



US Department
of Transportation
**Federal Highway
Administration**

June 28, 2000

400 Seventh St. s w
Washington, D C 20590

Refer to: HSA-1

Mr. Paul Lang
Lang Products International, Inc.
1870 E. 50th Street
Inver Grove Heights, MN 55077

Dear Mr. Lang:

Thank-you for your letter of December 21, 1999, requesting Federal Highway Administration acceptance of your company's portable sign stands as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a report from the Midwest Roadside Safety Facility (MWRSF) and videos of the crash tests. You requested that we find the tested devices acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." You also requested acceptance of a "36-inch" version of the stands. Significant additional information was provided by the MWRSF on March 3 1,2000.

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 were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. 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.

Enclosure 1 is a list enumerating the various devices for which you are requesting acceptance. Enclosure 2 consists of drawings of each of these devices, and Enclosure 3 summarizes the crash tests conducted. Systems you had tested were various portable sign stands of steel and fiberglass construction. Details of the sign stands are in the enclosures.

The following devices were tested with successful results:

System No. 1. A rigid mounted portable sign support with a 1219-mm x 1219-mm vinyl sign mounted at a height of 476 mm from the ground to the bottom of the sign panel and with no flags mounted to the top of the sign.

System No. 2. A rigid mounted “heavy duty” portable sign support with a 1219 mm x 1219 mm vinyl sign mounted at a height of 476 mm from the ground to the bottom of the sign panel and with no flags mounted to the top of the sign.

System No. 3. A rigid mounted portable sign support with a 1219 mm x 1219 mm vinyl sign mounted at a height of 476 mm from the ground to the bottom of the sign panel and with two fiberglass-stuffed flags mounted at a height of 2191 mm from the ground to the top of the sign.

System No. 4. A rigid mounted “heavy duty” portable sign support with a 1219 mm x 1219 mm vinyl sign mounted at a height of 476 mm from the ground to the bottom of the sign panel and with two fiberglass-stuffed flags mounted at a height of 2200 mm from the ground to the top of the sign.

The Basic 48 and the CrossWind 204-HD sign stands were tested only in the head-on impact condition because it was believed to be the worst case scenario. These sign support systems were configured with 7.76 mm thick horizontal fiberglass members, used a short tubular upright member, and had the bottom of the sign panel positioned approximately 450 to 480 mm above the ground. Tests of similar sign stands with sign heights ranging between 300 mm to 350 mm have not demonstrated any problems during the go-degree impacts. Also, testing of sign stand systems with low mounting heights and short uprights have not exhibited the potential for windshield penetration by the horizontal fiberglass member.

During testing, damage to the vehicle was limited to cosmetic damage to the front bumper and hood, and one dent to the roof. The test articles did not show potential for penetrating the occupant compartment. The results of this testing met the FHWA requirements and, therefore, the devices listed in Enclosure 1 are acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State.

The “CrossWind” model 606-EHD portable sign stand is also manufactured by Lang Products International. The legs are 32 mm square steel tubing, 3 mm thick and each is 1830 mm long. When fully deployed the four legs create an X-footprint that is 1356 mm wide and 2154 mm long. The four legs are secured by spring-loaded lock pins and 13 mm hardware. The brackets that join the legs at the base are made of 6 mm thick steel plates. A 1200 mm x 1200 mm vinyl roll-up sign panel was mounted to the support at an extended mounting height of 1520 mm from the ground to the bottom of the sign panel. The crash test was conducted by the Texas Transportation Institute and is summarized in our memorandum “Crashworthy Work Zone Traffic Control Devices - Pooled-Fund Study” dated June 6, 2000, and designated WZ-40. That memorandum also found the Crosswind 606-EHD acceptable for use.

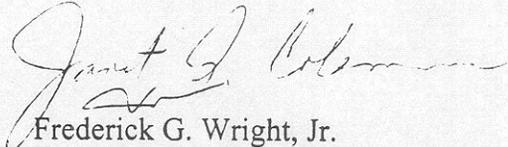
Please note the following standard provisions which apply to FHWA letters of acceptance:

- * 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 FHWA and NCHRP Report 350. A quality assurance program, developed to suit your needs, is necessary to do this.
- * To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-37, shall not be reproduced except in full.

Lang Products portable sign stands are patented products and 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 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 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.

Sincerely yours,



Frederick G. Wright, Jr.
Program Manager, Safety

4 Enclosures

FHWA:NArtimovich:db:x61331:6/20/00
cc: Reader - HSA-1, Chron File - HSA-1
NArtimovich - HSA-1
langmay00.wpd

Device	Test	System	Orientation	Legs	Base (all are steel)	Mast	Horiz. Spreader	Flags
Basic 48 stand with WF48-SB sign	L-1	1	Head On	Rigid Steel 14 ga	465-mm steel support rigidly attached	Fiberglass 9.50 mm	Fiberglass 4.75 mm	None
CrossWind 204-HD with WF48-SB sign	L-1	2	Head On	Rigid Steel 14 ga	490-mm steel support pivotally attached	Fiberglass 9.50 mm	Fiberglass 4.75 mm	None
Basic 48 stand with WF48-SB sign & flags	L-2	3	Head On	Rigid Steel 14 ga	465-mm steel support rigidly attached	Fiberglass 9.50 mm	Fiberglass 4.75 mm	3.20 mm Fiberglass Staff
Crosswind 204-HD with WF48-SB sign & flags	L-2	4	Head On	Rigid Steel 14 ga	490-mm steel support pivotally attached	Fiberglass 9.50 mm	Fiberglass 4.75 mm	3.20 mm Fiberglass Staff

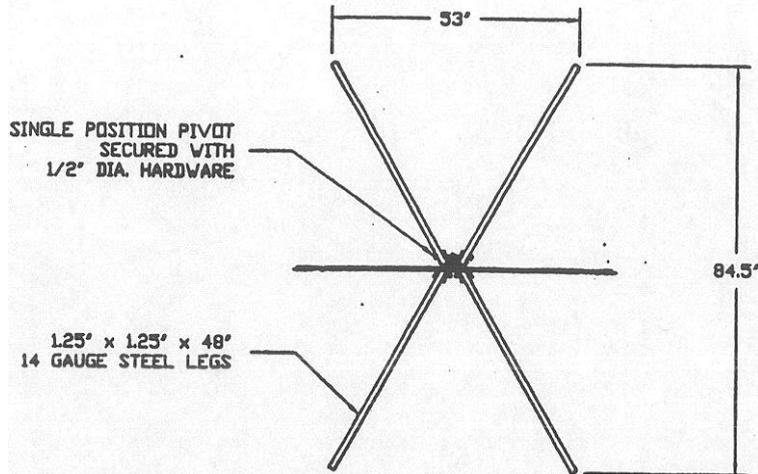
NOTES to Enclosure 1, Please refer to the individual drawings for the details of each device

SIGN: All sign panels were vinyl “roll-up” material. Details are on enclosed drawings.

LEGS: All legs are of square tubular steel. Rigid legs are 3 1.75 mm square.

MAST: “Fiberglass” is a flexible fiberglass piece approx. 31 mm wide, of thickness as noted.

FLAGS: Two 460-mm square vinyl flags on 1321-mm long fiberglass staffs, width as noted.



BasicTM 48 stand and
WF48-SB sign
without a flag system

Note: 1 inch = 25.4 mm

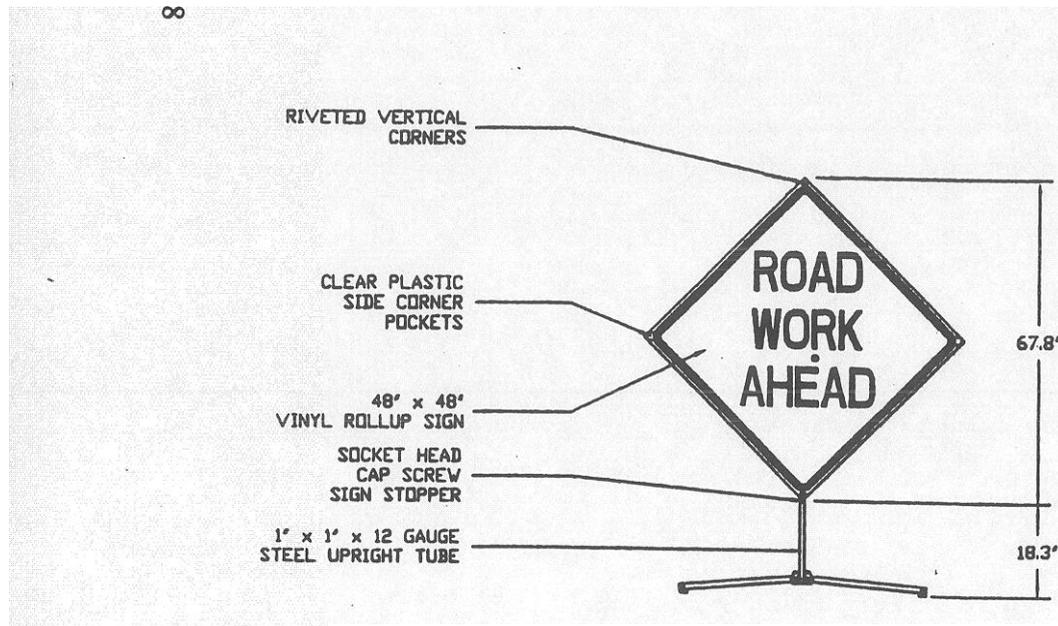
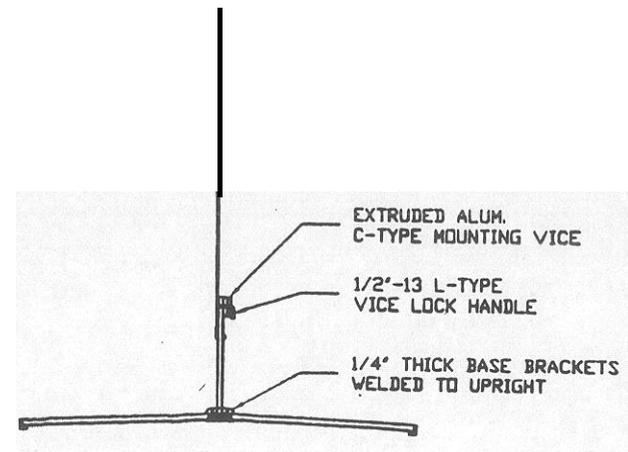
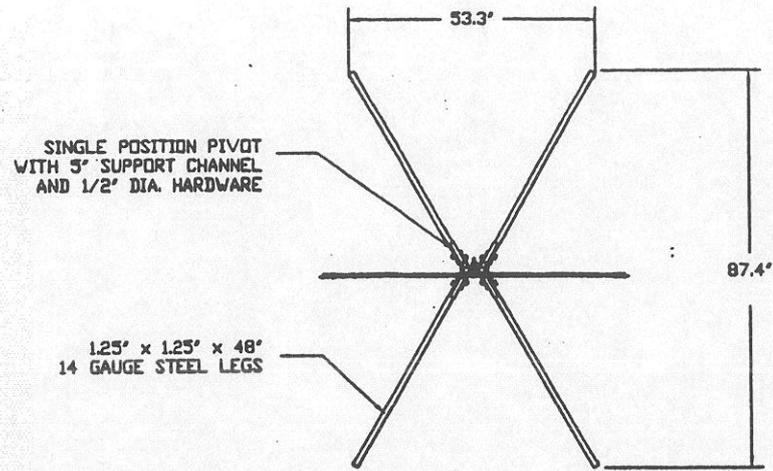


Figure 1. System No. 1 Sign Support Details, Test L-1





CrossWind™ 204-HD stand and WF48-SB sign, without a flag system

Note: 1 inch = 25.4 mm

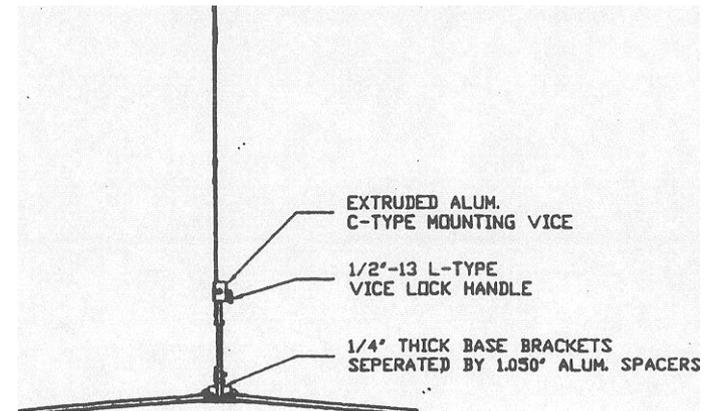
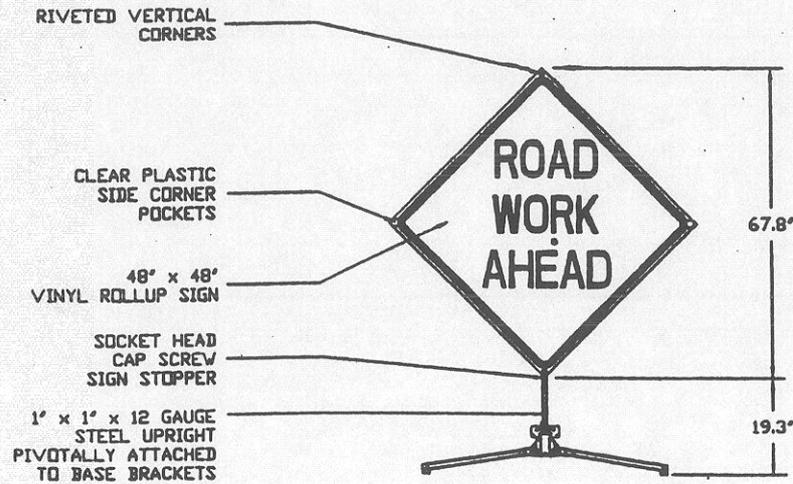
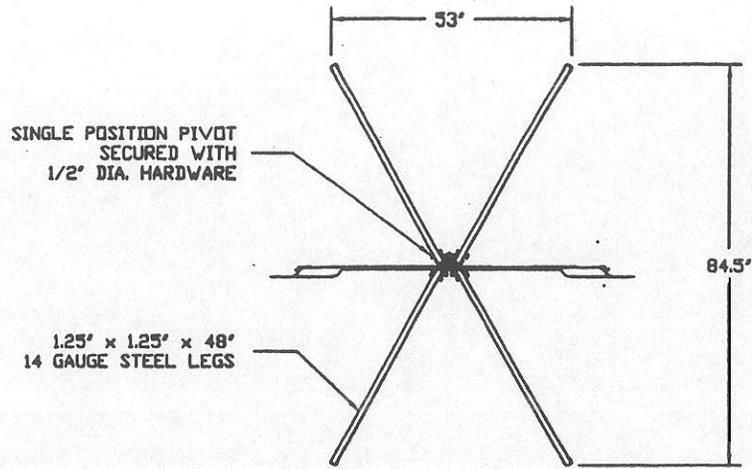


Figure 3. System No. 2 Sign Support Details, Test L-1



Basic 48 stand and
WF48-SB sign with
SnapFlag™ Dual
Warning Flag system

Note: 1 inch = 25.4 mm

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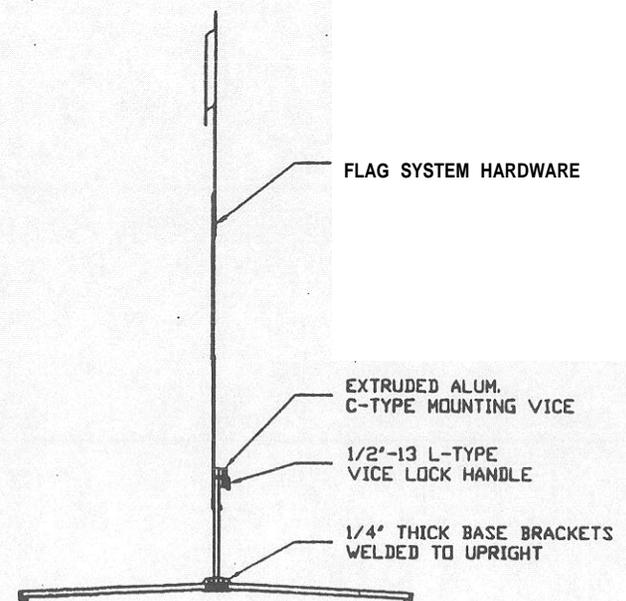
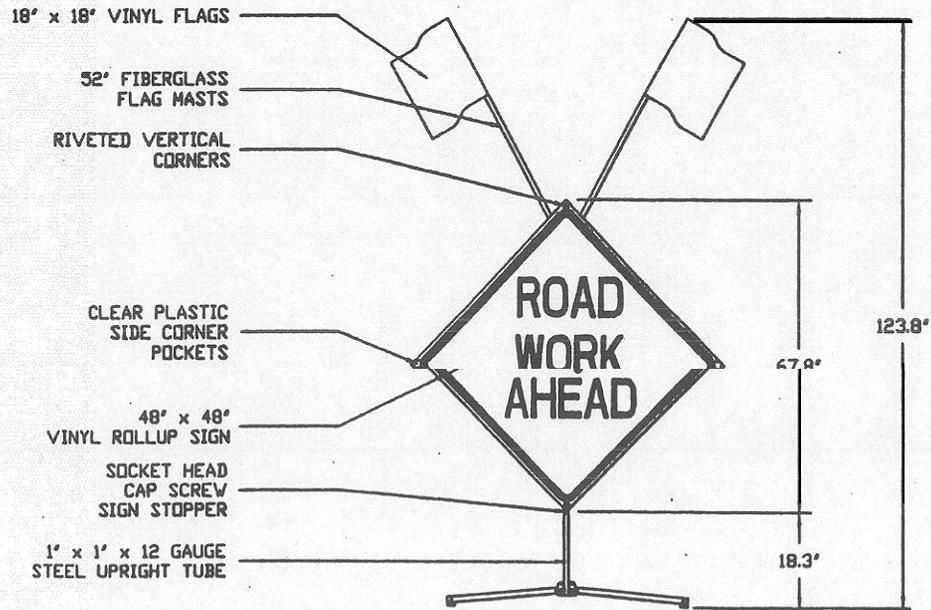
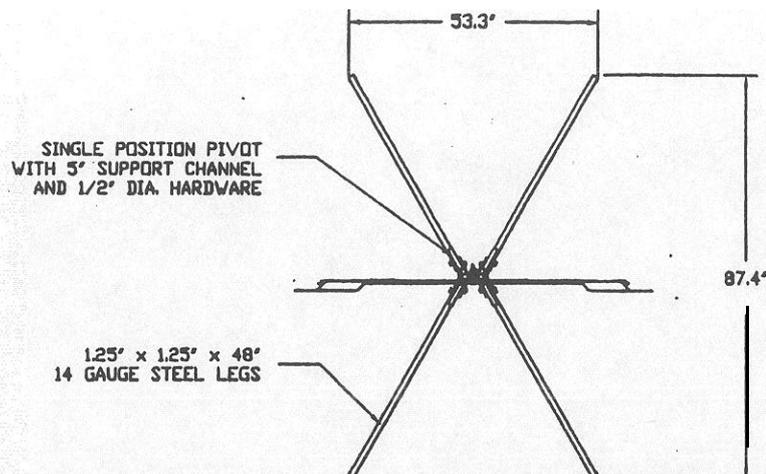
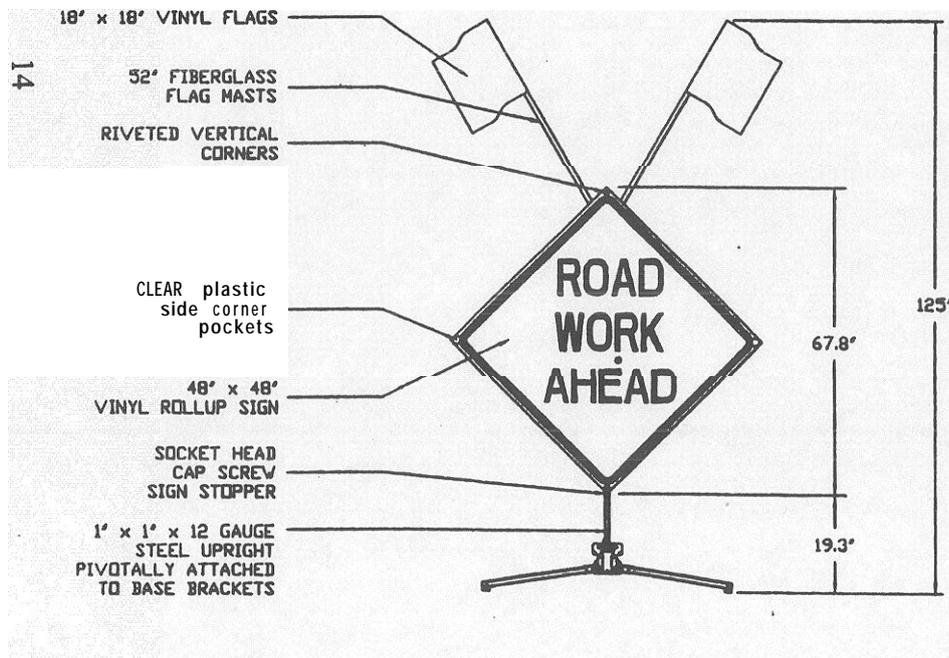


Figure 5. System No. 3 Sign Support Details, Test L-2



CrossWind™ 204-HD stand and WF48-SB sign with SnapFlag™ Dual Warning Flag system

Note: 1 inch = 25.4 mm



alum stainless steel
flag system hardware

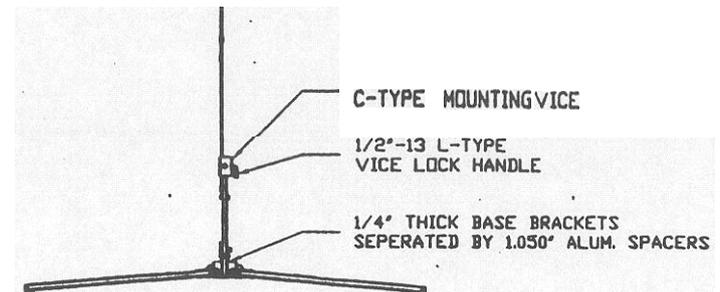


Figure 7. System No. 4 Sign Support Details, Test L-2

Enclosure 3, Summary of Crash Tests for Work Zone Traffic Control Devices, Lang Products International, Inc. WZ-37

Device	Test	System	Orientation	Vehicle Impact Speed	Vehicle Delta V	Windshield Damage
Basic 48 stand with WF48-SB sign	L-1	1	Head On	104.3 km/hr	0.36 m/sec	None
Crosswind 204-HD w/ WF48-SB sign	L-1	2	Head On	103.0 km/hr	(unknown)	None
Basic 48 stand with WF48-SB sign & flags	L-2	3	Head On	106.0 km/hr	0.56 m/sec	None
Crosswind 204-HD w/ WF48-SB sign flags	L-2	4	Head On	104.0 km/hr	(unknown)	None