



U.S. Department
of Transportation
Federal Highway

Administration

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

Refer to: HSA-10/SS-97

Mr. Brent Pooles
Safety Base Ltd.
490 Berry Street
Winnipeg, Manitoba Canada, R3J 1N9

Dear Mr. Pooles:

Thank you for your letter of May 30 requesting Federal Highway Administration (FHWA) acceptance of your company’s couplings as a breakaway mechanism for signs on the National Highway System (NHS). Accompanying your letter was a letter report from Texas Transportation Institute and videos of the pendulum crash tests. You requested that we find your company’s couplings 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

Testing of the supports was in compliance with the guidelines contained in the NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features. Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Testing

Pendulum testing was conducted on W200 x 31 (W8 x 21) wide flange steel beam sign supports mounted on your company’s couplings. A 174 kg (384 pound) steel plate was attached to the top of the support to simulate the mass of a sign panel and hardware. A “hinge” mechanism was formed below the simulated sign panel. The mass of the pendulum affixed with a crushable honeycomb nose simulating a 1979 Volkswagen Rabbit was 820 kg in all tests. The complete devices as tested are shown in the Enclosure 1.

A summary of the crash tests is presented in the following table.

Test #	UMA P1	UMA P2
NCHRP 350 Designation	3-60 (pendulum)	3-60 (pendulum)
Coupling Groove Diameter	39.51 mm (1.558 in)	38.23 mm (1.505 in)
Pendulum Impact Speed	9.73 m/s (31.9 fps)	10.0 m/s (32.82 fps)
Soil Type	Rigid mounting frame	Rigid mounting frame
Impact Angle 0 degrees	0 degrees	0 degrees

Velocity Change	1.59 m/s (5.23 fps)	1.48 m/s (4.87 fps)
Extrapolated High Speed Velocity Change *	2.97 m / s	2.97 m / s
Stub Height	43 mm (1.69 in)	43 mm (1.69 in)

* The FHWA Notice N 5040.20, "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," dated July 14, 1976, presents formulas for estimating the high speed (60 mph or 100 km/h) breakaway performance of a signpost, luminaire support, or other breakaway device tested at low speed (20 mph or 35 km/h). These formulas were developed under the FHWA study, "Safer Sign and Luminaire Supports." The study results are contained in reports FHWA-RD-76-32, -33, -34, and -35, dated from February to October 1976.

Findings

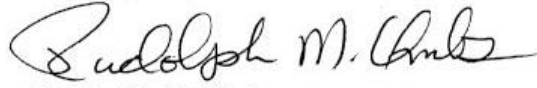
Velocity changes were within acceptable limits, and the only stub remaining was the lower portion of the coupling. The results of test met the FHWA requirements and, therefore, the devices described above and shown in the enclosed drawings for reference are acceptable for use as Test Level 3 devices 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 SS-97 shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The Intermodal Surface Transportation Efficiency Act of 1991, section 1048 (a) included iron as a material subject to the Buy America requirements. These requirements, including waiver provisions, are found in Title 23 of the Code of Federal Regulations, Section 635.410, a copy of which is enclosed. Please note that all manufacturing processes of steel and iron materials, including the application of coatings for these materials, must occur in the United States.
- The "Safety Base" couplings are patented products and considered "proprietary." The

use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects: (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,

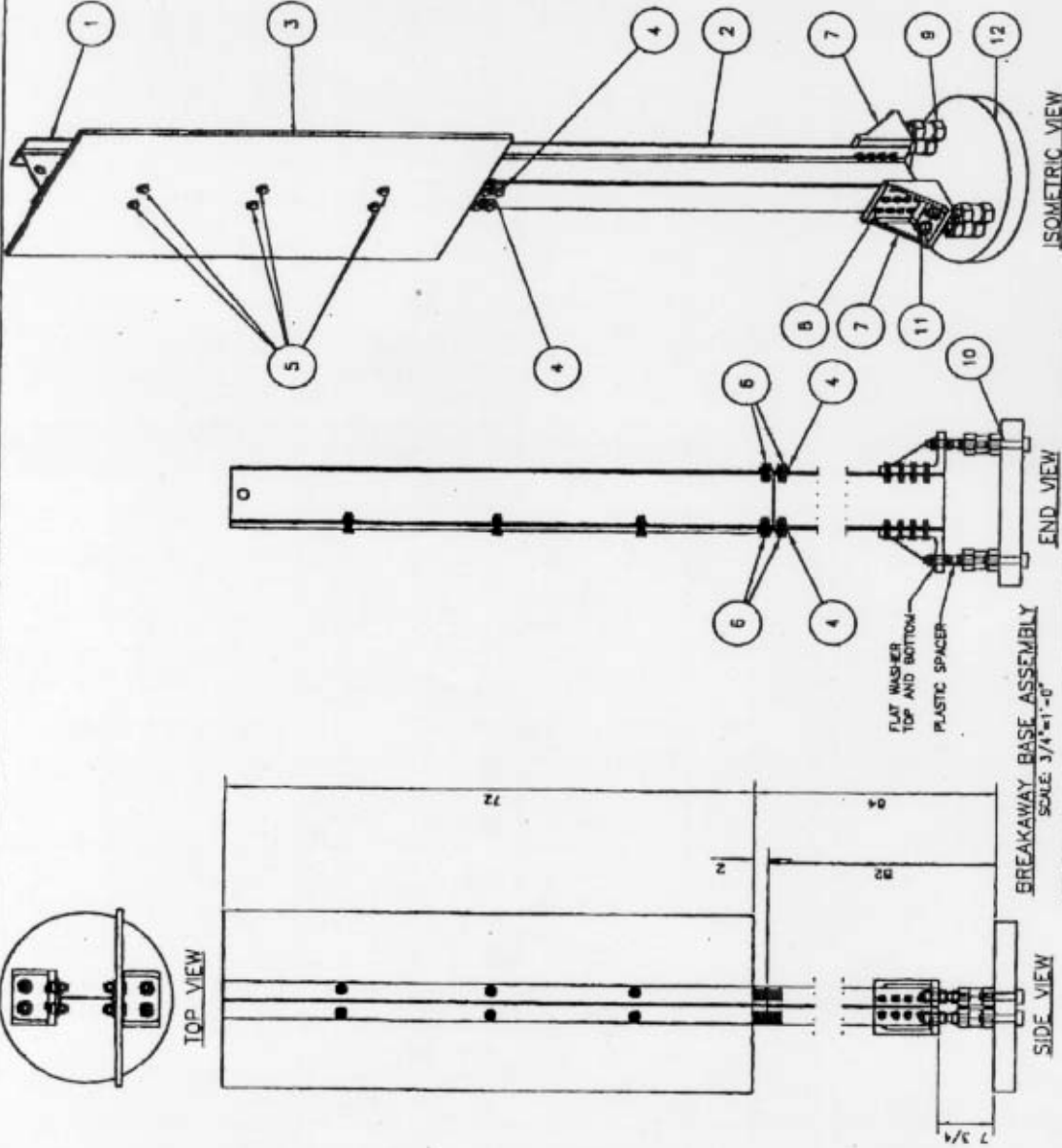


Frederick G. Wright, Jr.
Program Manager, Safety

for

Parts List			Material	Note
1	1	WB21 (W200x31) SIGN BEAM	ASTM A36 OR CSA-C40.21 GRADE 300W	REFER TO DWG M02
2	1	WB21 (W200x31) SUPPORT BEAM	ASTM A36 OR CSA-C40.21 GRADE 300W	REFER TO DWG M02
3	1	SIGN TESTING PLATE	ASTM A36 OR CSA-C40.21 GRADE 300W	REFER TO DWG M02
4	4	GALV. SIGN KNEE PLATE	ASTM A36 OR CSA-C40.21 GRADE 300W	REFER TO DWG M03
5	6	3/4" GALV. HEX CAP SCREW C/W GALV. NUT AND FLAT WASHERS BOTH SIDES - SAUG WRENCH TEST	ASTM A325	
6	8	3/4" GALV. HEX CAP SCREW C/W GALV. NUT AND FLAT WASHERS BOTH SIDES - TIGHTENED IN ACCORDANCE WITH ASHTO TURN-OF-NUT TIGHTENING - 1/3 TURN	ASTM A325	
7	2	GALV. DUCTILE IRON ANGLE BRACKET	ASTM A336, 65-45-12	REFER TO DWG M04
8	16	1/2" GALV. HEX CAP SCREW C/W GALV. NUT AND FLAT WASHERS BOTH SIDES - TIGHTENED IN ACCORDANCE WITH ASHTO TURN-OF-NUT TIGHTENING - 1/2 TURN	ASTM A325	
9	4	CAST GREY IRON FRANGIBLE BREAK AWAY BASE COUPLING WITH 18500 LBS TENSILE STRENGTH	ASTM A48 CLASS 30(S)	
10	4	1" STUD TORQUED TO 400 FOOT POUNDS	ASTM A325	
11	4	1" GALV. STUD C/W GALV. FLAT WASHERS (2), NUTS (3) AND PLASTIC SPACER (1) - ALL NUTS TIGHTENED TO 400 FOOT POUNDS	ASTM A325	
12	1	TESTING BASE	ASTM A325	

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BREAKAWAY BASE ASSEMBLY
SCALE 3/4"=1'-0"

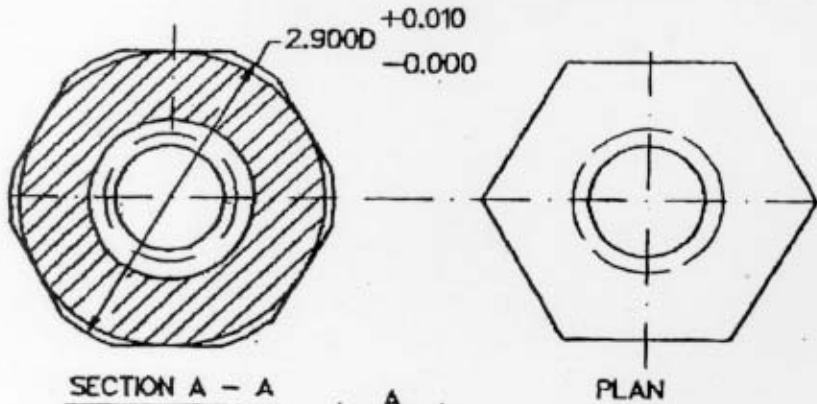
 UMA Engineering Ltd. 1475 Marine Plaza, Whittier, California 92691		TITLE1 TITLE2	
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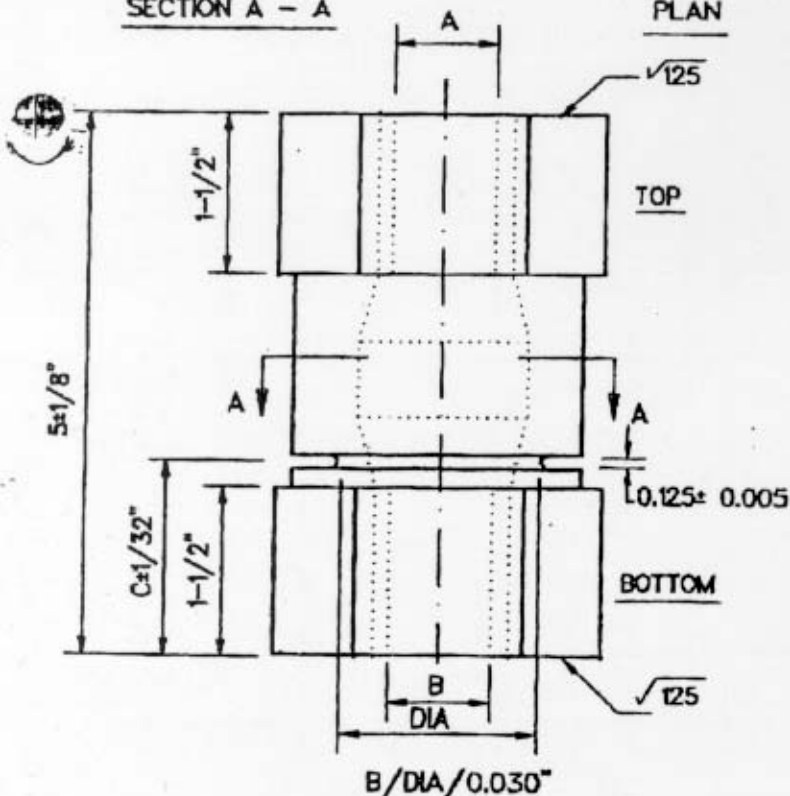
SAFETY BASE

1350 SASKATCHEWAN AVENUE, WINNIPEG, MANITOBA, CANADA R3E 0L2
 PHONE (204) 783-9229
 FAX (204) 783-9011

STANDARD SAFETY BASE COUPLER



DATE
 ORDER NO.:
 QTY.



PART NO.	A PLATED STD. SIZE*	B GALVANIZED **	C ±1/32"
1	1" BUNC	1" BUNC	1-3/4"
2	1" BUNC	1-1/8" 7UNC	1-3/4"
3	1" BUNC	1-1/4" 7UNC	1-3/4"
4	1-1/8" BUNC	1-3/8" 6UNC	2"
	GALVANIZED 0.021" OVERSIZE ON MAJOR MINOR & PITCH DIAMETERS		
5	1" BUNC	1" BUNC	1-3/4"
6	1" BUNC	1-1/8" 7UNC	1-3/4"
7	1" BUNC	1-1/4" 7UNC	1-3/4"
8	1-1/8" BUNC	1-3/8" 6UNC	2"

REVISED 5/28/96 BY L. LEPIE

*TOLERANCE PER UNIFIED THD. STD., CLASS 2
 ACCORD, WASHINGTON, D. C. ON NOV. 18, 1948

**GALVANIZED 0.021" ON MAJOR, MINOR &
 PITCH DIA. *

NOTE:

1. THD MIN DEPTH 15" 20"
2. FACING OPERATION 75% CLEANUP