



U.S. Department  
of Transportation

**Federal Highway  
Administration**

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

March 18, 1997

Refer to: HNG-14

Mr. Henry Ross  
Vice President  
WLI Industries, Inc.  
880 North Addison Road  
Villa Park, Illinois 60181-7050

Dear Mr. Ross:

This is in response to your February 11 letter to Mr. James Hatton requesting Federal Highway Administration's (FHWA) acceptance of your "SafetyCade" work zone barricade as acceptable for use on the National Highway System (NHS). Accompanying your letter was a copy of a report and a video on the crash testing conducted by E-Tech Testing Services, Inc. The "SafetyCade" barricades are plastic, collapsible, three-piece systems consisting of an upright panel and two legs. They are molded from high-density polyethylene plastic and can be equipped with an optional plastic molded light, a battery compartment mounted below bumper height, and retro-reflective sheeting. The "SafetyCade" can also be equipped with a sand-filled plastic boot for ballast to counteract wind gusts from traffic on high-speed highways. A patented spring-loaded mechanism enables the barricade to remain vertical until struck, and then lay flat on the pavement after impact. Drawings and specifications describing the barricades and all the optional features and batteries present when tested are enclosed.

Full-scale automobile testing was conducted on two styles of "SafetyCade" barricades to assess their crashworthiness according to the criteria in the National Cooperative Highway Research Program (NCHRP) Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Safety Features. Vertical (Model ISC-102VL) and Type II (Model ISC-154LI) barricades were impacted in separate tests conforming to the NCHRP Report 350 test designation 3-71 (820 C vehicle, 100 kmh speed, zero degree angle of impact.) Because the devices are free-standing and have a mass of less than 45 kg, measurement of occupant impact velocities and ridedown accelerations are not required. The primary purposes of testing devices of this nature are to assess the potential for occupant compartment intrusion and the test vehicle's post-impact trajectory.

In each test two barricades were struck. They were struck sequentially, the first being in the normal position and the second in a perpendicular orientation about 8 m downstream of the first. The tests were conducted on smooth, dry concrete pavement. A summary of the test results is presented in the table below.

E-Tech Test Number	05-0916-001	05-0916-002
SafetyCade Model	Vertical (Model ISC-102VL)	Type II (Model ISC-154LI)
Mass (with ballast)	36.25 kg	38.25 kg
Vehicle Mass	812 kg	812 kg
Impact Speed (N*)	102.0 kmh	102.00 kmh
Impact Speed (P*)	96.10 kmh	97.70 kmh
Velocity Change (N)	2.24 kmh (0.62 m/s)	2.09 kmh (0.58 m/s)
Velocity Change (P)	2.08 kmh (0.58 m/s)	1.89 kmh (0.53 m/s)

\*N and P refer to the Normal and Perpendicular orientation of the barricade. Because two barricades (one N and one P) struck during the same test were separated longitudinally, the test vehicle slowed prior to striking the second barricade.

The barricades were destroyed during all four impacts. The majority of the vehicle damage was limited to the bumper and the hood. No parts of the test articles showed potential for penetrating the occupant compartment. The warning light and its support bracket broke from the top of the barricade in each impact causing no damage to the windshield in test 05-0916-001 and only a crack in the windshield in test 05-0916-002. (The mass of the warning light, which is mounted on top of the barricade, was 0.4 kg. The batteries, which are located at the base of the barricade, were 1.25 kg.)

The severity index for the perpendicular impact in test 05-0916-001 was 2.3 kJ below the recommended minimum value of 291.6 kJ, but this was judged to be of no significant consequence in this test. As allowed in section 3.2.3.2 of the NCHRP Report 350, low speed testing was omitted because it was determined that the high speed test would be the more critical. Tests with the 2000P vehicle were not conducted because, from a study of the front profile of the pick-up truck and small car in relation to the geometry of the test articles, it was concluded that there was less potential for an element of one of the test articles penetrating the occupant compartment of the pick-up truck than the small car. We concur in these judgements.

Because the results of the full-scale testing met the FHWA velocity change and vehicle trajectory requirements, and they caused no passenger compartment intrusion, your company's Vertical and Type II "SafetyCade" barricades are acceptable for use in work zones on the NHS, within the range of conditions tested, when requested by a State. Our acceptance is limited to the breakaway characteristics of the barricades and does not cover their structural features, nor does it cover conformity of the barricades with the Manual on Uniform Traffic Control Devices. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from you that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as those used in the crash testing, and that they will meet the FHWA change in velocity requirements.

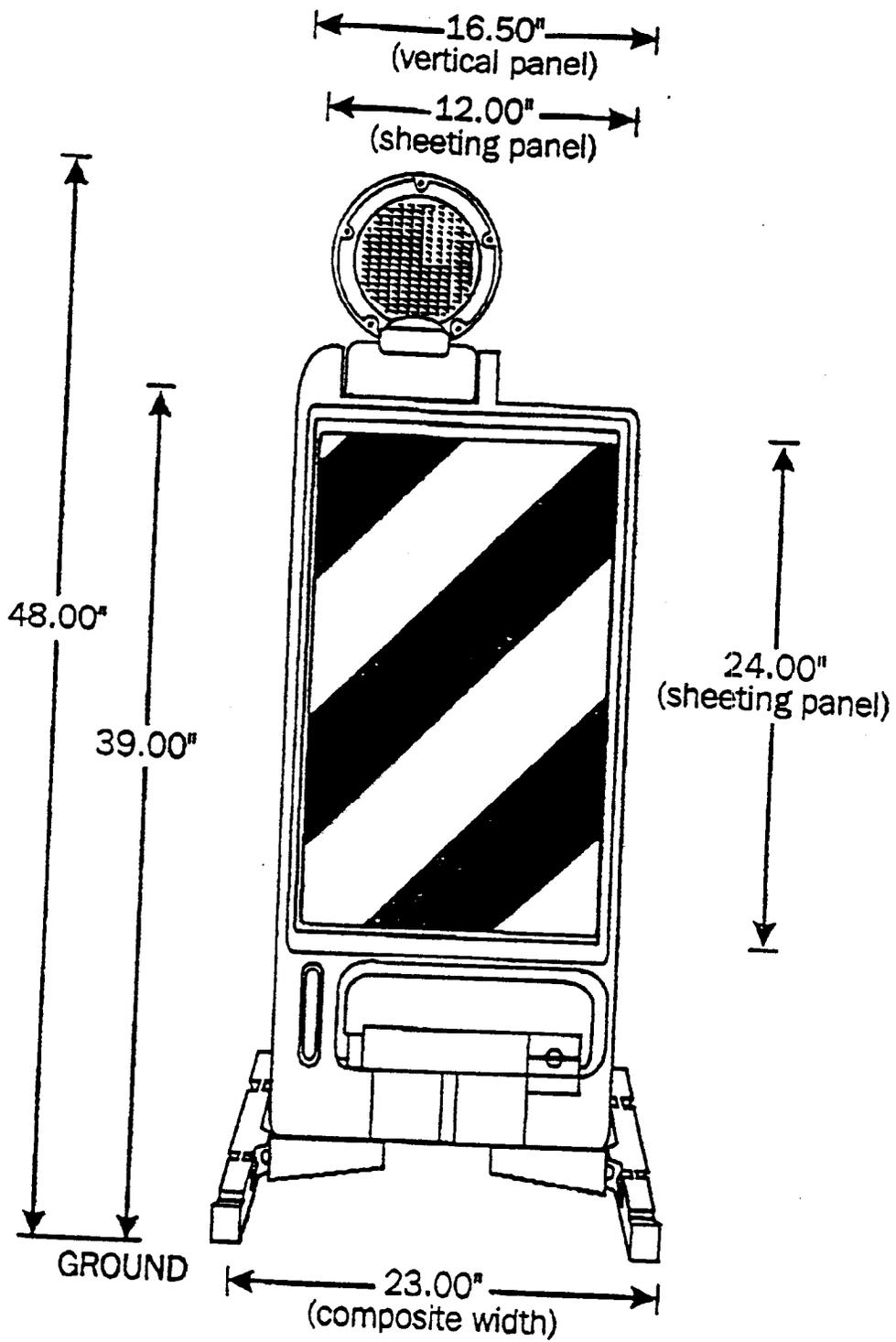
Because "SafetyCade" barricades are proprietary products, to be used in Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization 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.

Sincerely yours,



Dwight A. Horne, Chief  
Federal-Aid and Design Division

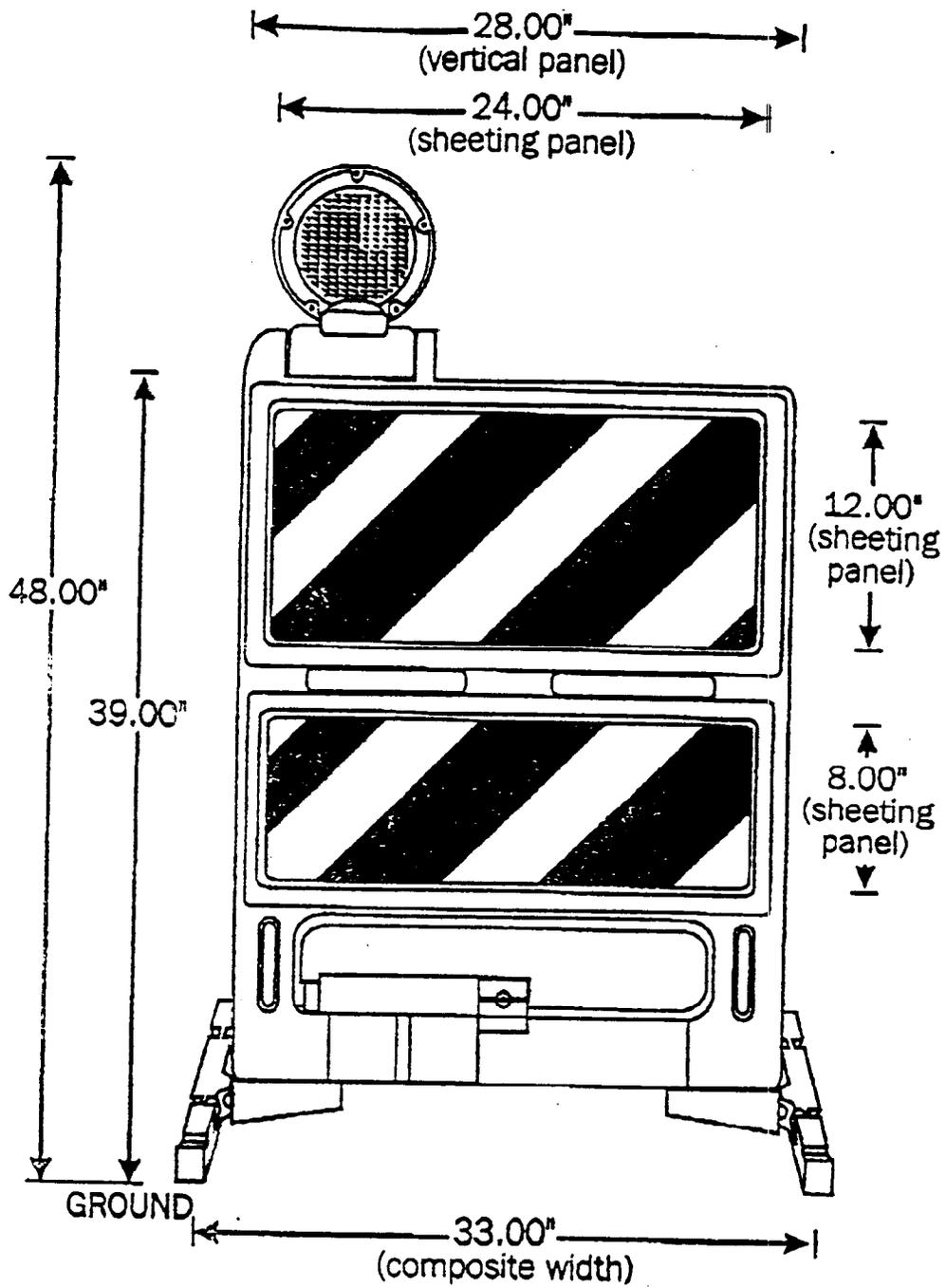
2 Enclosures



## VERTICAL SAFETYCADE BARRICADE

\*ALL DIMENSIONS ARE NOMINAL

Drawing D-1 Vertical SafetyCade Barricade



**TYPE II  
SAFETYCADE BARRICADE**

\*ALL DIMENSIONS ARE NOMINAL.

Drawing D-2 Type II SafetyCade Barricade

**SAFETYCADE®**  
**COLLAPSIBLE PLASTIC BARRICADE SPECIFICATIONS**

**DIMENSIONS:**  
(nominal)

	<u>Type I, Type II,</u> <u>SHRP Arrow</u>	<u>Vertical</u> <u>SafetyCade</u>
Height		
Upright Panel	39"	39"
With Light	48"	48"
Width		
Upright Panel	28"	16.5"
Overall (includes detent bolts)	33"	23"
Depth of Upright Panel	3"	3"
Length of Legs	36"	36"
Weight	35 lbs.	31 lbs.
Length Stacked (with light)	65"	70"

**SHIPPING:**

Skid Dimensions	65"H x 65"L x 35"W (20 units per skid)	65"H x 70"L x 46"W (40 units per skid)
Weight	740 lbs.	1280 lbs.

**SAFETYCADE BALLAST BOOT SPECIFICATIONS**  
(two per unit recommended when traffic speeds exceed 45 mph)

**DIMENSIONS:**

Height	3"
Width	9"
Depth	22"
Weight	23 lbs. (filled with sand) 2.25 lbs. (without sand)

**SHIPPING:**

**With Sand**

Quantity - 40  
Weight - 968 lbs.  
21"H x 40"L x 40"W (Skid)

**Without Sand**

Quantity - 20  
Weight - 47 lbs.  
33"H x 23"L x 19"W (Box)

(All dimensions are nominal.)

revised 9/96

these materials must occur in the United States.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel materials, to the same or greater extent as the provisions set forth in this section.

(3) The State elects to include alternate bid provisions for foreign and domestic steel materials which comply with the following requirements. Any procedure for obtaining alternate bids based on furnishing foreign steel materials which is acceptable to the Division Administrator may be used. The contract provisions must (i) require all bidders to submit a bid based on furnishing domestic steel materials, and (ii) clearly state that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic steel materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel materials by more than 25 percent.

(4) When steel materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel materials, if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the steel products as they are delivered to the project.

(c)(1) A State may request a waiver of the provisions of this section if:

(i) The application of those provisions would be inconsistent with the public interest; or

(ii) Steel materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

(3) A request for waiver, accompanied by supporting information, must be submitted in writing to the Regional Federal Highway Administrator (RPHWA) through the FHWA Division Administrator. A request must be submitted sufficiently in advance of the need for the waiver in order to allow time for proper review and action on the request. The RPHWA will have approval authority on the request.

(3) Requests for waivers may be made for specific projects, or for certain materials or products in specific geographic areas, or for combinations of both, depending on the circumstances.

(4) The denial of the request by the RPHWA may be appealed by the State to the Federal Highway Administrator (Administrator), whose action on the request shall be considered administratively final.

(5) A request for a waiver which involves nationwide public interest or availability issues or more than one FHWA region may be submitted by the RPHWA to the Administrator for action.

(6) A request for waiver and an appeal from a denial of a request must include facts and justification to support the granting of the waiver. The FHWA response to a request or appeal will be in writing and made available to the public upon request. Any request for a nationwide waiver and FHWA's action on such a request may be published in the **FEDERAL REGISTER** for public comment.

(7) In determining whether the waivers described in paragraph (c)(1) of this section will be granted, the FHWA will consider all appropriate factors including, but not limited to, cost, administrative burden, and delay that would be imposed if the provision were not waived.

(d) Standard State and Federal-aid contract procedures may be used to assure compliance with the requirements of this section.

(23 U.S.C. 315, sec. 10 of Pub. L. 98-229, 98 Stat. 55, sec. 105 of Pub. L. 97-424, 98 Stat. 2136 and 49 CFR 1.48(b))

(48 FR 53104, Nov. 25, 1983, as amended at 49 FR 18021, May 3, 1984)

#### § 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

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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.

#### § 635.413 Guaranty and warranty clauses.

(a) Except as provided in paragraph (b) of this section, clauses that require the contractor to guarantee or warrant materials and workmanship or to otherwise maintain the work for a specified period after its satisfactory completion by the contractor and its final acceptance by the State, will not be approved for use in Federal-aid contracts. Work performed and materials replaced under such guaranty or warranty clauses after final acceptance of work are not eligible for Federal participation.

(b) Contracts which involve furnishing and/or installing electrical or mechanical equipment should generally include contract clauses that require:

(1) Manufacturer's warranties or guarantees on all electrical and mechanical equipment consistent with those provided as customary trade practice, or

(2) Contractors' warranties or guarantees providing for satisfactory in-service operation of the mechanical and electrical equipment and related components for a period not to exceed 6 months following project acceptance.

#### § 635.417 Convict produced materials.

(a) Materials produced by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) *Qualified prison facility* means any prison facility in which convicts,