U.S. Department
of Transportation
Federal Highway Administration

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

October 12, 2005

In Reply Refer To: HSA-10/WZ-218

Mr. Mike Harris
Quality Manager
Advanced Construction Products
Allied Plastics, Inc.
150 Holly Hill Road
P.O. Box 1010
Twin Lakes, WI 53181

Dear Mr. Harris:

Thank you for your letter of January 31, 2005, and email correspondence of August 22, 2005, requesting the Federal Highway Administration (FHWA) acceptance of your company's Multicade work zone channelizer as a crashworthy traffic control device for use on the National Highway System (NHS). Accompanying your letter was a video of informal crash testing with the Multicade. You requested that we find this device 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."

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 are those lightweight devices which are to be self-certified by the vendor, Category II devices are other lightweight devices which need individual crash testing but with reduced instrumentation, Category III devices are barriers and other fixed or heavy devices also needing crash testing with normal instrumentation, and Category IV devices are trailer mounted lighted signs, arrow panels, etc. for which crash testing requirements have not yet been established. 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 device follows:

The Multicade is a three-sided channelizing device intended to replicate the appearance of a drum. It is a single piece of molded high molecular weight polyethylene plastic with three flat sides that are folded to shape the device and a triangular top piece that folds down to secure the device's shape. The Multicade's wall thickness is a nominal 0.187 inches and a single device weighs 9 pounds.

Testing

Because of its unique construction we were uncertain if the Multicade would behave like a Category 1 drum or require full scale testing as a Category 2 device. After considerable discussion we agreed that informal crash testing might be appropriate and should be conducted, with the understanding that the performance may indicate full scale testing could be required. Two stand-alone examples of the device were tested in tandem, one head-on and the next placed ten feet downstream turned at 90 degrees. A Ford Ranger pickup truck was used for these tests, impacting first at 20 mph and the second time at 60 mph. Each Multicade had a truck tire sidewall at the base for ballast. An Empco Light warning light, weighing 3.2 pounds, was attached to each Multicade during these tests. During the 20 mph test the lights remained intact after the impacts, and the Multicades were re-used for the 60 mph test. At 60 mph the Multicades were deformed, but not so badly that they could not be reassembled. Also at 60 mph one of the warning light lenses broke off while the other was slightly cracked.

You also tested a combination of two Multicade units, forming a six-sided "Megacade." No lights were attached, but the vehicle suffered no additional damage of significance after the 60 mph test.

Findings

Damage to the vehicle was limited to minor dents and scrapes to the grille and hood. There was no windshield damage, and there did not appear to be any contact with the windshield. The height of the test vehicle's hood was lower than the top of the Multicade; if a warning light and/or lens were to break off and impact the windshield it would be able to reach the windshield as if a smaller test vehicle had been used.

The results of the informal testing met the FHWA requirements and, therefore, the devices described above and detailed in the enclosed drawings are acceptable for use on the NHS under the range of conditions tested, when proposed by a State. Additional testing will be required if the Multicade units are to be used in combination with pipes or barricade rails joining two or more units.

Please note the following standard provisions that apply to the 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 the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-218 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.
- The Multicade is a patent-pending device and is 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 by a highway agency* for use on Federal-aid 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.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, 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.

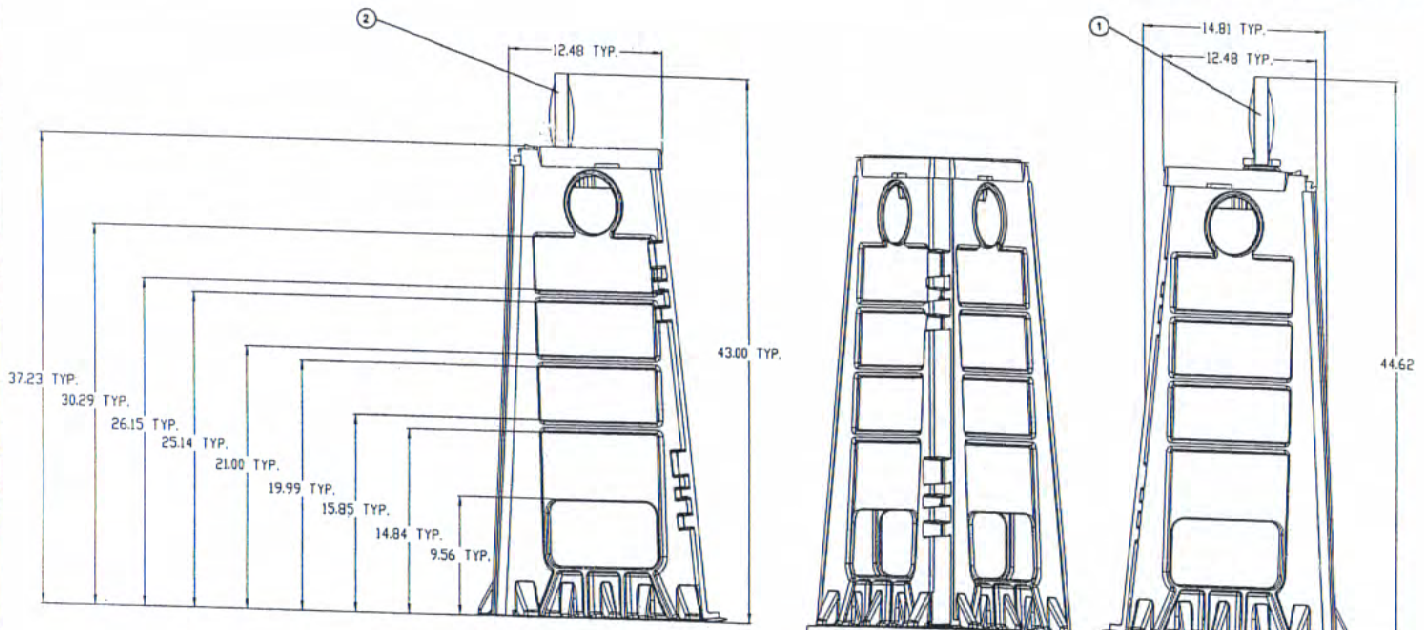
Sincerely yours,

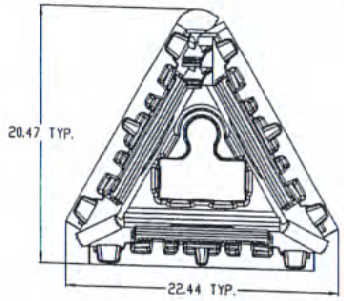
/original signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

Enclosures
FHWA:HSA-10:NArtimovich:tb:x61331:10/07/05
File: h://directory folder/artimovich/WZ218Multicade
cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N.Artimovich, HSA-10)

REVISION HISTORY					
BY	REV	DESCRIPTION	DATE	SLS APPVL	ENG APPVL
AJP	1	RELEASED FOR PRODUCTION	-	-	-





ALLIED'S MOLD#1177&1177A

QUALITY SPECIFICATIONS

NOTES:

- MATL: .187" HMWPE ORANGE
1) EMPCO-LITE MODEL NO. 400
2) EMPCO-LITE-Y2K

TOLERANCING INFORMATION	
FOLLOW ALL TOLERANCING GUIDELINES UNLESS OTHERWISE SPECIFIED. ALL TOLERANCING IN INCHES UNLESS OTHERWISE SPECIFIED.	
ONE DECIMAL	X.X ± 0.250
TWO DECIMAL	X.XX ± 0.125
THREE DECIMAL	X.XXX ± 0.030
ALL ANGLES	± 0.5°

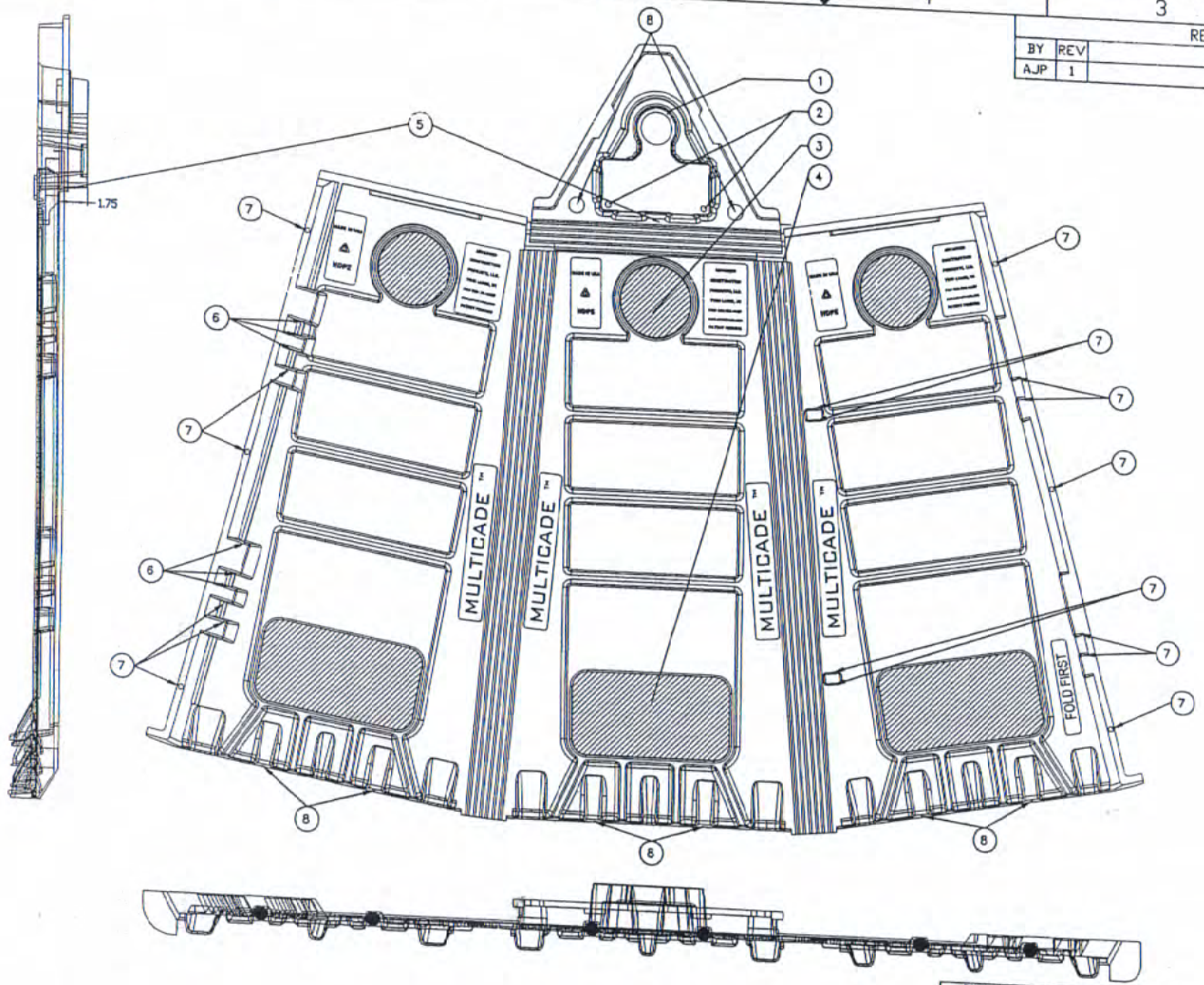
www.alliedplastic.com
Allied Plastics, Inc.
150 HOLY HILL ROAD P.O. BOX 1010
TWIN LAKES, WI 53181
PHONE (262)-877-4700
FAX (262)-877-4701

ACP, LLC.

HIGHWAY SAFETY BARRIER

SIZE	SHEET 1 OF 1	DWG. FILE
D	UNITS: INCHES	1177&1177A
DO NOT SCALE	CREATED BY: AJP	DATE: 02-23-05

REVISION HISTORY					
BY	REV	DESCRIPTION	DATE	SLS APPVL	ENG APPVL
AJP	1	ORIGINAL	-	-	-



ALLIED'S MOLD#1177&1177A

QUALITY SPECIFICATIONS

NOTES:

- MATL: .125" HMWPE ORANGE

1) ø2.00" SIGN HOLE
2) ø.37" DRAIN HOLE, 2X
3) ROUTED HAND HOLE, 3X
4) ROUTED SANDBAG HOLE, 3X
5) ø.563" LIGHT BOLT HOLE, ON SIDE WALL
6) ø.281 PIN HOLE, 6X
7) ø.335" HOLE, 16X
8) ø1.00" HOLE, 8X

TOLERANCING INFORMATION
FOLLOW ALL TOLERANCING GUIDELINES UNLESS OTHERWISE SPECIFIED. ALL TOLERANCES IN INCHES UNLESS OTHERWISE SPECIFIED.
ONE DECIMAL X.X = ±.250
TWO DECIMAL X.XX = ±.125
THREE DECIMAL X.XXX = ±.030
ALL ANGLES = ±.5°

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PHONE (262)-877-4700
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ACP, LLC.

HIGHWAY SAFETY BARRIER

SIZE	SHEET 1 OF 1	DWG. FILE
D	UNITS: INCHES	1177 & 1177A
DO NOT SCALE	CREATED BY: AJP	DATE: 02-02-05