with a ø⅜" x 2" long aluminum pin with a ¾" diameter washer spot welded to the pin
16"
134½"
37¼"
12"
1"
23"