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U.S. Department
of Transportation
Federal Highway
Administration

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

OCT 19 2000

Refer to: HSA-1

WZ-50

Mr. Grant Dickie
Dickie Tool Company
P.O. Box 518
Downers Grove, Illinois 60515

Dear Mr. Dickie:

Thank you for your May 17, 2000 requesting the Federal Highway Administration (FHWA) acceptance of a number 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 copy of the crash test report dated March 17, 2000, by the Midwest Roadside Safety Facility, and video documentation 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 (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." In response to our request you provided additional video documentation on September, 29.

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 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 latest memorandum lists devices that are acceptable under Categories I, II, and III.

The portable sign stands tested in this Phase V of testing are described below. Additional details are listed in Enclosure 1 for reference, and drawings of the stands are presented in Enclosure 2.

1. (System No. 46) DF4000 Stand. A heavy duty, double torsion spring mounted sign support with a 1220 x 1220 mm sign mounted at a height of 305 mm from the ground and with three wood-stuffed flags mounted at a height of 2305 mm. This stand supported a RUNR48 non-reflective vinyl roll-up sign. Tested head-on (see item 6, System 55, below for the 90-degree test.)

2. (System No. 48) UF 2000 Stand. A single upright coil spring mounted sign support with a 1220 x 1220 mm sign mounted at a height of 318 mm from the ground and with two wood-staffed flags mounted at a height of 2022 mm from the ground to the top of the sign panel. This stand supported a RUNR48FS3 non-reflective vinyl roll-up sign.
3. (System No. 50) T50 Tripod - Added Weight Stand. A tripod with added weight at the bottom of each leg, mounted portable sign support with a 1220 x 1220 mm sign mounted at a height of 368 mm and with three wood-staffed flags mounted at a height of 1460 mm from the ground to the top of the stand's legs. This stand supported a RUNR48 non-reflective vinyl roll-up sign.
4. (System No. 52) T50 Tripod - Added Weight Stand. A tripod with added weight at the bottom of each leg, mounted portable sign support with a 1220 x 1220 mm sign mounted at a height of 381 mm and with three wood-staffed flags mounted at a height of 1435 mm from the ground to the top of the stand's legs. This stand supported a RUR48 reflective vinyl roll-up sign.
5. (System No. 53) T50 Tripod - Short Top Stand. A tripod with the tops of the legs shortened, mounted portable sign support with a 1220 x 1220 mm sign mounted at a height of 330 mm and without flags. This stand supported a RUNR48 non-reflective vinyl roll-up sign.
6. (System No. 55) DF4000 Stand. A heavy duty extension spring mounted sign support with a 1220 x 1220 mm sign mounted at a height of 305 mm and with three wood-staffed flags mounted at a height of 2375 mm from the ground. This stand supported a RUR48 reflective vinyl roll-up sign and was tested at 90 degrees.

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, aluminum and/or fiberglass construction. Details of the sign stands are in the enclosures.

Testing

Full-scale automobile testing was conducted on your company's portable sign stands. The DF4000 Stand and T50 Tripod Stand were tested head-on and at 90 degrees as recommended in our guidance memoranda. The UF 2000 Stand was only tested at 90 degrees, but a similar stand, the UF2000B, had been tested and found acceptable with both head-on and 90 degree testing as of our Acceptance Letter WZ-25 dated May 24, 2000.

Because the devices are free-standing and have a low mass such that significant vehicle velocity change was not expected, measurement of occupant impact velocities and ridedown accelerations were not conducted. The primary purpose of the tests was to assess the potential for occupant compartment intrusion and the test vehicle's post-impact trajectory.

Findings

During the tests the most extensive damage was cracking of the windshield. However, there was no occupant compartment intrusion or deformation observed, nor did any test article debris 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 on the NHS under the range of conditions tested as NCHRP Report 350 TL-3 devices when proposed by a State.

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 (MUTCD).
- 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.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-50, shall not be reproduced except in full.

- Some features of Dicke Tool Company sign stands may be patented 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

Enclosure 1, Summary of Crash Tested Work Zone Traffic Control Devices, Dicke Tool Co., WZ-50

Device	Test	System	Orientation	Legs	Base	Mast	Horiz. Spreader	Height(ex flags)	Flags
DF4000 Stand	D-24	46	Head-on	Fixed Aluminum	HD Dual Torsion Spring	Telescoping Alum.	6.3 mm thick	2026 mm	3 wood
UF2000 Stand	D-25	48	90 deg.	Telescoping Alum.	Single Upright Spring	Aluminum	4.9 mm thick	2022 mm	2 wood
T50 Tripod Add. Wt.	D-26	50	Head-on	Round steel tubing	(tripod arrangement)	n/a	6.36 mm thick	1994 mm	3 wood
T50 Tripod Add. Wt.	D-27	52	90 deg.	Round steel tubing	(tripod arrangement)	n/a	6.47 mm thick	1911 mm	3 wood
T50 Tripod Short Top	D-27	53	90 deg.	Round steel tubing	(tripod arrangement)	n/a	4.99 mm thick	1880 mm	None
DF4000 Stand	D-28	55	90 deg.	Fixed Aluminum	HD Dual Torsion Spring	Telescoping Alum.	6.6 mm thick	2003 mm	3 wood

NOTES to Enclosure 1, Dicke Tool Company. Please refer to the individual drawings for the details of each device.

DEVICE: Stand: X-footprint portable sign stand holding roll-up sign.

Tripod: Three legs originating from a point behind the top of the sign.

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

LEGS: Stand legs are of square tubular aluminum. Rigid legs are 31.75 mm square. Telescoping legs are 31.71 mm and 25.40 mm square.

Tripod legs are 25.4 mm O.D. round steel tubing. For tube wall thickness see drawings.

BASE: "Dual Torsion Spring" are steel with a double torsion spring system.

"Single Upright Spring" are steel with a single upright spring system.

MAST: All "stands" have square tubular aluminum supports of one to three components, sizes vary. Mast extends from the base to the top of the sign panel

HEIGHT: This is the height from the ground to the top of the sign panel.

FLAGS: Material of flagstaff: Wood = 618 mm long, 19 mm diameter wood rod.

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Enclosure 3, Summary of Crash Tests for Work Zone Traffic Control Devices, Dicke Tool Co.

Device	Test	System	Orientation	Vehicle Impact Speed	Vehicle Delta V	Windshield Damage
DF4000 Stand	D-24	46	Head-on	102.1 km/hr	??	Extensive cracking
UF2000 Stand	D-25	48	90 deg.	102.9 km/hr	??	None *
T50 Tripod Add. Wt.	D-26	50	Head-on	70.5 km/hr	??	None
T50 Tripod Add. Wt.	D-27	52	90 deg.	101.4 km/hr	0.67 m/s	Minor cracking
T50 & T55 Tripod Short Top	D-27	53	90 deg.	99.0 km/hr	??	Minor cracking
DF4000	D-28	55	90 deg.	99.3 km/hr	??	Minor cracking

* No cracking from impact with this sign. Another sign, not part of this acceptance, was also struck during this test, causing extensive damage.



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In Reply Refer To: HSSD/WZ-50 Addendum

Mr. Paul Wander
Dicke Safety Products
1201 Warren Avenue
Downers Grove, Illinois 60515

Dear Mr. Mauer:

This letter provides an addendum of WZ-50 to extend FHWA Acceptance to Dicke Tool Company's tripod sign stand model number T55. The T55 model is equivalent to the previously accepted model T50. The difference between models is that the T55 model will use orange powder coated tubing. A drawing is enclosed for reference.

MOVING THE
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T55 With 36" Mesh Sign

FEATURES: _____