



U.S. Department
of Transportation
Federal Highway

Administration

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

Refer to: HSA-10/WZ-99

MR. GRANT DICKE
DICKE TOOL COMPANY
1201 WARREN AVENUE
P.O. BOX 518
DOWNERS GROVE, IL 60515

Dear Mr. Dicke:

Thank you for your letter of August 27 requesting Federal Highway Administration (FHWA) acceptance of your company's DF-4503 and SLIP-60 portable sign systems as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a preliminary report of crash testing conducted by Midwest Roadside Safety Facility and a 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 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.

A brief description of the devices follows:

1. (Systems 56 and 57, Test No. D-29) DF-4503 Stand - A heavy duty, double torsion spring mounted portable sign support with a 1219 x 1219 mm sign mounted at a height of 1518 mm from the ground and with three wood-staffed flags at a height of 3778 mm. This stand supported a RUR48 reflective vinyl roll up sign. Tested at both 90 degrees and head-on.
2. (Systems 60 and 61, Test No. D-31) SLIP-60 Stand. A rigid mounted portable sign support with a 1219 x 1219 mm sign mounted at a height of 1613 mm from the ground. This stand features a three-bolt slip base mechanism to enhance performance. It supported a 2.00 mm thick aluminum sign. Tested at both 90 degrees and head-on with an EMPCO type "B" light mounted to the type of the vertical mast. Height to top of light 3473 mm.

3. (Systems 62 and 63, Test No. D-32) SLIP-60 Stand. A rigid mounted portable sign support with a 1219 x 1219 mm sign mounted at a height of 1638 mm from the ground. This stand is the same as the SLIP- 60 tested as systems 60 and 61 except that no warning light was attached to the top supported a 2.00 mm thick aluminum sign. Tested at both 90 degrees and head-on.

Testing

Full-scale automobile testing was conducted on your company's devices. Two stand-alone examples of the device were tested in tandem, one turned 90 degrees and the next placed six meters downstream struck head-on, as called for in our guidance memoranda. The complete device as tested is shown in Enclosure 1. The crash test is summarized in the table below:

Test Number	D-29	D-31	D-32
Test Article	DF-4503	SLIP-60	SLIP-60
Sign	1219 x 1219 mm roll up	1219 x 1219 mm 2 mm aluminum	1219 x 1219 mm 2 mm aluminum
Height to Sign Bottom	1518 mm (60 in)	1613 mm (60 in)	1651 mm (65 in)
Height to Sign Top	3239 mm	3277 mm	3300 mm (130 in)
Flags or lights	With flags	Empco Light	None
Test Article Mass	20.5 kg	32 kg	30.6 kg
Total Mass of Ballast	none	250 kg	250 kg
Vehicle Inertial Mass	897 kg	897 kg	883 kg
Impact Speed, Head-on	104.5 km/hr	88.9 km/hr	97.8 km/hr
Impact Speed, 90 Deg.	107.7 km/hr	107.8 km/hr	101.5 km/hr
Velocity Change*	0.89 m/sec	5.25 m/sec	1.02 m/sec
Vehicle crush	Minor cracks, scrapes on bumper and roof	Minor damage to bumper and lights	Minor roof deformation
Occupant Compart. Intrusion	None	None	None
Windshield Damage	None	None	None

* Velocity change of vehicle was measured after striking both test articles. In test D-30 the brakes malfunctioned between impacts so the "velocity change" shown above does not reflect the action of the test article.

Findings

Damage was limited to dents on the bumper, grill, hood, and roof. There was no windshield damage nor passenger compartment intrusion due to the test articles. The results of the testing met the FHWA requirements and, therefore, the devices described above and shown in the enclosed drawings for reference are acceptable for use on the NHS under the range of conditions tested, 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.
- 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-99 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.

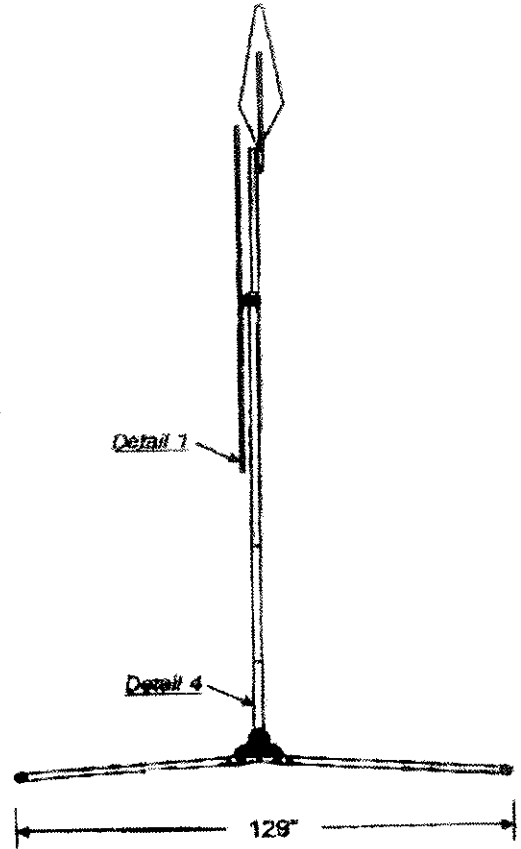
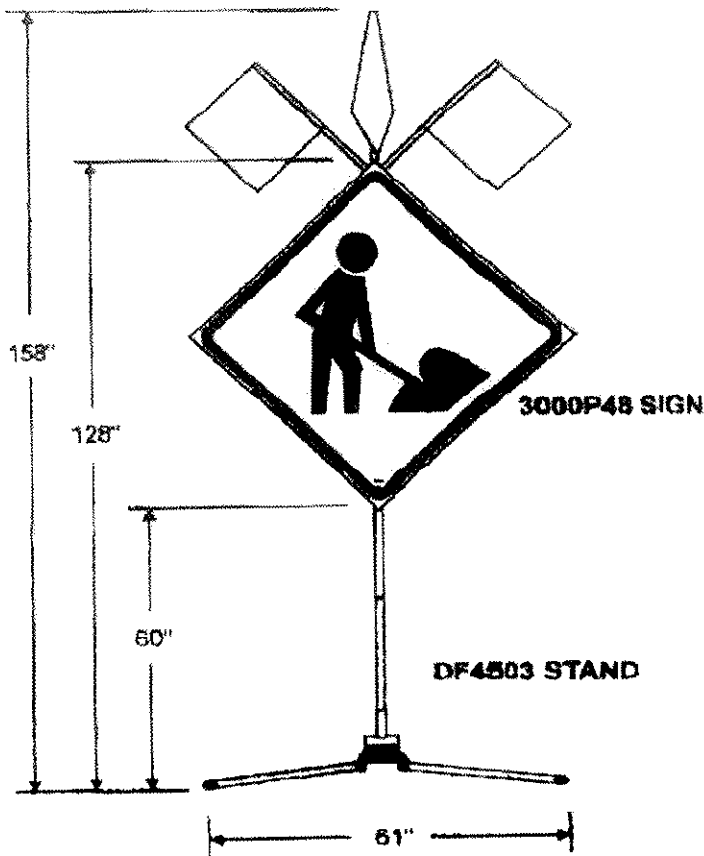
Dicke Tool sign stands may include patented components and if so are considered "proprietary." The use of proprietary work zone traffic control devices in Federal-aid projects is generally of a temporary nature. They are selected by the contractor for use as needed and removed upon completion of the 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,

Michael L. Halladay
Acting Program Manager, Safety

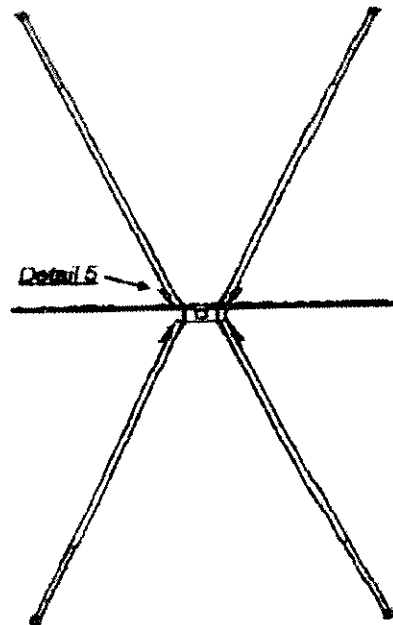
Enclosure

FHWA:HSA-10:NArtimovich:tm:x61331:11/16/01
File: WZ99-DickeNov01Fin.wpd
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N. Artimovich, HSA-10)



DF4603 STAND

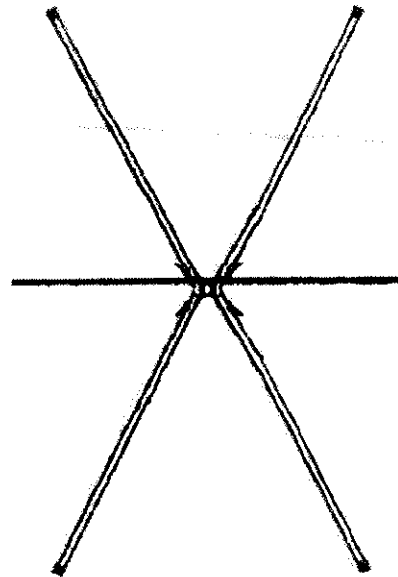
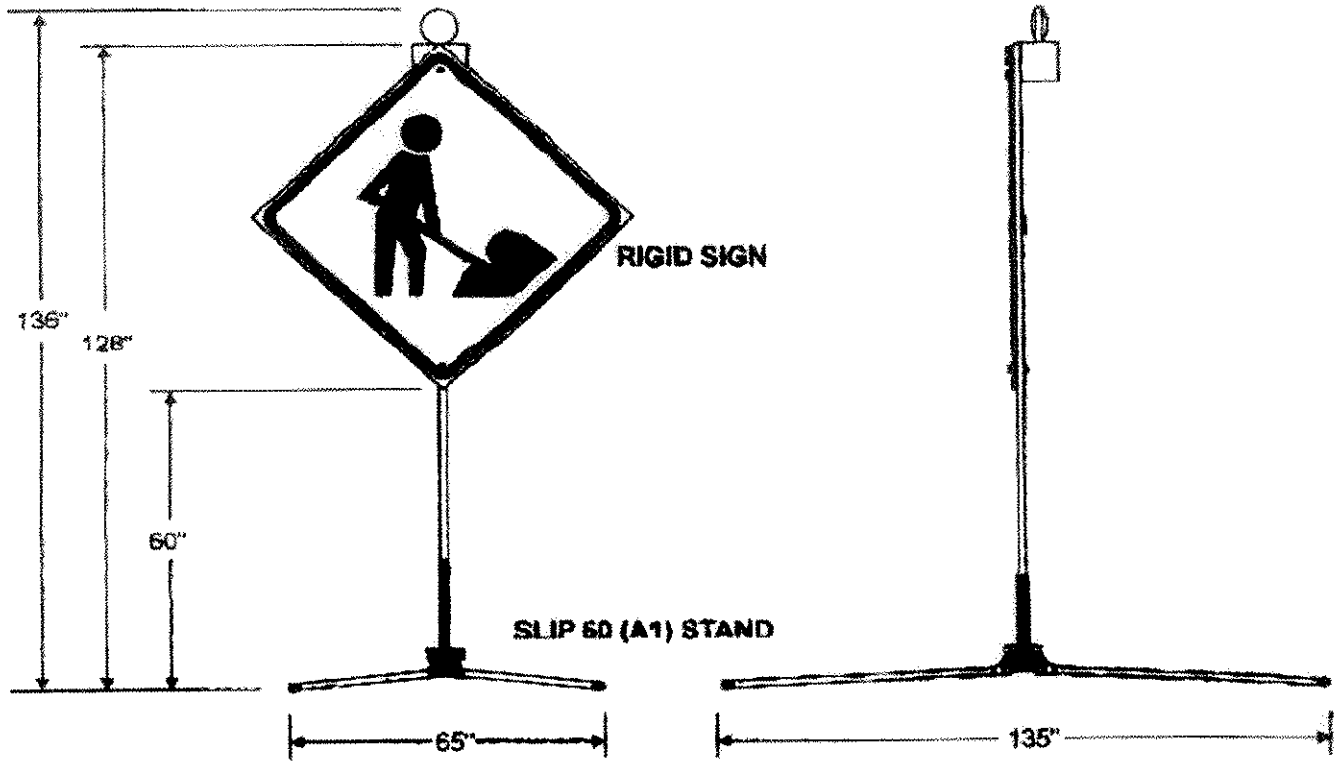
- Base- Steel with heavy duty dual torsion spring system
- Mast- 3 stage telescoping, sq. aluminum tubing with .100 wall thickness
- Legs- Telescoping 1-1/4" sq. x .100 wall x 48" alum. tube, 1" sq. x .100 wall x 25" alum tube
- Weight - 36.5 lbs.



VINYL ROLL-UP SIGN

- Panel- Reflective vinyl, 48" x 48"
- Crossbrace- Vertical member is 1/4" th. x 1-1/4" x 60-1/4" long fiberglass
- Crossbrace- Horizontal member is 1/4" th. x 1-1/4" w x 66-1/4" long fiberglass
- Flags- 18" x 18" vinyl with 30" staff

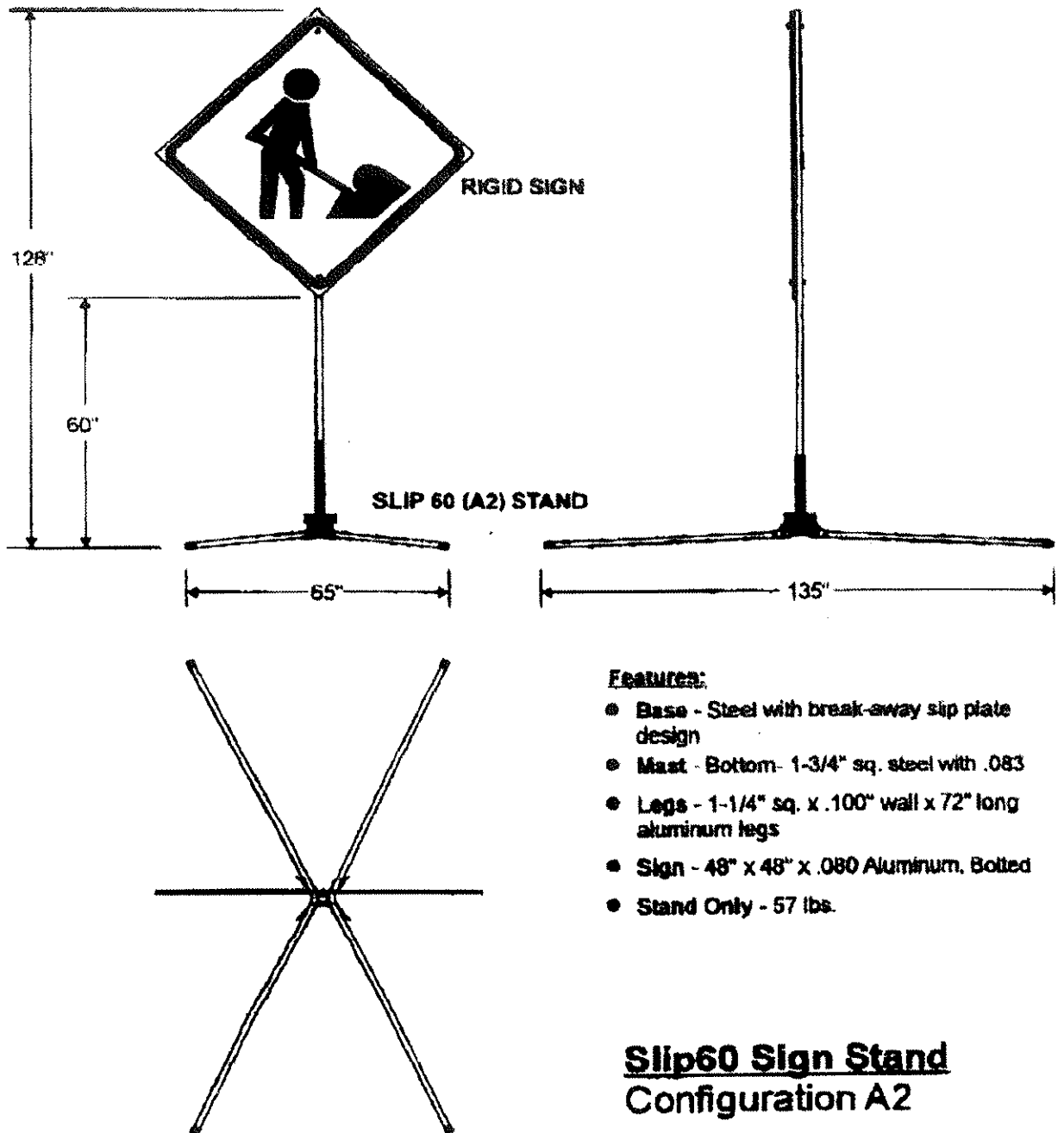
System Nos. 56 and 57 Sign Support Details, Test D-29

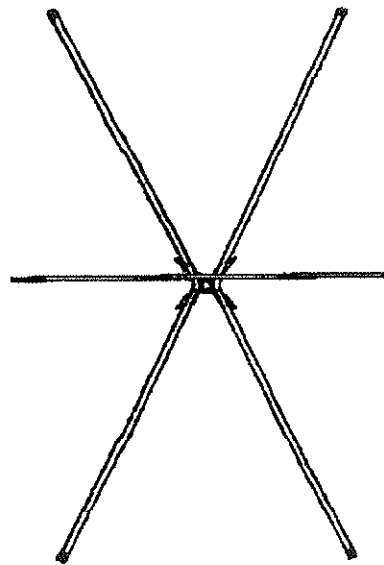
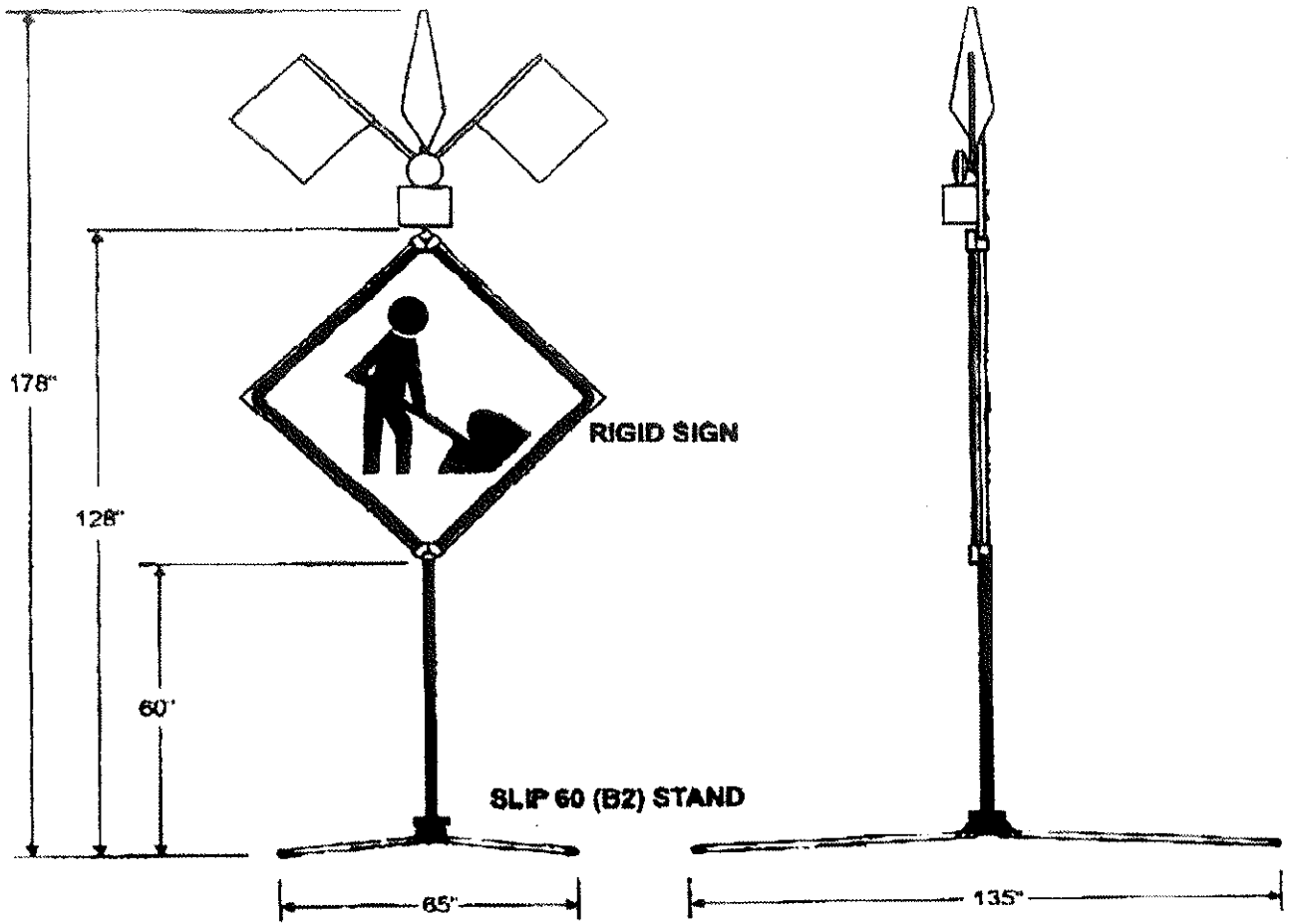


Features:

- Base - Steel with break-away slip plate design
- Mast - Bottom- 1-3/4" sq. steel with .083
- Legs - 1-1/4" sq. x .100" wall x 72" long aluminum legs
- Sign - 48" x 48" x .080 Aluminum, Bolted
- Stand Only - 57 lbs.
- Light - 21 lbs.

Slip60 Sign Stand
Configuration A1



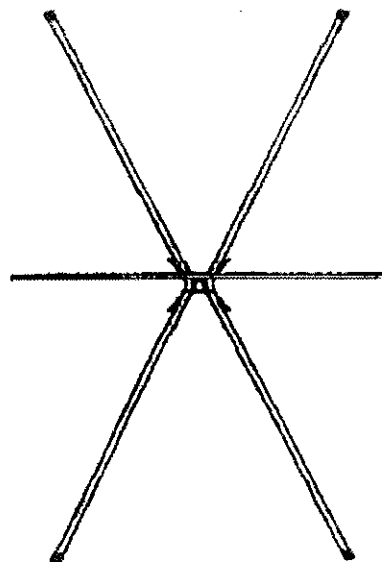
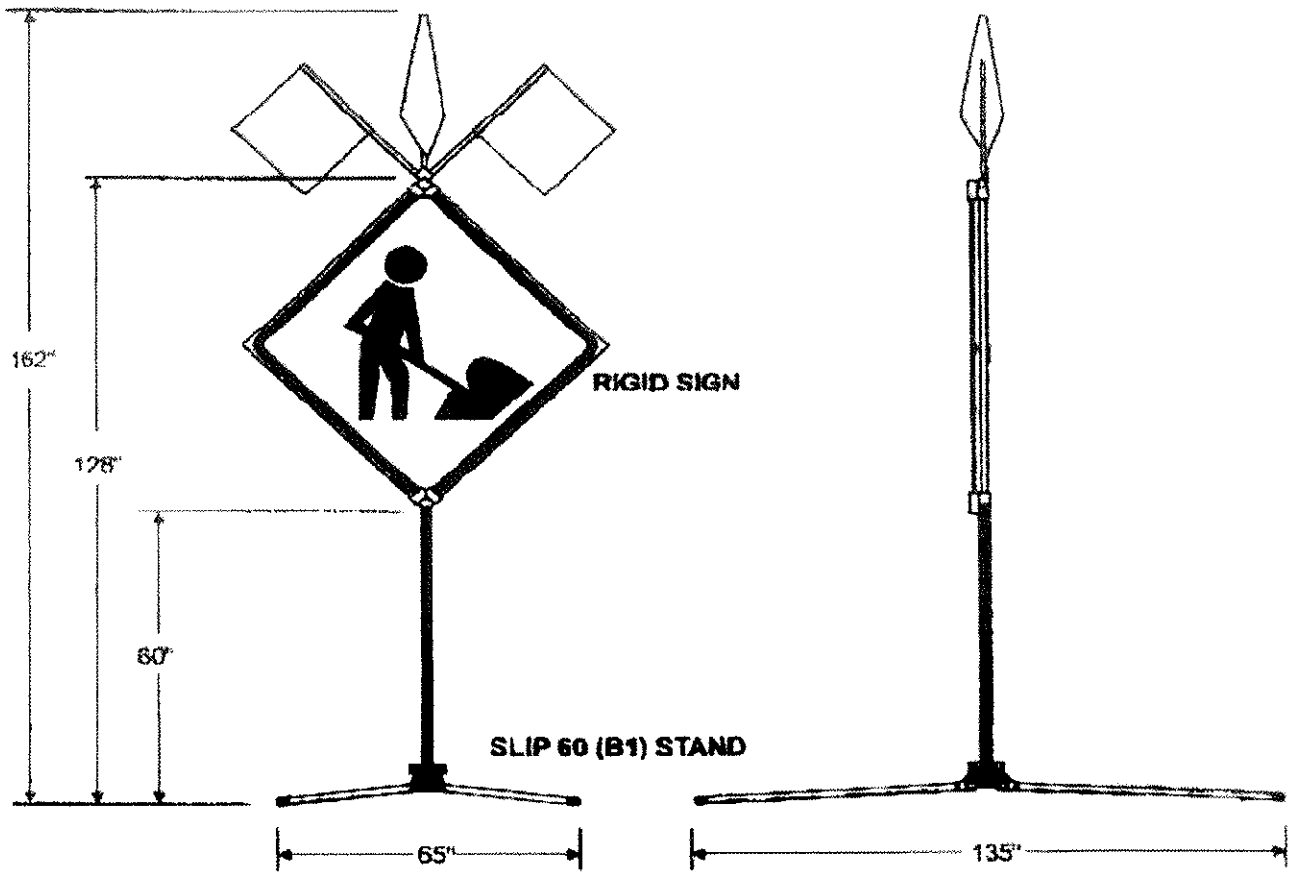


Features:

- Base - Steel with break-away slip plate design
- Mast - Bottom- 1-3/4" sq. steel with .083 wall
Top- 1-1/2" sq. aluminum tubing with .100" wall thickness
- Legs - 1-1/4" sq. x .100" wall x 72" long aluminum legs
- Sign - 48" x 48" x .060 Aluminum, Brackets
- Stand Only - 47 lbs.
- Light - 21 lbs

Slip60 Sign Stand Configuration B2

System Nos. 60 and 61 With Three Wooden Staff Flags



Features:

- Base - Steel with break-away slip plate design
- Mast - Bottom- 1-3/4" sq. steel with .083 wall
Top- 1-1/2" sq. aluminum tubing with .100" wall thickness
- Legs - 1-1/4" sq. x .100" wall x 72" long aluminum legs
- Sign - 48" x 48" x .080 Aluminum, Brackets
- Stand Weight - 47 lbs.

Slip60 Sign Stand
Configuration B1

System Nos. 62 and 63 With Three Wooden Staff Flags