



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

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

November 30, 2012

In Reply Refer To:
HSST/LS-78

Roland Burke
Main Street Lighting, Inc.
10802 Industrial Parkway
Medina, Ohio 44256

Dear Mr. Burke:

This letter is in response to your request for the Federal Highway Administration (FHWA) to review a roadside safety system for eligibility for reimbursement under the Federal-aid highway program.

Name of system: Fiberglass light pole 12.75 foot height
Type of system: Breakaway luminaire support
Test Level: NCHRP Report 350 Test Level 3
Testing conducted by: Southwest Research Institute
Date of request: February 27, 2012

Decision: The following device is eligible, with details provided in the form which is attached as an integral part of this letter:

- Main Street Lighting Fiberglass light pole 12.75 foot height

Based on a review of the crash test report, dated April 1996, submitted by the manufacturer certifying the device described herein meets the crash test and evaluation criteria of the National Cooperative Highway Research Program (NCHRP) Report 350, the device is eligible for reimbursement under the Federal-aid highway program. Eligibility for reimbursement under the Federal-aid highway program does not establish approval or endorsement by the FHWA for any particular purpose or use.

The FHWA, the Department of Transportation, and the United States Government do not endorse products or services and the issuance of a reimbursement eligibility letter is not an endorsement of any product or service.

Requirements

To be found eligible for Federal-aid funding, roadside safety devices should meet the crash test and evaluation criteria contained in the NCHRP Report 350 or the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH).

FHWA:HSST:NArtimovich:sf:x61331:11/15/12 NArtimovich: **Updated 11/26/12**

File: s://directory folder/HSST/ LS78_Roland Burke Main St Lighting.docx

cc: HSST (NArtimovich; BFouch)

Description

The device and supporting documentation are described in the attached form, report, and drawing. The pendulum testing showed an occupant impact velocity of 1.5 m/s. The subsequent calculation for estimated high speed results showed an occupant impact velocity of 1.9 m/s. Both results are within the 5.0 m/s maximum under NCHRP Report 350.

Summary and Standard Provisions

Therefore, the system described and detailed in the attached form is eligible for reimbursement and may be installed under the range of conditions tested.

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

- This finding of eligibility does not cover other structural features of the systems, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may influence system conformance with NCHRP Report 350 criteria will require a new reimbursement eligibility letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals safety problems, or that the system is significantly different from the version that was crash tested, we reserve the right to modify or revoke this letter.
- You are expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the crash test and evaluation criteria of the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of eligibility is designated as number LS-78 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.
- This 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 FHWA does not become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.
- The Main Street Lighting luminaire supports are patented products and considered proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid 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.

Sincerely yours,

Michael S. Griffith
Director, Office of Safety Technologies

Enclosures

Office of Safety



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- This 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 FHWA does not become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.
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Sincerely yours,



Michael S. Griffith
Director, Office of Safety Technologies

Enclosures

Office of Safety

Request for Federal Aid Reimbursement Eligibility Of Highway Safety Hardware

Submitter	Date of Request:	FEB. 27, 2012
	Name:	Roland Burke
	Company:	Main Street Lighting Inc.
	Address:	10802 Industrial pkwy Medina, Ohio 44256
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

System Type	Device Name / Variant	Testing Criterion	Test Level
'LS': Breakaway Luminaire Supports	Fiberglass light pole 12.75 foot height	NCHRP Report 350	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the test / evaluation results meet the appropriate evaluation criteria in the MASH.

Identification of the individual or organization responsible for the product:

Contact Name:	Roland Burke
Company Name:	Main Street Lighting Inc.
Address 1:	1080 Industrial Parkway
Address 2:	
City/State/Zip:	Medina, Ohio 44256
Country:	USA

PRODUCT DESCRIPTION

Product Description
Light pole of fiberglass. Shaft 8-10 foot long tapered fluted with cast aluminum luminaire mounting tenon molded into the top of shaft. The shaft is bonded to decorative fiberglass base 17 - 20" in dia. 18-46" high base with a 3/8" steel or aluminum mounting plate bonded and bolted with 3/8" stainless steel bolts thru the sidewall of the base. Average fiberglass thickness is 1/2"

CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-80 (820C)		
S3-80 (700C)		
3-81 (820C)		

Required Test Number	Narrative Description	Evaluation Results
S3-81 (700C)		
3-80 (820C)		
NCHRP Report 350	LAB TEST MS-1 Dated Nov. 1, 1995. Project no. Report 06-7536-208 Dated April 1996. There have been no changes made to the methods or raw materials since the 1995 test which met the AASHTO 1985 specifications in accordance with the guidelines set forth in NCHRP report 350. There would be no indication that any further testing would have a different result.	PASS

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Southwest Research Institute
Laboratory Contact:	John W. Strybos, P.E.
Address:	6220 Culebra Rd. San Antonio, Texas 78238
Country:	USA
Accreditation Certificate Number and Date:	SWRI PROJECT NO. 06-7536-208

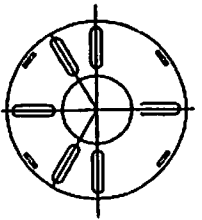
ATTACHMENTS

Attach to this form:

- 1) A copy of the Test Data Summary Sheet for each test conducted in support of this request.
- 2) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are key to understanding the performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

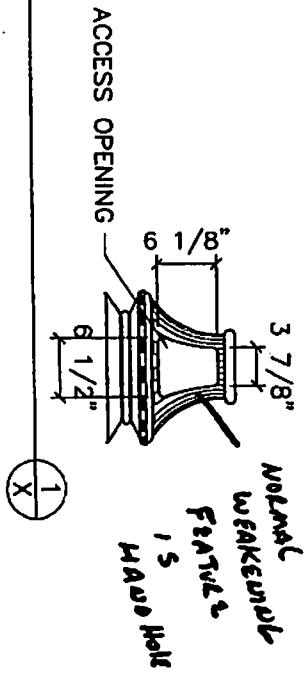
Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words



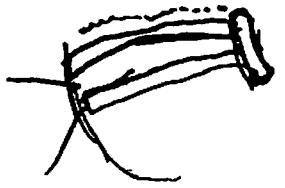
THE BASE PLATE
IS EPPOXIED
& BOLTED TO
FIBERGLASS
BASE

CAST ALUMINUM PLATE, 6 SLOT
UNIVERSAL 3 OR 4 BOLT
VARIABLE 9 1/2" - 12 1/2"
BOLT CIRCLE, BOLT CIRCLE 5/8"
BOLTS

TEST
BOLT CIRCLE



NORMAL
WEAKENED
FEATURE
1 5/8
HARD HOLE

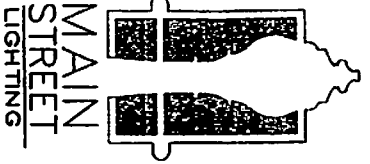


VALLEY
1/4" THICK
RIB SECTION
3/8" THICK

FIBERGLASS
ASSEMBLY

"CITY OF COLUMBUS"

THIS IS TYP. OF
ALL SECTIONS OF
THE BASE



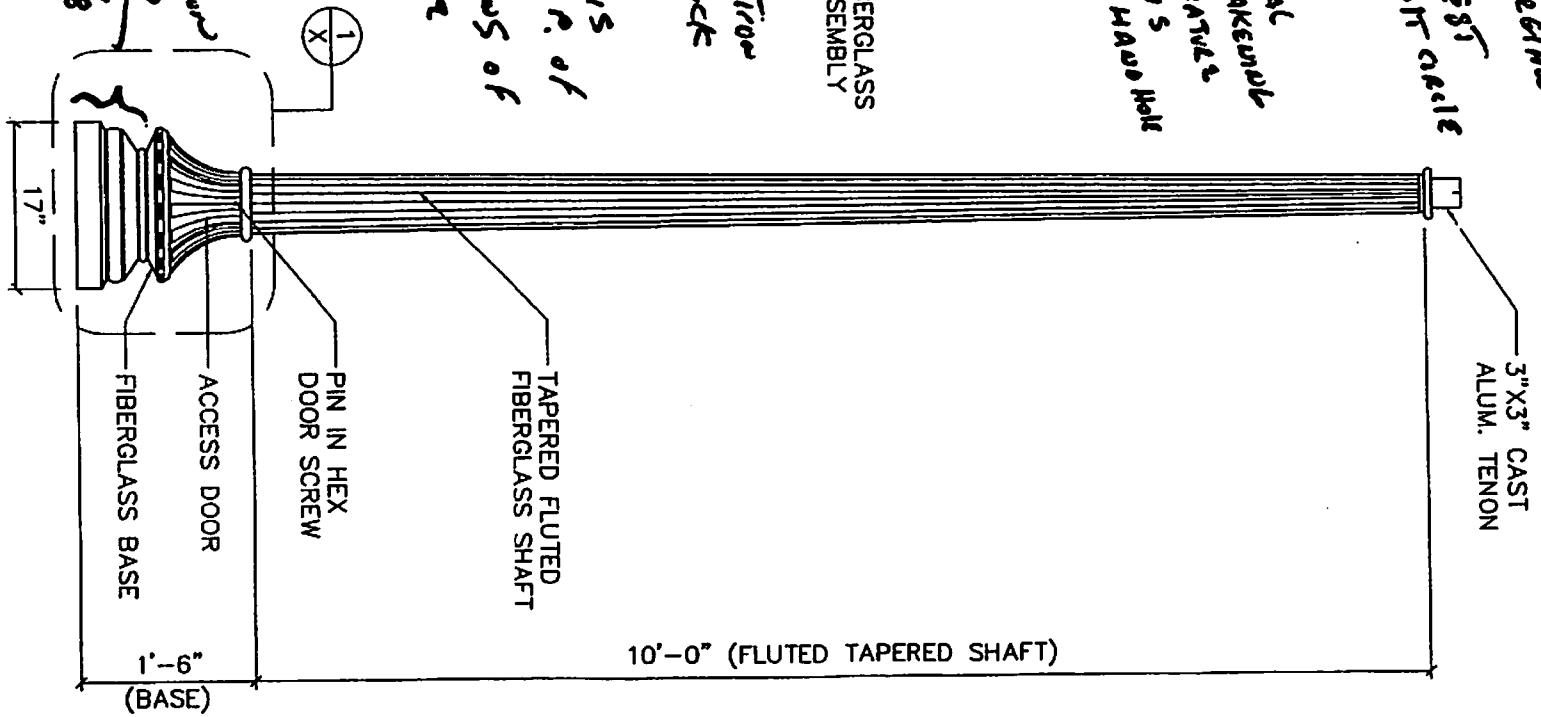
(330) 723-4431 FAX: (330) 723-2570
1090 INDUSTRIAL PKWY. MEDINA OH 44256

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO
MAIN STREET. THIS DRAWING AND INFORMATION IS NOT
TO BE REPRODUCED, TRANSMITTED, DISCLOSED, OR USED
OTHERWISE IN WHOLE OR IN PART, WITHOUT THE WRITTEN
AUTHORIZATION OF MAIN STREET.

FF802-11'6"

SCALE: NTS

DATE: 10/10/12



THIS SECTION'S
THICKNESS
RANGES 3/8
TO 3/4"

10'-0" (FLUTED TAPERED SHAFT)

1'-6"
(BASE)

PENDULUM TEST REPORT OF AN ORNAMENTAL LIGHT POLE

Test No. MS-1
SwRI Project No. 06-7536-208

Prepared by


John W. Strybos, P.E.
Joe B. Mayer, Jr.

Prepared for

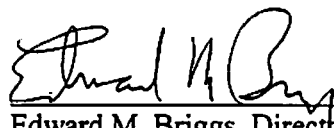
Main Street Lighting
1021 Industrial Parkway
Medina, Ohio 44256

April 1996

Reviewed by:


Lawrence J. Goland, P.E., Manager
Structures Section

Approved by:


Edward M. Briggs, Director
Marine Technology Department

TEST NO. MS-1

1.0 INTRODUCTION

Road signs and luminaries are often located immediately adjacent to roadways and are subject to impact by errant vehicles and must, therefore, yield or breakaway if struck. Verification of the breakaway properties of these devices usually can be accomplished by pendulum or bogie tests which simulate vehicle collisions. In the project described herein, a test was conducted using a 816-kg (1,800-lb) mass with a 35 km/h (22 mi/h) impact speed. A description of the test facility, test article, procedures, results, and evaluation of the results is contained in the sections which follow.

2.0 TEST FACILITY AND PROCEDURES

The Southwest Research Institute Pendulum Impact Test Facility is an FHWA approved test facility. The impact facility utilizes a 816-kg (1,800-lb) mass with a 10-stage crushable nose. Figure 1 shows the nose configuration used. The mass is a reinforced concrete structure which is suspended from cables with a nominal swing radius of 7.9 m (26 ft). Testing is conducted by raising the mass to a drop-height which will result in the desired impact velocity. A quick-release system is then activated to release the mass, allowing the mass to swing down and strike the test article. The base of the pendulum is equipped with a 2 m (6.6 ft) deep soil pit which allows the use of different soils as test parameters dictate. For this particular test, a rigid steel plate attached to a steel framework was secured to the facility foundation. Thirty-five millimeter still photographs are taken of the test article both before and after tests for documentation. The tests are conducted in accordance with the guidelines set forth in NCHRP Report 350⁽¹⁾. This test facility is designed to test specimens for compliance with the evaluation criteria as set forth in Section 7 of the 1985 AASHTO Specifications⁽²⁾.

3.0 TEST ARTICLE DESCRIPTION

The test article consisted of a 3.91-m (12.75-ft) tapered/fluted fiberglass ornamental lamp post. The post was installed on top of the steel test fixture of the pendulum test facility. The test article is shown in Figure 2. The drawing, supplied by the manufacturer, presents greater details not mentioned above. Prior to the test, the entire assembly was weighed, and the center of gravity was determined before mounting to the pendulum facility. All attachment nuts were tightened securely with a wrench. Impact height of the test article was 0.46 m (18 in) above grade. Figure 3 presents pretest photographs.

4.0 RESULTS AND EVALUATION

On impact, the base fractured allowing the mass to continue its trajectory with a velocity change of 1.5 m/sec (4.9 ft/sec), leaving a stub height of 3.2 cm (1.25 in). The 1985 AASHTO Specification delineates a maximum velocity change of 4.88 m/sec (16 ft/sec) as acceptable with a 3.05 m/sec (10 ft/sec) or less change more desirable. In addition, they require that any "substantial remains" of the breakaway support not project greater than 10.2 cm (4 in) above ground level to avoid vehicle undercarriage snagging. Based on the results obtained in this test, 1.5 m/sec (4.9 ft/sec) velocity change with a stub projection of 3.2 cm (1.25 in), the test article is within this criteria. The change in velocity is based on energy used to break away the device and is derived from the *pendulum kinetics accelerometer data*. This is determined when the accelerations drop to near zero, and the impulse becomes stable. In all cases of the subject tests, the occupant did not travel 2 feet during breakaway. The following is a listing of where the data is taken from.

	Time (sec)	Pend. Disp. (ft)	Occ. Disp. (ft)
Test MS-1	0.80	2.3	0.27

Post-test photographs are included in Figure 4. A complete listing of accelerometer data, as well as occupant risk data based on accelerations, is shown in Tables 1 and 2, and a plot of accelerations as a function of time are shown in Figure 5.

An additional requirement of the 1985 AASHTO Specification is that the appurtenance must also satisfy the velocity change at a 100 km/h (62 mi/h) impact condition. FHWA currently allows for the extrapolation of the 35 km/h (22 mi/h) test results using the methodology presented in FHWA Notice N 5040.20⁽³⁾ to determine breakaway performance at 100 km/h (62 mi/h). For this test, the calculated change in velocity was 1.9 m/sec (6.3 ft/sec). Based on the results of these calculations, the test article also meets these AASHTO Specification requirements. Table 3 presents the calculation performed in accordance with the FHWA Notice.

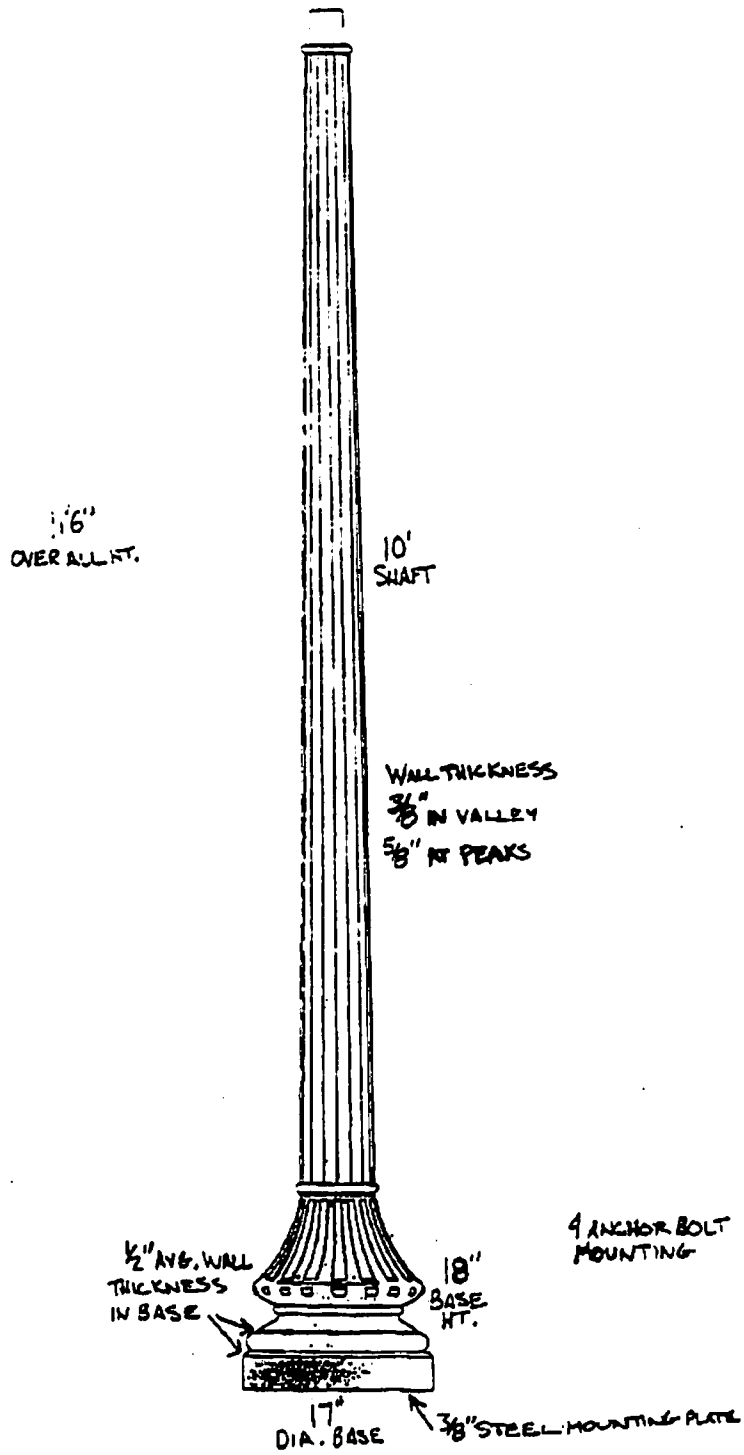
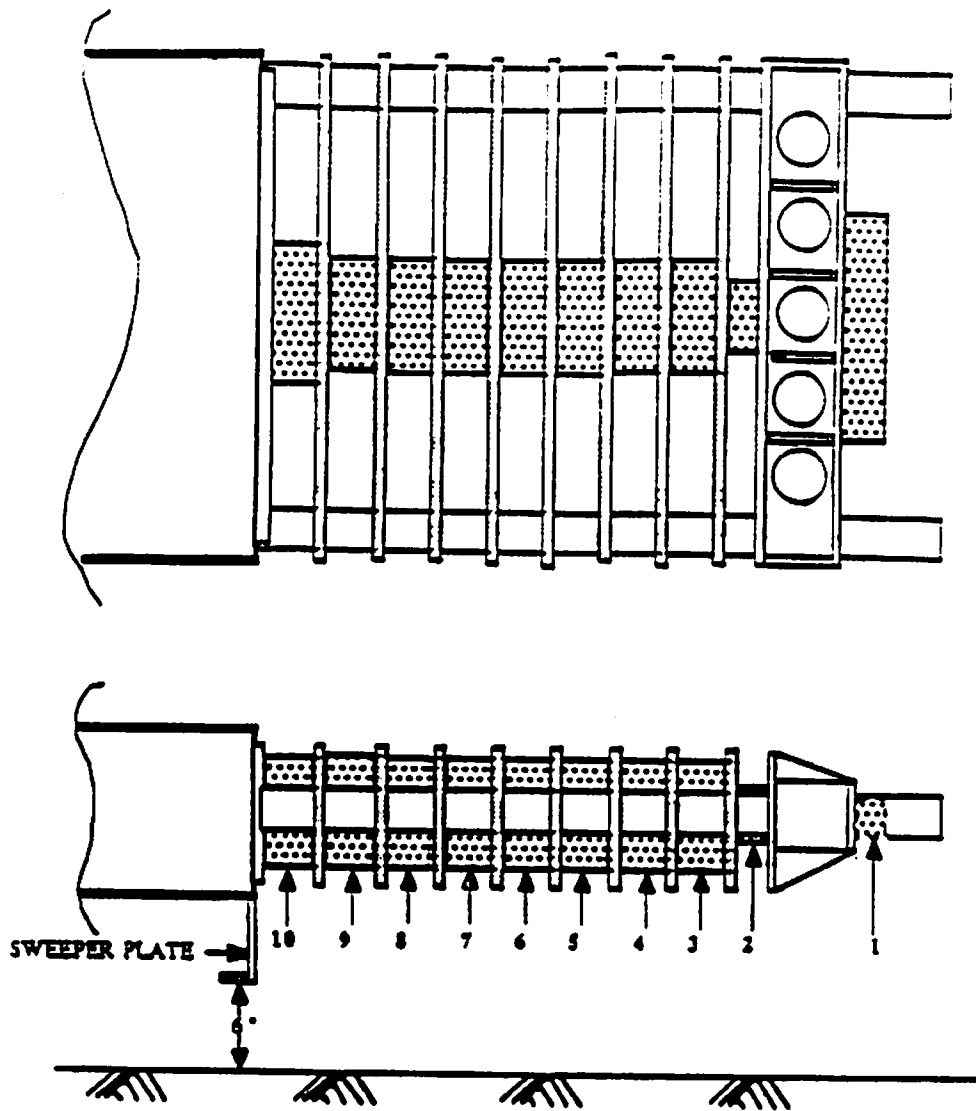


Figure 2. Test Article



<u>Cartridge Number</u>	<u>Size</u>	<u>Static Crush Strength (psi)</u>
1	2-3/4 x 16 x 3	130
2	4 x 5 x 3	25
3	8 x 8 x 3 / 21	130
4	8 x 8 x 3 / 15	230
5	8 x 8 x 3 / 6	230
6	8 x 8 x 3	230
7	8 x 8 x 3 / 21	400
8	8 x 8 x 3 / 12	400
9	8 x 8 x 3	400
10	8 x 10 x 3	400

Figure 1. Pendulum Nose Configuration

Table 3. 35-100 km/h Extrapolation Calculations

TEST NO.	MS-1	
INPUT DATA: DIMENSIONS (FEET)	Lpole	12.75
	Hcg pole	6.08
	Hcg arm	0.00
	Hcg wgt	0.00
	Hcg base	0.00
	Hsys	5.40
	Himp	1.50
WEIGHTS (LB)	Warm	0.00
	Wwgt	0.00
	Wbase	0.00
	Wpole	122.00
	Wtot	122.00
	Wpend	1800.00
	Wtot[kilos]	55.33
CHANGE IN MOMENTUM AT 35 k/h	(DMV)22:	274.00 [lb-sec]
COMPUTE MASS MOMENT OF INERTIA:		
COMPONENT LOCAL MASS MOMENT OF INERTIA (Log) of pole:		
Pole--	$I_p = (W_{pole})(L_{pole}^2)/(12)g$	51.33 [lb-sec ² -ft]
SYSTEM MASS MOMENT OF INERTIA (Is):		
	$I_s = I_p + ((W_{pole})(H_{cg \ pole}^2)/g) + ((W_{arm})(H_{cg \ arm}^2)/g) + ((W_{wgt})(H_{cg \ wgt}^2)/g) + ((W_{base})(H_{cg \ base}^2)/g)$	191.39 [lb-sec ² -ft]
COMPUTE SYSTEM MASS RADIUS OF GYRATION (k):		
	$k = \sqrt{(I_s)/(W_{tot}/g)}$	k= 7.11 [ft]
COMPUTE DISTANCE FROM IMPACT POINT TO SYSTEM CG (Do) :		
	$D_o = H_{sys} - H_{imp}$	Do= 3.90 [ft]
COMPUTE 'b'		
	$b = 1.1(W_{tot}/g)(k^2)/(k^2 + D_o^2)$	3.20 [lb-sec ² /ft]
COMPUTE EXTRAPOLATED CHANGE IN MOMENTUM FOR 60 mph IMPACT (DMV60)		
	$DMV = (32.3/90.9)DMV20 + (b^*79.4)$	351.39
COMPUTE EXTRAPOLATED CHANGE IN VELOCITY FOR 100 k/h IMPACT		
	$DV = DMV62/(w_{pend}/g)$	DV62 6.29
CONVERT DV62 TO METRIC		1.92 m/s