

July 16, 2004

Refer to: HSA-10/WZ-185

Mr. John I. Lund
Chief Engineer
Cortina Safety Products Group
10706 West Grand Avenue
Franklin Park, Illinois 60131

Dear Mr. Lund:

Thank you for your letter of March 29, 2004, requesting Federal Highway Administration (FHWA) acceptance of your company's M-Cade Plastic Type I and Type II Barricades as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter were films of informal bogie crash testing conducted by the Midwest Roadside Safety Facility (MwRSF). 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 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 devices follows:

Type I and Type II Barricades

The M-Cade family of barricades uses plastic waffleboard panels. The 12x24 panel is 610x308 mm x 19.05 mm thick. The thickness steps down to 11.43 mm at each end. The panel faces are 3.00 mm thick and the ribs vary from 2.50 to 3.00 mm thick. The mass of the 12x24 panel is 0.80 kg. The 8x24 panel is similar with dimensions of 610x210 mm and a mass of 0.55 kg. The "Sand Bar" is 610x83 mm with a mass of 0.25 kg.

The legs are molded in an “H” cross section and measure 46x61 mm with length either 1118 mm or 1524 mm having masses of 0.76 kg and 0.99 kg respectively. The legs are held together at the pivot point without fasteners by the unique interlocking configuration of the components. An optional 12.7 mm plastic push pin may be used to hold the alignment of the open barricade.

Each panel is factory attached to a pair of legs with 6.35 mm steel/aluminum rivets. The steel center shank of the rivets is 3.80 mm which is slightly less than the 4.15 mm root diameter of the threads used in the ¼ - 20 bolts on the original crash tested barricade cited in the FHWA acceptance letter WZ-6. Individual components are also provided for field assembly. You requested that the M-Cade Type I and II barricades, whether assembled in the factory or field, be acceptable with a lightweight warning light (1.5 kg or less).

Following are the tables you provided which list the details of the various barricades for which you requested acceptance.

Table 1 Specifications of Cortina M-Cade Barricades

Product Number	Top Panel	Bottom Panel	Top Sheeting	Bottom Sheeting	Sand Bar	Mass, Plain	Mass, w/ Light
Type I M-Cades			<i>Represented in Test Run No. 1 and 2</i>				
97-11-001-11	12"	8"	Prismatic w/ Arrow	None	Optional	7.0 kg	8.5 kg
97-11-001-44	12"	8"	EGR Sheeting	None	Optional	7.0 kg	8.5 kg
97-11-001-45	12"	8"	Hi-Intensity	None	Optional	7.0 kg	8.5 kg
97-11-001-46	12"	8"	SEG Sheeting	None	Optional	7.0 kg	8.5 kg
Type II M-Cades			<i>Represented in Test Run No. 1 and 2</i>				
97-11-002-11	8"	8"	Prismatic w/ Arrow	EGR Sheeting	Optional	6.6 kg	8.1 kg
97-11-002-44	8"	8"	EGR Sheeting	EGR Sheeting	Optional	6.6 kg	8.1 kg
97-11-002-45	8"	8"	Hi-Intensity	Hi-Intensity	Optional	6.6 kg	8.1 kg
97-11-002-46	8"	8"	SEG Sheeting	SEG Sheeting	Optional	6.6 kg	8.1 kg
Type II Barrel Eliminator M-Cades			<i>Represented in Test Run No. 1 and 2</i>				
97-11-003	12"	8"	EGR Sheeting	Plain	Optional	7.1 kg	8.6 kg
97-11-003-11	12"	8"	Prismatic w/ Arrow	EGR Sheeting	Optional	7.1 kg	8.6 kg
97-11-003-44	12"	8"	EGR Sheeting	EGR Sheeting	Optional	7.1 kg	8.6 kg
97-11-003-45	12"	8"	Hi-Intensity	Hi-Intensity	Optional	7.1 kg	8.6 kg
97-11-003-46	12"	8"	SEG Sheeting	SEG Sheeting	Optional	7.1 kg	8.6 kg
Type I Excavator M-Cades			<i>Represented in Test Run No. 3 and 4</i>				
97-11-001-60	12"	8"	EGR Sheeting	None	Yes	8.0 kg	**
97-11-001-61	12"	8"	Hi-Intensity	None	Yes	8.0 kg	**
97-11-001-62	12"	8"	EGR Sheeting	Plain	Yes	8.0 kg	**

Type II Excavator M-Cades*Represented in Test Run No. 3 and 4*

97-11-002-60	8"	8"	EGR Sheeting	EGR Sheeting	Yes	7.6 kg	**
97-11-002-61	8"	8"	Hi-Intensity	Hi-Intensity	Yes	7.6 kg	**
97-11-002-62	8"	8"	EGR Sheeting	Plain	Yes	7.6 kg	**

Individual Components for field assembly of Type I and Type II Barricades

97-1100	Modular Barricade Leg, 44"	0.75 kg
97-1200	Modular Barricade Leg, 60"	0.99 kg
97-1400	Modular Sand Bar, 3" x 24"	0.25 kg
97-1500	Modular Panel, 8" x 24", No Sheeting	0.55 kg
97-1600	Modular Panel, 12" x 24", No Sheeting	0.80 kg

** Additional testing of the Excavator devices with lights is planned.

Plastic Resin

The molded components (panels and legs) are molded from Sunoco TI-4230G-5 copolymer polypropylene resin, or from equivalent material obtained from another plastic compounder. 100 percent virgin resin is used except for the reground runners and sprues. The UV stabilizers are added in advance by the plastic compounder. The amount of regrind is held to 10 percent or lower for these parts. This material (or its equivalent) was used in the molding of your PlastX Barricades, which have been found acceptable for use in WZ-47 and WZ-17.

Testing

The MwRSF conducted "research and development" style tests of your company's cones using a hard-nosed bogie vehicle of a mass larger than the standard 820C test vehicle. There are significant constraints involved in using such a non-standard testing device, some of which are:

1. The potential vehicle velocity change must be considered insignificant.
2. The crush characteristics of an automobile bumper must not be expected to have a significant affect on the trajectory of the test article.
3. The profile of the bogie vehicle must be configured to replicate the outline of a production vehicle. The MwRSF bogie was configured to replicate the outline of a Geo Metro, a vehicle commonly used in testing of work zone devices.
4. No part of the test article may intrude into the windshield area of the vehicle after impact.

In these tests it was clear that the "M-Cade" and "Excavator M-Cade" barricades would meet our crashworthiness criteria. In addition, the M-Cade barricades (with 44 inch long legs) with warning lights would have met our criteria. We understand you are considering full-scale automobile crash testing of your Excavator M-Cades (with 60inch long legs) to verify their performance with lights.

Findings

The results of the informal testing met the FHWA requirements and, therefore, the devices described in the tables 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.

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 NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-1 85, 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.
- M-Cade channelizers are patented devices and 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. These provisions do not apply to exempt non-NHS projects. 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 Richard Powers/

~for~

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

Enclosure

FHWA:HSA-10:NArtimovich:tb:x61331:7/16/04

File: h://directory folder/nartimovich/WZ185-CortinaFIN

cc: HSA-10 (Reader, HSA-1; Chron File, HSA-10;
N. Artimovich, HSA-10)

Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

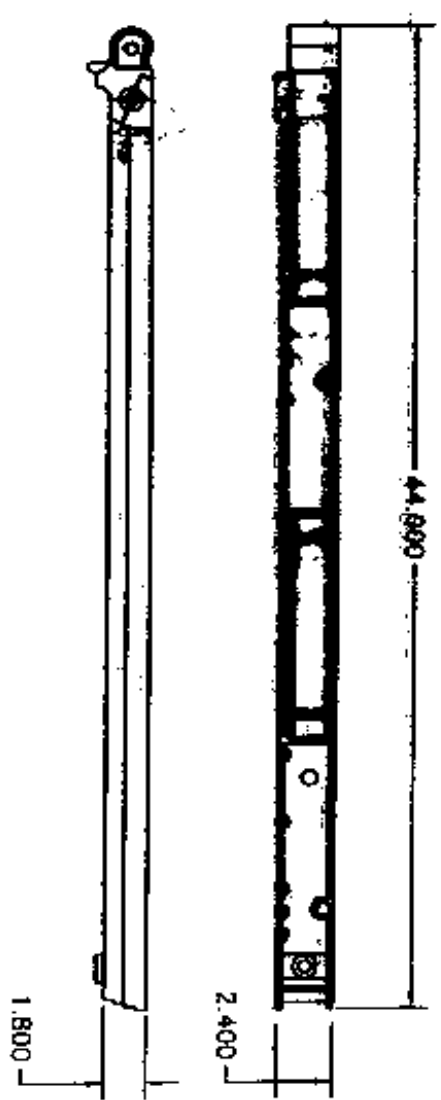
(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

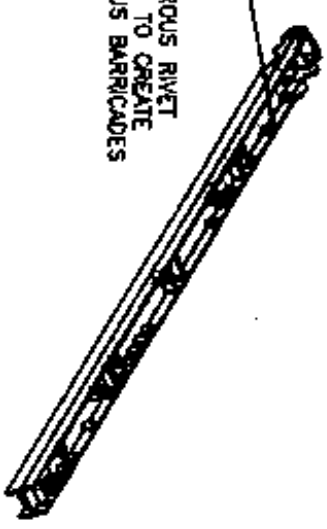
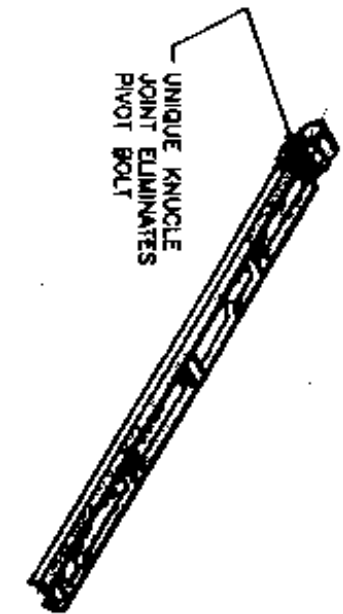
(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

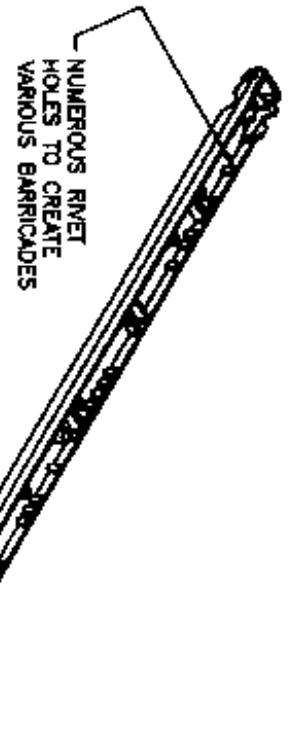
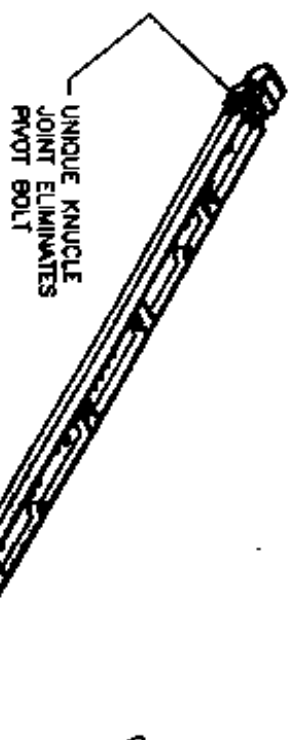
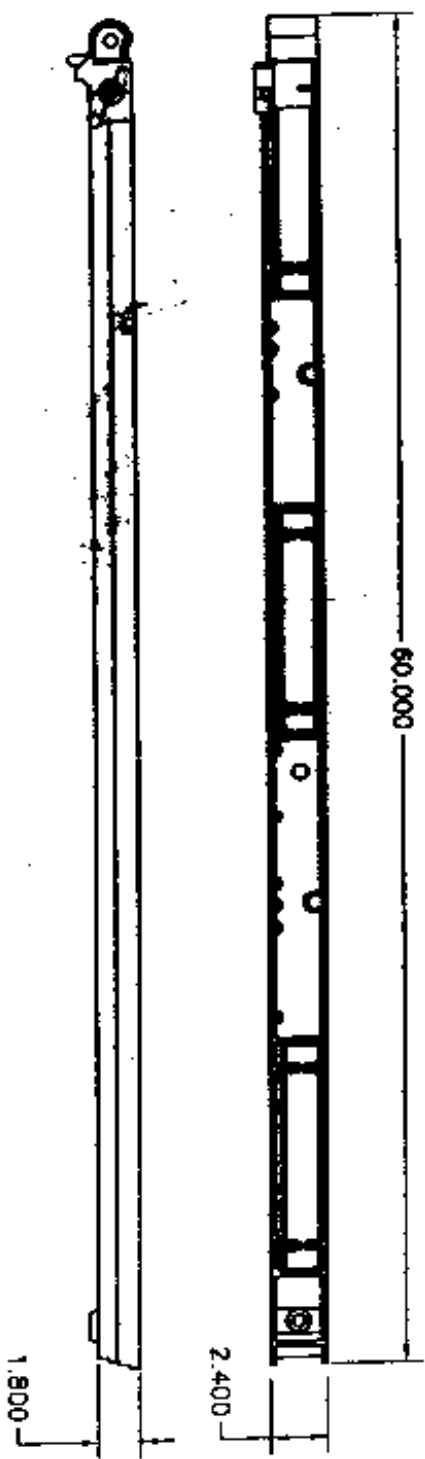


UNIQUE KNUCLE
JOINT ELIMINATES
PIVOT BOLT

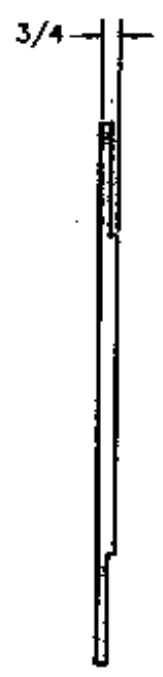
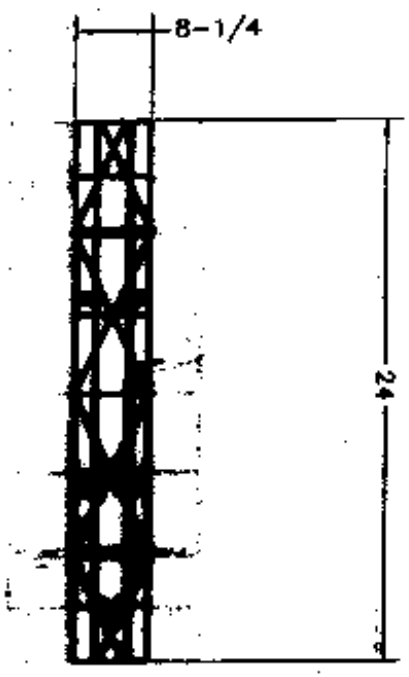
NUMEROUS RIVET
HOLES TO CREATE
VARIOUS BARRICADES



REV	01	INITIAL RELEASE	JIL	11-17-2003	DATE	
REV		REVISION DESCRIPTION	BY			
MATERIAL	POLYOLEFIN	COLOR AND FINISH	WHITE			
		THIRD ANGLE PROJECTION				
		TOLERANCES UNLESS OTHERWISE SPECIFIED				
		2 PL. DECIMALS ±	N/A			
		3 PL. DECIMALS ±	N/A			
		ANGLES ±	N/A			
<p>CTM Cortina Tool & Molding Co. 10708 WEST GRAND AVENUE, FRANKLIN PARK, IL 60131</p> <p>MODULAR BARRICADE LEG, 44" M-CADE AND TYPE III BARRICADES FOR FACTORY OR FIELD USE</p> <p>SCALE AT A SIZE 1 = 8 DRAWING NUMBER 97-1100</p> <p>DRAWN BY JIL DATE 11-17-2003</p> <p>CHECKER DATE</p> <p>REVISION 01</p>						
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01		INITIAL RELEASE	JIL	11-17-2003	DATE	
REV	REF	REVISION DESCRIPTION	BY	DATE		
MATERIAL		COLOR AND FINISH	TOLERANCES UNLESS OTHERWISE SPECIFIED			
POLYOLEFIN		WHITE	2 PL. DECIMALS ± N/A 3 PL. DECIMALS ± N/A ANGLES ± N/A			
THIRD ANGLE PROJECTION						
<p>CTM Cortina Tool & Molding Co. 10700 WEST GRAND AVENUE, FRANKLIN PARK, IL 60151</p> <p>MODULAR BARRICADE LEG, 60" M-CADE AND TYPE III BARRICADES FOR FACTORY OR FIELD USE</p>						
SCALE AT A SIZE 1" = 8"		DRAWING NUMBER		REVISION		
DRAWN BY	JIL	DATE	11-17-2003	97-1200	01	
CHECKER		DATE				
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FLAT FRONT SURFACE -
NO RAIL TO INTERFERE
WITH SHEETING



EXTENSIVE RIBBING FOR
RIGIDITY AND DURABILITY



01	INITIAL RELEASE	JIL	7-28-2003
REV	REVISION DESCRIPTION	BY	DATE
MATERIAL POLYOLEFIN	COLOR AND FINISH WHITE	THIRD ANGLE PROJECTION TOLERANCES UNLESS OTHERWISE SPECIFIED 2 PL. DECIMALS ± N/A 3 PL. DECIMALS ± N/A ANGLES ± N/A	

CTM Cortina
 Tool & Molding Co.
 10708 WEST GRAND AVENUE, FRANKLIN PARK, IL 60131

MODULAR SAND BAR, 3" X 24"
 M-CODE TYPE I AND II BARRICADES
 FOR FACTORY OR FIELD USE

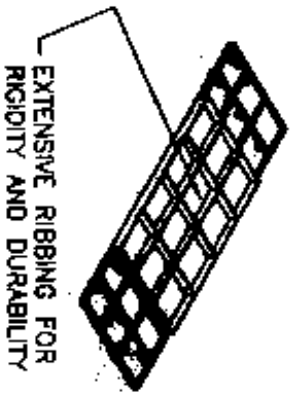
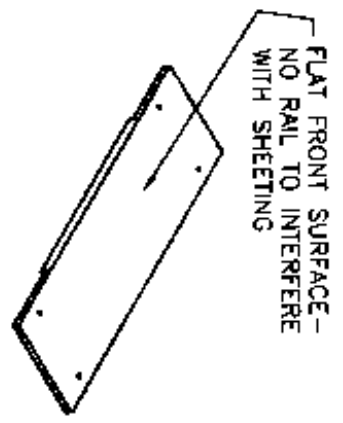
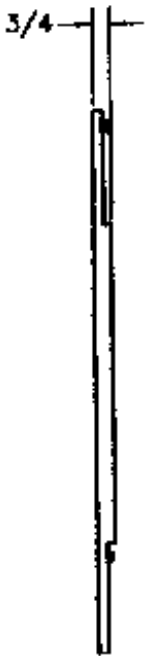
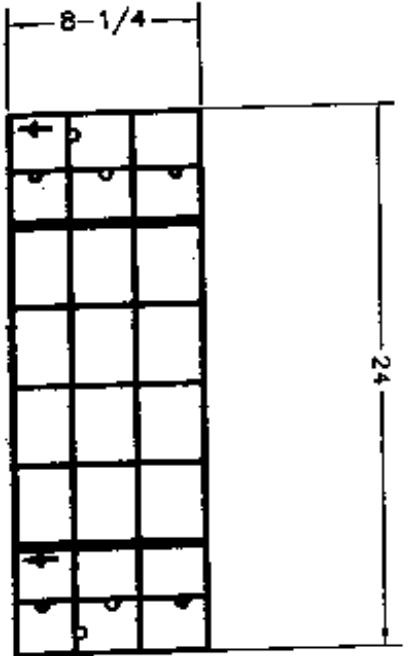
SCALE AT A SIZE 1 = 8

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CHECKER		DATE	

DRAWING NUMBER 97-1400

REVISION 01

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REV	01	INITIAL RELEASE	DATE	7-28-2001
DATE		REVISION DESCRIPTION		
		COLOR AND FINISH		
		WHITE		
		THIRD ANGLE PROJECTION		
		TELEPHONE UNLESS OTHERWISE SPECIFIED		
		3 PL. DIMENSIONS & ANGLES		
		3 PL. DIMENSIONS & ANGLES		
		3 PL. DIMENSIONS & ANGLES		

Chertina
Steel & Molding Co.
 9001 W. 24th St. #101
 Franklin Park, IL 60151

Model # 97-1500
Material 9" X 24" UNSHEETED
Finish WHITE
Quantity 1 AND 11 BARRICADES
Notes FOR FACTORY OR FIELD USE

SCALE: 1" = 8'
 DATE: 7-28-2001
 DRAWN BY: JIL
 CHECKED BY: JIL
 REVISION: 01

97-1500

