



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

1200 New Jersey Ave., SE
Washington, D.C. 20590

August 18, 2011

In Reply Refer To:
HSST/LS-75

Mr. Zach Thiemann, E.I.T.
Associate Product Development Engineer
Valmont Industries, Inc.
7002 North 288th Street/P.O. Box 358
Valley, Nebraska 68064-0358

Dear Mr. Thiemann:

This letter is in response to your request for the Federal Highway Administration (FHWA) acceptance of specific Valmont pole and decorative base covers for use on the National Highway System (NHS).

Name of system: Various cast aluminum base covers for lighting and luminaire support posts as described below

Type of system: Valmont Decorative "Clamshell" Covers for Various Lighting Poles and Luminaire Supports

Test Level: NCHRP Report 350 Test Level 3 (Pendulum Testing)

Testing conducted by: Midwest Roadside Safety Facility (MwRSF)

Date of requests: December 30, 2010

Request initially acknowledged: January 5, 2011

You requested that we find five (5) decorative base covers used with a range of previously-accepted breakaway couplings and with a range of aluminum poles 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." The specific clamshell bases for which acceptance is requested include the Memphis, Washington, Huntington, Harrisburg, and Osceola designs.

Requirements

Roadside safety devices should meet the guidelines contained in the National Cooperative Highway Research Program (NCHRP) Report 350 if tested prior to December 31, 2010, and the American Association of State Highway and Transportation Officials' (AASHTO) Manual for Assessing Safety Hardware (MASH) if tested after that date. Requirements for breakaway supports are contained in the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

Decision

FHWA:HSSI:NArtimovichr:ms:x61331:7/14/11

File: s://directory folder/HSST/Artimovich/LS75_Valmont #12.dotx

cc: HSST (NArtimovich; JDewar)

The Valmont clamshell designs/pole configurations described below were tested by the MwRSF and found to meet the required evaluation criteria.

Test Descriptions

A test protocol was developed to test the crashworthiness of two “worst case” combinations of clamshell bases and aluminum poles mounted on breakaway couplings. The largest clamshell base was tested on a 55-foot (16.8-meter) tall aluminum pole/luminaire arm assembly using TRANSPO Industry’s 1.25-inch (32-millimeter) diameter double-neck, pole-safe breakaway couplings. In addition, the heaviest clamshell base that could fit around an 8-foot (2.4-meter) tall aluminum pole without a top attachment was tested, also utilizing TRANSPO breakaway couplings. The clamshell bases suffered only minor to moderate damage, and the calculated changes in velocity (ΔV s) for the surrogate vehicle in each test satisfied the 16.4 ft/s (5.0 m/s) limit. The results for NCHRP Report 350 test designation 3-61 were conservatively estimated using the high-speed test extrapolation equation, and all three tested configurations provided ΔV s below the 16.4 ft/s (5.0 m/s) limit. Each of the three tests that were conducted is described in more detail below.

In test LST-440, the 1,842-pound (836-kilogram) pendulum impacted an 8-foot (2.4-meter) nominal height aluminum pole fitted with your Memphis decorative clamshell base (Enclosure 1) at a speed of 21.5 mph (34.7 km/h). In this test, the welds between the pole and the base plate fractured instead of the TRANSPO couplings. Consequently, the base plate and couplings remained attached to the foundation after the initial impact leaving a stub height of 9⁷/₈ inches (251 millimeters), exceeding the 4-inch (100-millimeter) height limit. Therefore, this test was repeated as test LST-455 after a sweeper plate was added to the pendulum. Enclosure 2 is a summary of the test results for LST-440.

In test LST-441, the pendulum impacted a 55-foot (16.8-meter) nominal height aluminum pole and your Washington decorative clamshell base (Enclosure 3) at a speed of 21.8 mph (35.1 km/h). All four couplings fractured at the lower neck location leaving a stub height of 3 inches (76 millimeter) which falls below the 4-inch (100-millimeter) limit. Enclosure 4 is a summary of these test results.

Test LST-455 was a repeat of test LST-440. With the addition of the aforementioned sweeper plate to the pendulum, the TRANSPO couplers fractured at their lower necks, leaving a stub height of only 3 inches (76 millimeters). Enclosure 5 is a summary of test LST-455.

Crash Testing

Pendulum testing was conducted on the test articles described above by the MwRSF at Valmont’s pendulum facility in Valley, Nebraska. All tests were conducted according to NCHRP 350 test designation 3-60. The FHWA accepts pendulum tests as surrogates for this low-speed small car test. The FHWA also allows the results of the high speed tests to be estimated using data from the low-speed pendulum test in combination with an analytical extrapolation method described in the FHWA memorandum “Identifying Acceptable Highway Safety Features” dated on July 25, 1997.

Findings

Based on the test results described above, your Memphis-15 and Washington-30 clamshell bases are considered to be crashworthy when used in combination with the breakaway couplings and

pole sizes in tests LST-440 and LST-441. Since testing was conducted using both the shortest and lightest pole used with the heaviest base for that pole size and with the largest pole/luminaire and heaviest base combination, you requested acceptance of intermediate pole and clamshell base combinations. The additional bases were the Huntington (Enclosure 6), the Harrisburg (Enclosure 7), and the Osceola (Enclosure 8) designs. In summary, the FHWA concurs that these five bases are acceptable for use on the NHS when:

- used with Transpo couplings ranging from 0.75-inches (20-millimeters) to 1.25-inches (32-millimeters) in diameter
- used with aluminum poles ranging from 0.125-inches (32-millimeters) to 0.313-inches (7.9-millimeters) thick
- used with aluminum poles with mounting heights ranging from 8 to 55 feet (2.6 to 16.8-meters)
- used with aluminum poles having base diameters ranging from 4 to 10 inches (102 to 254-millimeters).

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

- This acceptance is limited to the crashworthiness characteristics of the tested features and does not cover their structural features, such as resistance to wind loads.
- Any design or material changes that may adversely influence the crashworthiness of the Dent system 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 system being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our 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 it will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance is designated as number LS-75 and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.
- The Valmont poles and decorative clamshell bases identified above are patented products and considered proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the 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.

- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate system, 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,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures



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Decision

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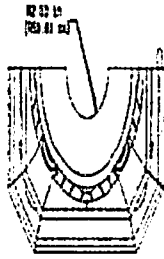
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Sincerely yours,

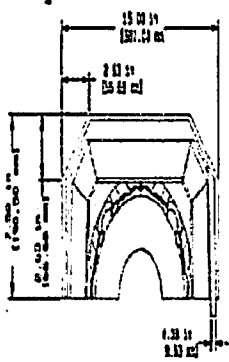
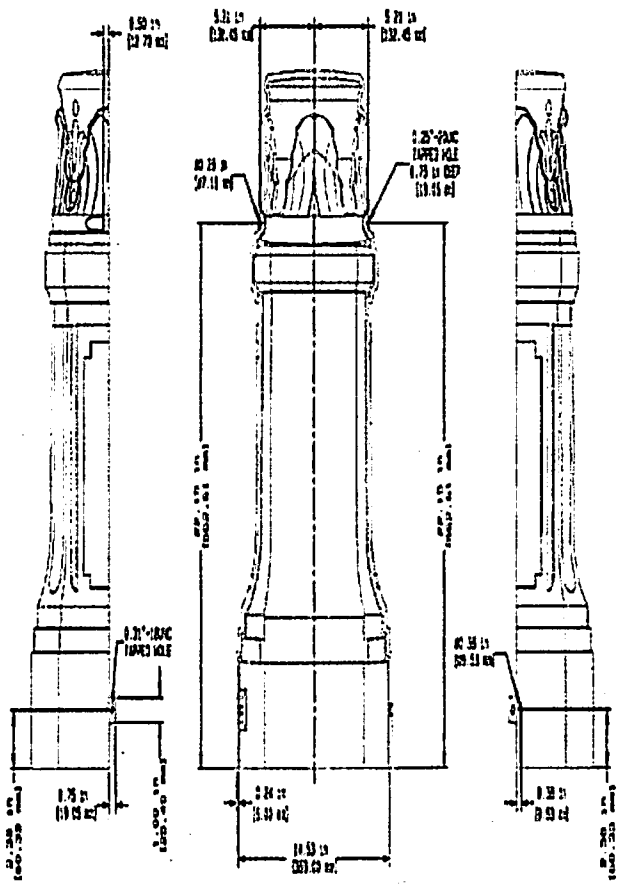
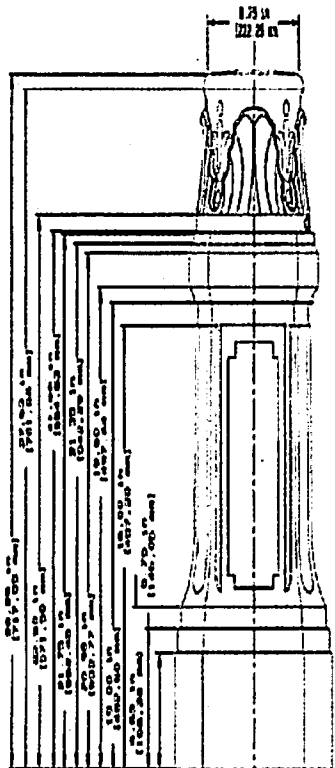


Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures



- NOTES
1. SURFACE SHALL BE WITH THE ALUMINUM COMPOSITION 100% OF 2024
 2. THIS PART WAS CREATED FROM A 3D MODEL. FOR MORE DETAIL INFORMATION SEE THE 3D FILE.
 3. TOLERANCES SHALL BE THE FOLLOWING UNLESS OTHERWISE NOTED
 LINEAR DIMENSIONS: ±0.003 IN (±0.076 MM) UP TO 0.125 IN (3.175 MM)
 AND AN ANGULARITY ±0.003 IN (±0.076 MM)
 FOR DIM > 0.125 IN (3.175 MM) OVER 0.125 IN (3.175 MM)
 ANGULAR DIMENSIONS: ±1°
 4. SURFACE FINISH SHALL BE SUFFICIENTLY FINISHED USING ANY APPROPRIATE MATERIALS
 TO USUALLY RESISTABLE WEAR, SCRATCHES, PUNCTURE OR UNDESIRABLE MARKS ARE PERMITTED
 ON THE FINISHED SURFACE.
 5. PART VALUE: \$27.1473 (2024) OF 20

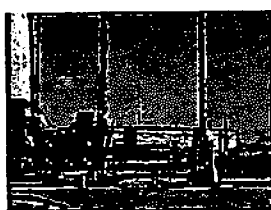


MP15 BACK HALF

PAGE 3 OF 4

J079936

Enclosure 1



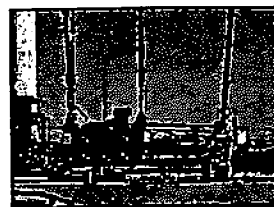
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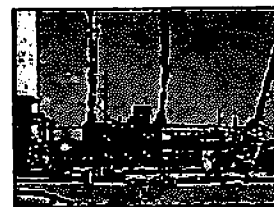
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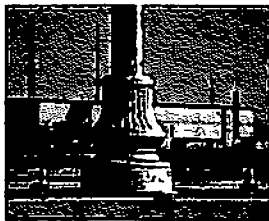


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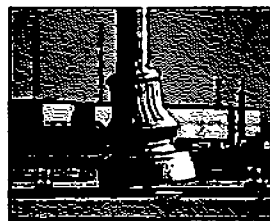
- Test Agency MWRSF
- Test Facility Valmont-MWRSF/UNL Pendulum
- Test Number LST-440
- Date 11/03/10
- NCHRP Report No. 350 Test Designation Number 3-G0
- Test Article Memphis-15 Clamshell Base with Aluminum Pole
- Nominal Height 8 ft (2.4 m)
- Key Component - Tapered Aluminum Pole
 - Height 8 ft - 7½ in. (2.63 m)
 - Bottom Diameter 4 in. (102 mm)
 - Thickness ½ in. (3.2 mm)
- Key Component - Couplings
 - Type Transpo Industries Double-Neck Pole-Safe
 - Diameter 1½ in. (32 mm)
 - Height 6 in. (175 mm)
- Key Component - Decorative Clamshell Base
 - Model Memphis-15
 - Height 28¾ in. (730 mm)
 - Dimensions 14¾ in. x 15 in. (375 mm x 381 mm)
- Total Installation Mass 59 lb (26.8 kg)
 - Pole 19 lb (8.6 kg)
 - Clamshell Base 40 lb (18.1 kg)
- Surrogate Vehicle Pendulum
 - Mass 1,842 lb (836 kg)
 - Impact Head Crushable Nose
- Impact Conditions
 - Speed 21.5 mph (34.7 km/h)
 - Angle 0 deg
 - Impact Height 17¾ in. (451 mm)

- Test Article Damage
 - Pole Moderate
 - Base Moderate
- Stub Height 9¾ in. (251 mm) > 4 in. (100 mm)
- Transducer Data

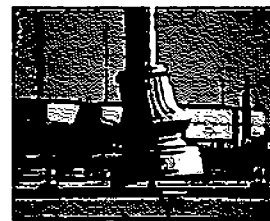
Evaluation Criteria	Transducer			NCHRP Report 350 Limit
	EDR-3	DTS		
		CM54H	BF57H	
Longitudinal OIV ft/s (m/s)	NA (no occupant contact)	NA (no occupant contact)	NA (no occupant contact)	≤16.4 (5.0)
Longitudinal OIRA g's	NA (no occupant contact)	NA (no occupant contact)	NA (no occupant contact)	≤20
Maximum Vehicle ΔV ft/s (m/s)	8.20 (2.50)	8.20 (2.50)	8.01 (2.44)	≤16.4 (5.0)



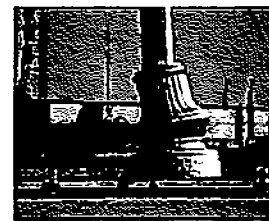
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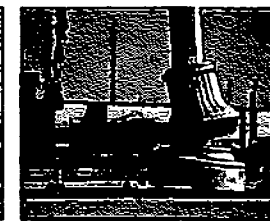
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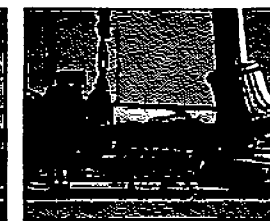
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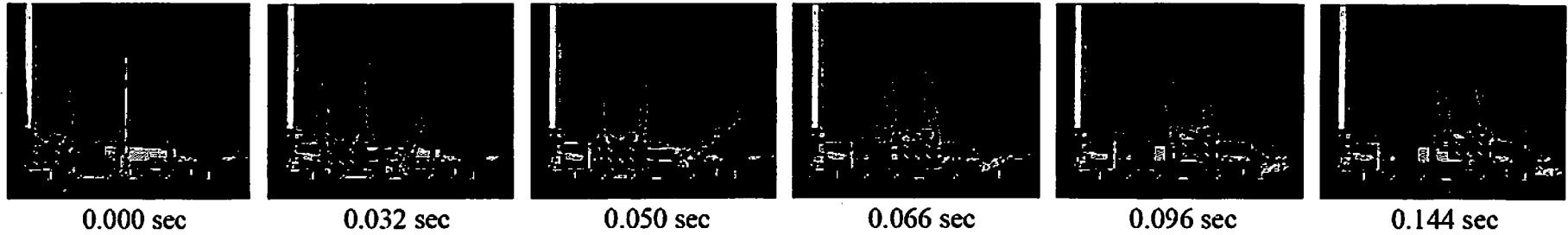
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- Test Agency MwRSF
- Test Facility Valmont-MwRSF/UNL Pendulum
- Test Number LST-441
- Date 11/03/10
- NCHRP Report No. 350 Test Designation No 3-60
- Test Article Washington-30 Clamshell Base with Aluminum Pole
- Nominal Height 55 ft (16.8 m)
- Key Component – Tapered Aluminum Pole
 - Height 50 ft – 1 1/4 in. (15.3 m)
 - Bonom Diameter 10 in. (254 mm)
 - Thickness 5/16 in. (7.9 mm)
- Key Component – Luminaire Arm
 - Length 20 ft (6.1 m)
 - Mounting Height 47 ft – 7 1/4 in. (14.5 m)
- Key Component – Couplings
 - Type TRANSCO Industries Double-Neck Pole-Safe
 - Diameter 1 1/4 in. (32 mm)
 - Height 6 1/4 in. (175 mm)
- Key Component – Decorative Clamshell Base
 - Model Washington-30
 - Height 37 1/2 in. (946 mm)
 - Diameter 30 in. (762 mm)
- Total Installation Mass 777 lb (352 kg)
 - Pole 536 lb (243 kg)
 - Luminaire Arm Assembly 139 lb (63 kg)
 - Clamshell Base 102 lb (46 kg)
- Surrogate Vehicle Pendulum
 - Mass 1,842 lb (836 kg)
 - Impact Head Crushable Nose

- Impact Conditions
 - Speed 21.8 mph (35.1 km/h)
 - Angle 0 deg
 - Impact Height 17 1/2 in. (451 mm)
- Test Article Damage
 - Pole Moderate
 - Base Moderate
- Stub Height
 - Four Occurrences 3 in. (76 mm) < 4 in. (100 mm)
- Transducer Data

Evaluation Criteria	Transducer		NCHRP Report 350 Limit	
	EDR-3	DTS		
		CM54H		BF57H
Longitudinal OIV ft/s (m/s)	NA (No occupant contact)	NA	NA	≤16.4 (5.0)
Longitudinal ORA g's	NA (No occupant contact)	NA	NA	≤20
Maximum Vehicle ΔV ft/s (m/s)	8.40 (2.56)	NA	NA	≤16.4 (5.0)

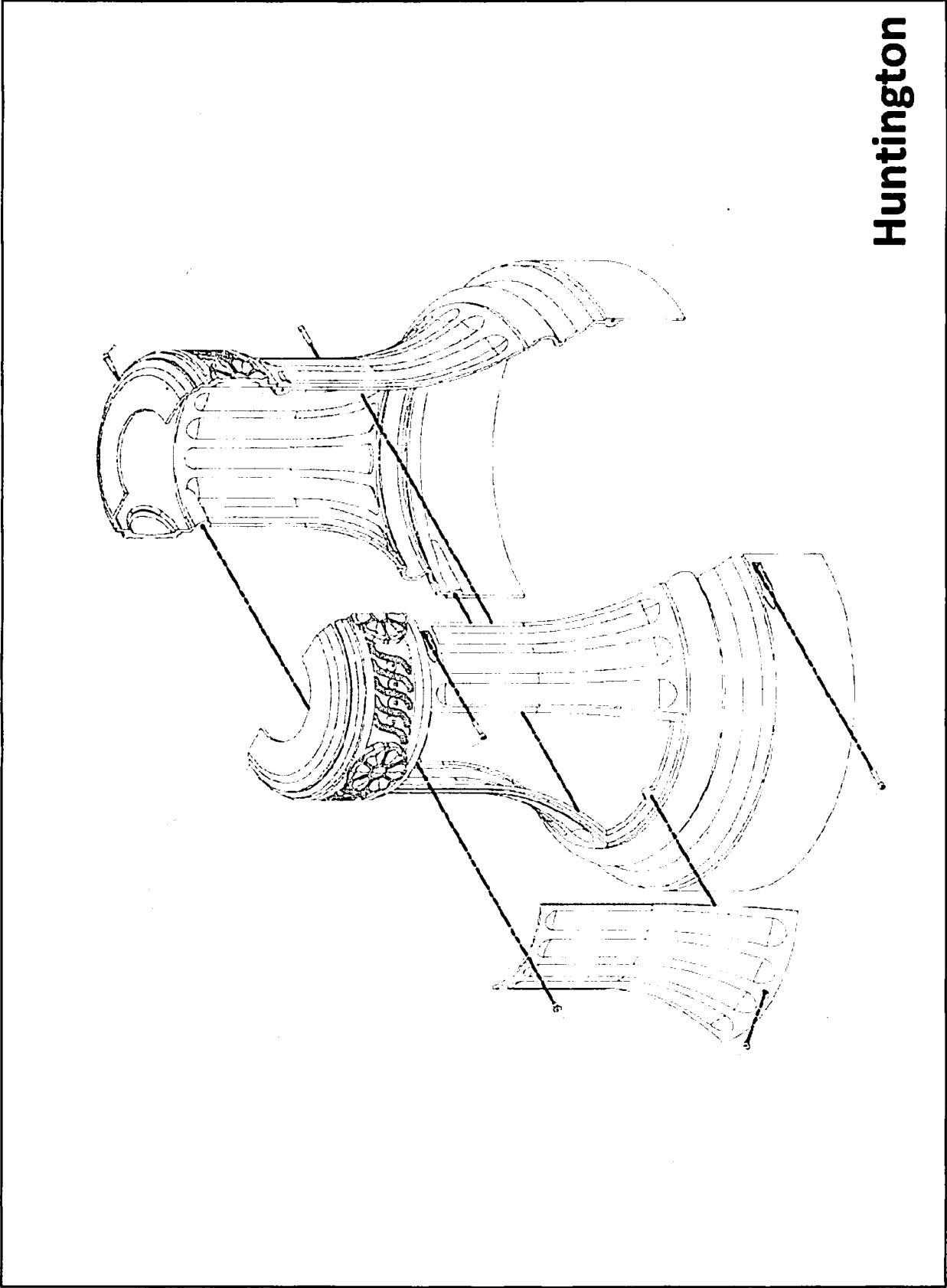
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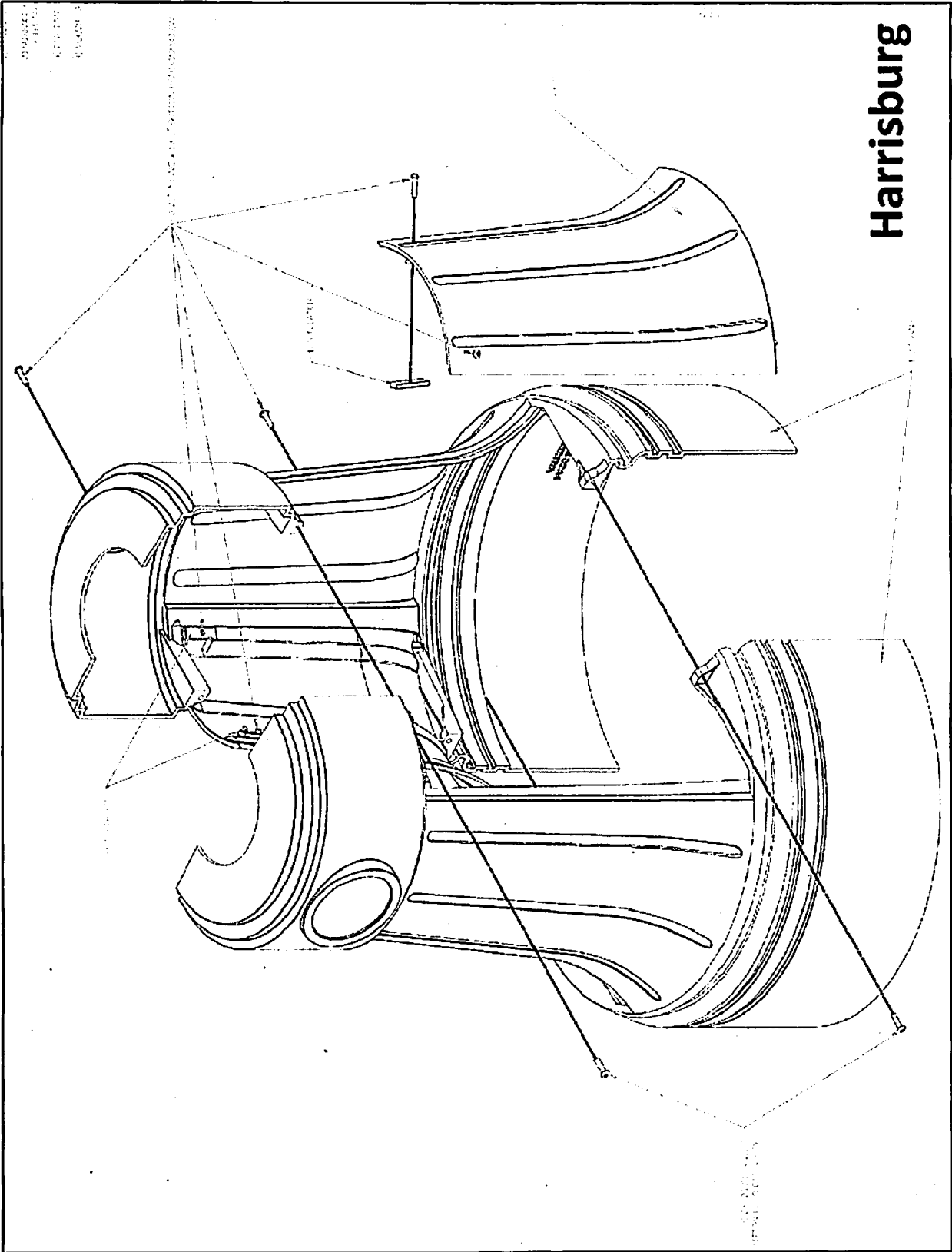
- Test Agency..... MwRSF
- Test Facility..... Valmont-MwRSF/UNL Pendulum
- Test Number..... LST-455
- Date 12/01/10
- NCHRP Report No. 350 Test Designation Number..... 3-60
- Test Article..... Memphis-15 Clamshell Base with Aluminum Pole
- Nominal Height..... 8 ft (2.4 m)
- Key Component – Tapered Aluminum Pole
 - Height..... 8 ft – 8 in. (2.64 m)
 - Bottom Diameter..... 4 in. (102 mm)
 - Thickness..... ¼ in. (3.2 mm)
- Key Component – Couplings
 - Type..... Transpo Industries Double-Neck Pole-Safe
 - Diameter..... 1¼ in. (32 mm)
 - Height..... 6¾ in. (175 mm)
- Key Component – Decorative Clamshell Base
 - Model..... Memphis-15
 - Height..... 29 in. (737 mm)
 - Dimensions..... 15 in. x 15 in. (381 mm x 381 mm)
- Total Installation Mass..... 59 lb (26.8 kg)
 - Pole..... 20 lb (9.1 kg)
 - Clamshell Base..... 39 lb (17.7 kg)
- Surrogate Vehicle..... Pendulum
 - Mass..... 1,882 lb (854 kg)
 - Impact Head..... Crushable Nose
- Impact Conditions
 - Speed..... 21.7 mph (35.0 km/h)
 - Angle..... 0 deg
 - Impact Height..... 17¾ in. (448 mm)

- Test Article Damage
 - Pole..... Moderate
 - Base..... Moderate
- Stub Height
 - Four Occurances..... 3 in. (76 mm) < 4 in. (100 mm)
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Evaluation Criteria	Transducer			NCHRP Report 350 Limit
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Maximum Vehicle ΔV ft/s (m/s)	7.91 (2.41)	8.14 (2.48)	8.23 (2.51)	≤16.4 (5.0)



Huntington



Harrisburg

Enclosure 7

