



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

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

January 28, 1998

Refer to: HNG-14

Ms. Sue Reiss  
Regional Manager  
Impact Recovery Systems, Inc.  
934 N. Breen's Bay Road  
Oconomowoc, Wisconsin 53066

Dear Ms. Reiss:

This is in reply to your November 13 letter to Mr. Nicholas Artimovich of my office regarding Federal Highway Administration (FHWA) acceptance of your company's traffic control devices under the National Cooperative Highway Research Program (NCHRP) Report 350 guidelines. Your original submission of July 24 included the test report "Testing and Evaluation of Work Zone Traffic Control Devices Provided by Flasher Equipment Company." (Impact Recovery Systems is the successor to Flasher Equipment.) The Report is dated January 1991, and was prepared by the Texas Transportation Institute. Our July 25, 1997, memorandum, "Identifying Acceptable Highway Safety Features," suggested the arrangement of work zone traffic control devices to be crash tested. Although the 1991 TTI tests did not replicate exactly the number, spacing, and orientation of devices we outlined in our memorandum, the tests conducted were similar enough to demonstrate the crashworthiness of the devices when actually in use.

Your letter included additional information we requested in our November 6 letter which addressed your initial submission. You also requested that various items from your initial submission not be considered at this time, namely, any devices with lights attached and the vertical panel mounted on a wooden box. We will be pleased to review your submission of devices with lights on top at your convenience. We also understand that the vertical panel mounted on a box was not a compliance test.

The items from your initial submission for which you are requesting acceptance are listed here according to the categories described in our July 25, 1997, memorandum:

- Category 1: Driveable delineator post;
- Category 2: Portable single and double vertical panels;  
Fixed single and double vertical panels; fixed chevron sign assemblies.

As delineator posts are included in our "category 1" for crashworthiness considerations, we will not review those tests for acceptance. Because the test results were indeed acceptable, you may rely on them when you certify to highway agencies that your company's delineator posts are crashworthy. We will add the TTI test information to our database of tests that show "category 1" devices are, by their very nature, crashworthy.

The vertical panel and chevron assemblies, however, are not considered "category 1" devices. We consider them to be "category 2" devices, not because of any perceived hazards associated with your company's devices, but because many vertical panel type devices are seen in work zones around the country that are mounted on entirely inappropriate bases. We have seen them on steel rods welded to tire rims, attached to concrete cinder blocks, and supported on other hazardous bases. The TTI demonstration test of the vertical panel on a wooden box showed the amount of hazardous debris that could result from an improper base. Until we gain enough crash test evidence to be able to specify what base assemblies are crashworthy and can "move" them to category 1, all vertical panels (and your company's chevron panels) will be treated by this office as category 2 devices on a case-by-case basis.

The following discussion is our review of your company's single and double vertical panels and chevron signs. Drawings and material data sheets for these devices are enclosed as Enclosure 1. The following table summarizes the tests that were conducted on single and double vertical panels and chevron signs mounted on your company's hardware:

Device	Single Vertical Panel		Double Vertical Panel		Chevron Sign
	Portable	Fixed	Portable	Fixed	
Base	Portable	Fixed	Portable	Fixed	Fixed
Test #	# 4	# 13			# 14
High Impact Speed	96.12 km/h (59.7 mph)	93.2 km/h (57.9 mph)			99.0 km/h (61.5 mph)
# Struck *	2	4			3
Occupant Impact Speed	None	None			None
Test #			# 5	# 9	# 10
Low Impact Speed			70.0 km/h (43.5 mph)	72.3 km/h (44.9 mph)	70.0 km/h (43.5 mph)
# Struck *			2	4 **	3
Occupant Impact Speed			1.7 m/s (5.5 ft/s)	None	None

\*Devices were spaced at 13.7 m (45 ft) for low speed tests and 18.3 m (60 ft) for high speed tests.

\*\*One of the devices tested had a warning light attached.

In all tests a 892-kg (1967-pound) Honda Civic was directed into two, three, or four devices. The vehicle exhibited very stable behavior during impact, even in tests where the tires of the vehicle were purposely lined up to ride directly over the devices. Damage to the vehicle ranged from none to very minor cosmetic damage.

Except for one high speed test involving chevron signs mounted on fixed bases (test 14), the spring-loaded mechanism successfully returned the traffic control devices to their pre-impact positions with, mostly, minor damage to the panel and the reflective sheeting. While the spring-loaded mechanism worked well for traffic control devices mounted on portable bases, the assemblies were typically moved around by the impacting vehicle. This could place the devices out of position and require some maintenance to return them to their proper positions.

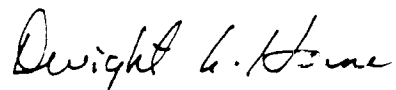
Except in situations where a driveable base was pulled out from the ground or a fixed base torn loose from the pavement, there was no debris from the devices to pose a potential hazard. Most of the base failures involved devices which had flashing light units attached. Although all such tests indicated that such devices were crashworthy, at your request, this letter does not address these devices with lights.

The tested work zone traffic control devices described above, and shown in Enclosure 1, met the change in velocity requirements of the FHWA. Therefore, they are acceptable for use on the National Highway System (NHS) when accepted by a State. Our acceptance is limited to the breakaway characteristics of the devices and does not cover their structural features. Presumably, you will provide users with sufficient information on structural design and installation requirements to ensure proper performance of your hardware and provide certification to transportation agencies that the hardware furnished will have essentially the same chemistry, mechanical properties, and geometry as those used in the tests and that it will meet FHWA change in velocity requirements.

Your company's work zone traffic control devices are proprietary products, but their use 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 products are specified for use on 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,

A handwritten signature in cursive script that reads "Dwight A. Horne".

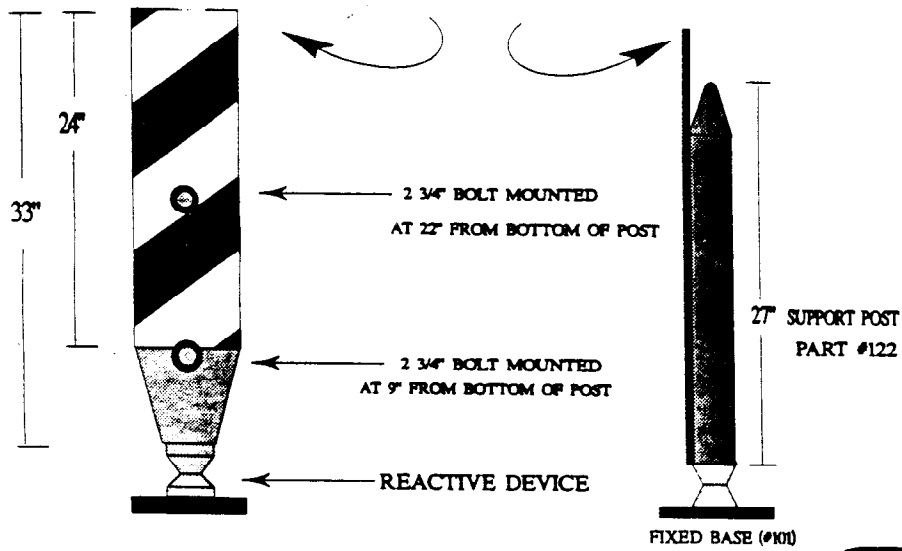
Dwight A. Horne  
Chief, Federal-Aid and Design Division

2 Enclosures

Geometric and Safety Design Acceptance Letter WZ-2

PART #130  
ORANGE AND WHITE  
RIGHT VERTICAL PANEL

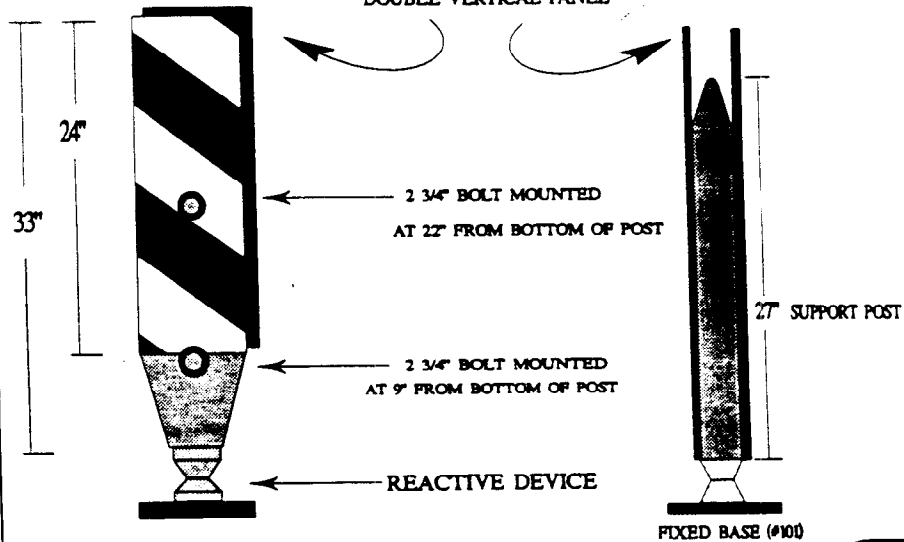
THIS UNIT ABSORBS IMPACTS FROM VEHICULAR TRAFFIC WITH LITTLE OR NO DAMAGE TO UNIT. REACTIVE DEVICE BENDS WITH IMPACT. UNIT IS MADE FROM RECYCLABLE PLASTICS.



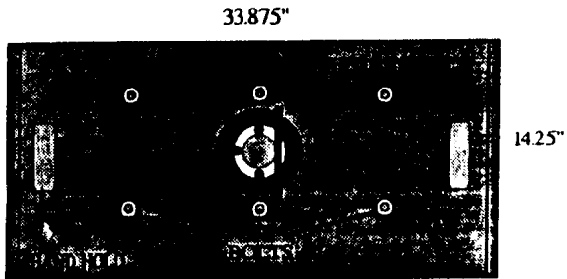
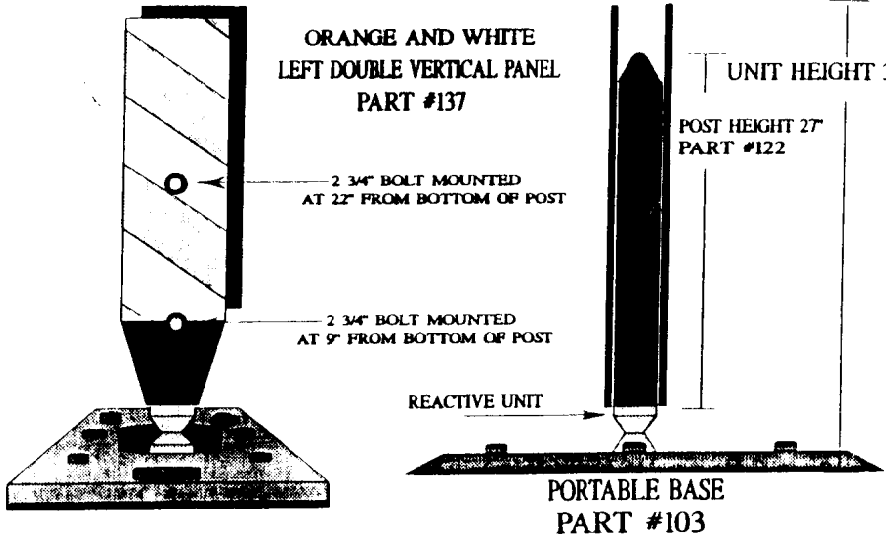
RIGHT V.P. FOR #101  
FIXED BASE  
PART #221 (TB-175)  
IMPACT RECOVERY SYSTEM  
(NOT TO SCALE)  
7/8/91

PART #137  
ORANGE AND WHITE  
DOUBLE VERTICAL PANEL

THIS UNIT ABSORBS IMPACTS FROM VEHICULAR TRAFFIC WITH LITTLE OR NO DAMAGE TO UNIT. REACTIVE DEVICE BENDS WITH IMPACT. UNIT IS MADE FROM RECYCLABLE PLASTICS.



DOUBLE LEFT V.P.  
FOR FIXED BASE  
PART #226 (TB-200)  
IMPACT RECOVERY SYSTEM  
(NOT TO SCALE)  
1/1/93

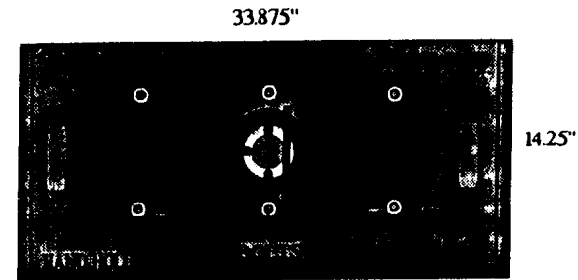
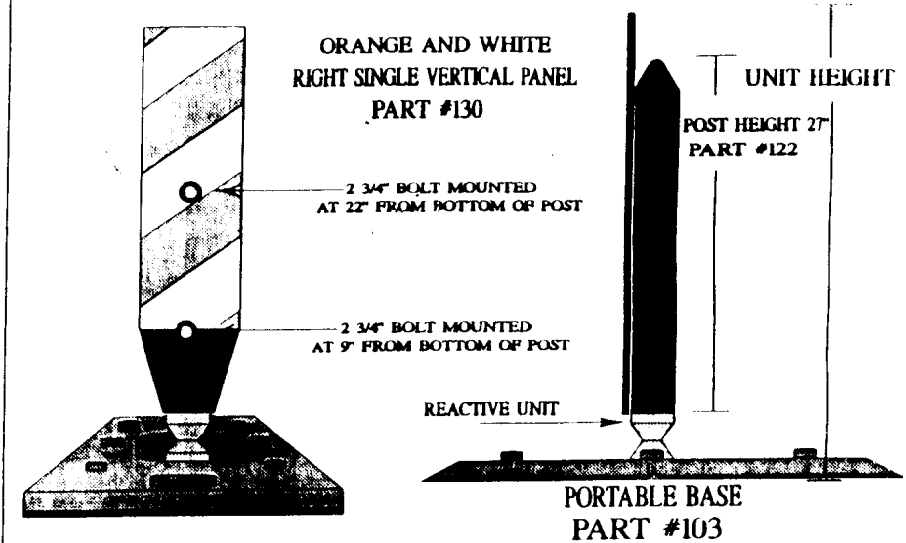


THIS UNIT ABSORBS IMPACTS FROM  
VEHICULAR TRAFFIC WITH OR NO  
DAMAGE TO UNIT REACTIVE DEVICE  
BENDS WITH IMPACT THIS UNIT  
IS MADE FROM RECYCLABLE PLASTICS

DOUBLE V.P. FOR PORTABLE BASE  
PART #228 (TB-175)

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IMPACT RECOVERY SYSTEM  
(NOT TO SCALE)  
1/1/93

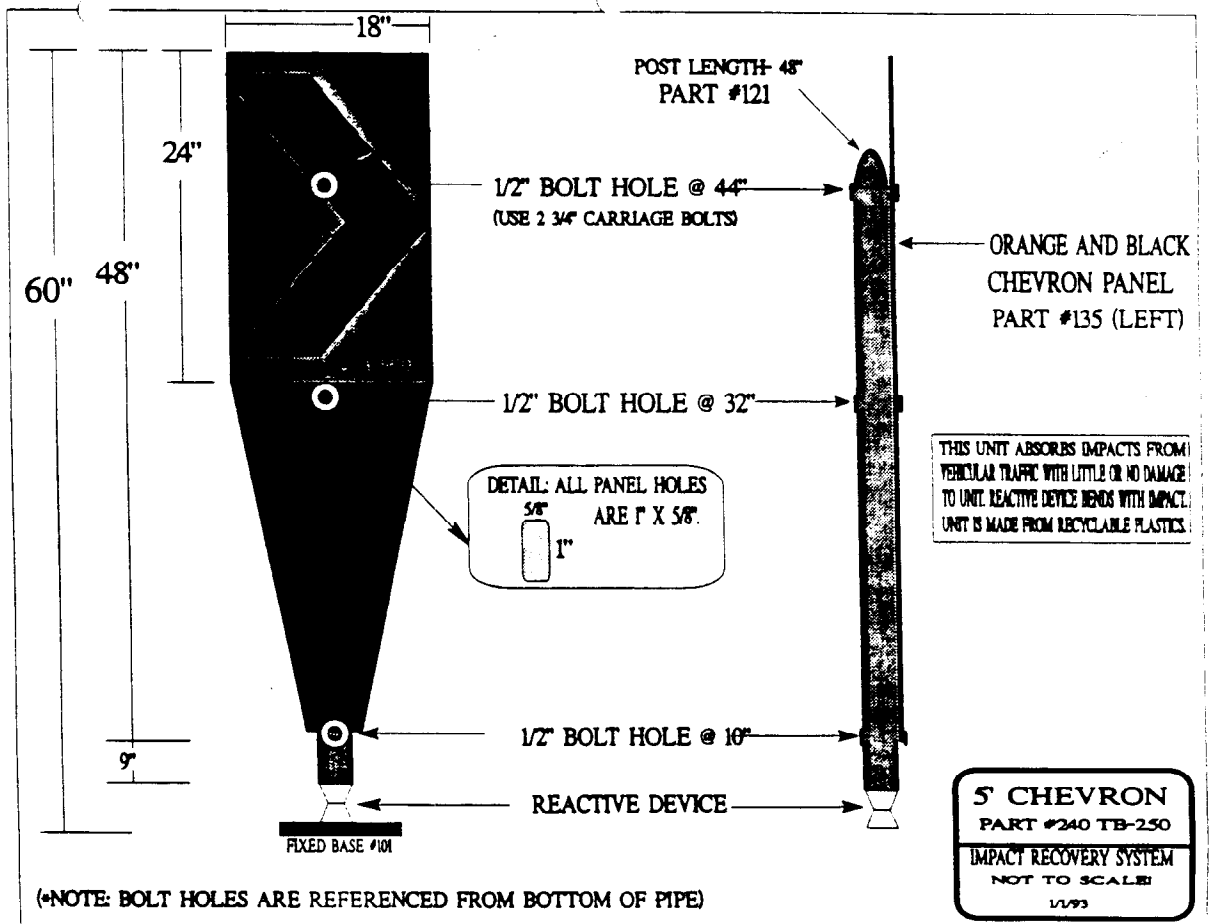
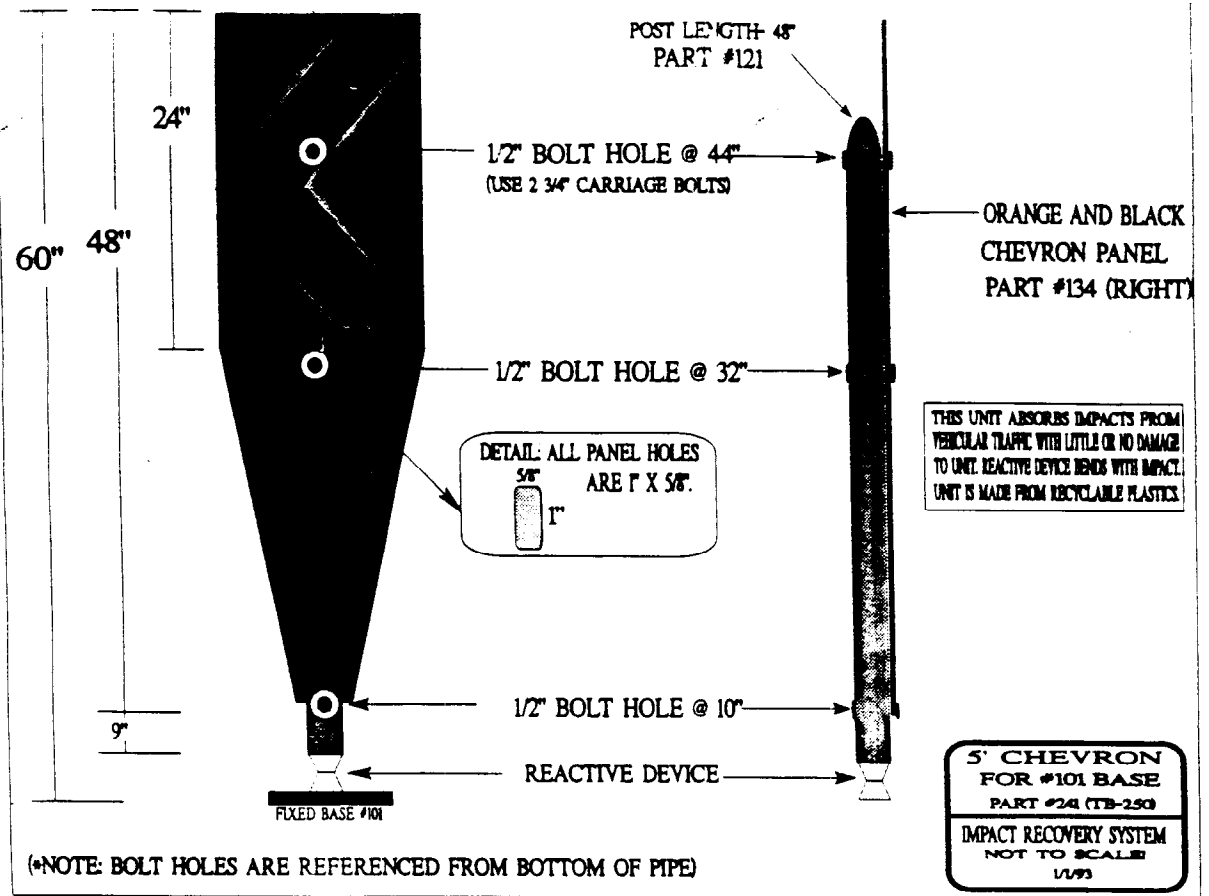


THIS UNIT ABSORBS IMPACTS FROM  
VEHICULAR TRAFFIC WITH OR NO  
DAMAGE TO UNIT REACTIVE DEVICE  
BENDS WITH IMPACT THIS UNIT  
IS MADE FROM RECYCLABLE PLASTICS

RIGHT V.P. FOR PORTABLE BASE  
PART #221 (TB-175)

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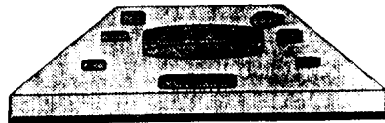
IMPACT RECOVERY SYSTEM  
(NOT TO SCALE)  
7/8/91



# IMPACT RECOVERY SYSTEMS

## PORTABLE BASE

### PART #103

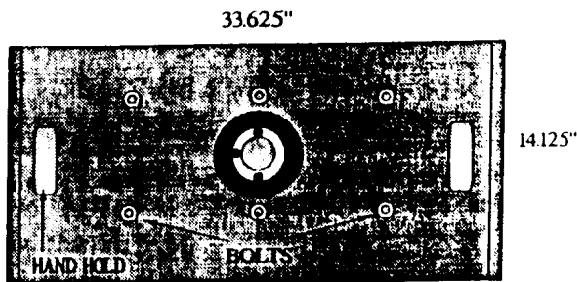


FRONT VIEW

THIS UNIT ABSORBS HIGH SPEED IMPACTS FROM VEHICULAR TRAFFIC WITH LITTLE OR NO DAMAGE TO UNIT. THIS UNIT IS MADE FROM RECYCLED RUBBER.



SIDE VIEW



TOP VIEW

(BASE WEIGHS APPROXIMATELY 355 LBS)

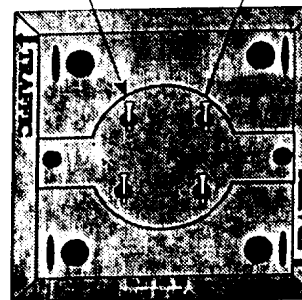
# IMPACT RECOVERY SYSTEMS

## FIXED BASE

### PART #101

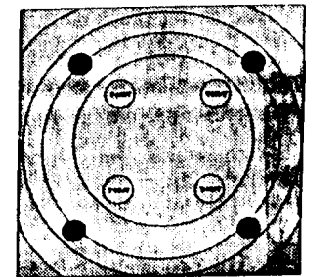
8" X 8" PLASTIC BASE

SPRING ASSEMBLY FITS INTO BASE AND ATTACHES WITH CAP SCREWS



TOP VIEW  
(NOT TO SCALE)

EPOXY FILLS UNDERSIDE OF BASE



BOTTOM VIEW

SCREWS FOR INSTALLING SPRING ASSEMBLY

FACING TRAFFIC



SIDE VIEW

FIXED BASE IS USED FOR PERMANENT INSTALLATIONS. THE #101 BASE MAY BE ATTACHED TO ASPHALT USING EPOXY OR CONCRETE ANCHORS.



the request. The RFWA 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 RFWA 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 RFWA 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.

[48 FR 53104, Nov. 25, 1983, as amended at 49 FR 18821, May 3, 1984; 58 FR 38975, July 21, 1993]

EDITORIAL NOTE: For a waiver document affecting § 635.410, see 60 FR 16478, Mar. 24, 1995.

**§ 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 com-

petitive 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 Warranty clauses.**

The SHA may include warranty provisions in National Highway System (NHS) construction contracts in accordance with the following:

(a) Warranty provisions shall be for a specific construction product or feature. Items of maintenance not eligible for Federal participation shall not be covered.

(b) All warranty requirements and subsequent revisions shall be submitted to the Division Administrator for advance approval.

(c) No warranty requirement shall be approved which, in the judgment of the Division Administrator, may place an undue obligation on the contractor for items over which the contractor has no control.

(d) A SHA may follow its own procedures regarding the inclusion of war-

ranty provisions in non-NHS Federal-aid contracts.

[60 FR 44274, Aug. 25, 1995]

**§ 635.417 Convict produced materials.**

(a) Materials produced after July 1, 1991, 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, during the 12-month period ending July 1, 1987, produced materials for use in Federal-aid highway construction projects.

[53 FR 1923, Jan. 25, 1988, as amended at 58 FR 38975, July 21, 1993]

**APPENDIX A TO SUBPART D—SUMMARY OF ACCEPTABLE CRITERIA FOR SPECIFYING TYPES OF CULVERT PIPES**

Type of drainage installation	Alternatives required			AASHTO designations to be included with alternatives	Application	Remarks
	Yes	No	Number			
Cross drains under high-type pavement. <sup>1</sup>		X			Statewide	Any AASHTO-approved material. <sup>2</sup>
Other cross-drain installations.	X		3 minimum	M-170 and M-190.	do	Do. <sup>2</sup>
Side-drain installations.	X		do	M-38	do	Do. <sup>2</sup>
Special installation conditions.		X			Individual installation.	Specified to meet special conditions.
Special drainage systems (storm sewers, inverted siphons, etc.)		X			do	Specified to meet site requirements.

<sup>1</sup> High-type pavement is generally described as FHWA construction type codes I, J, K, L, and plant mix and penetration macadam segments, respectively shown in the right-hand columns of type codes G and H having a combined thickness of surface and base of 7 in or more (or equivalent) or that are constructed on rigid bases.

<sup>2</sup> Types not included in currently approved AASHTO specifications may be specified if recommended by the State with adequate justification and approved by FHWA.

**Subpart E—Interstate Maintenance Guidelines**

SOURCE: 45 FR 20793, Mar. 31, 1980, unless otherwise noted.

**§ 635.501 Purpose.**

To prescribe Interstate maintenance guidelines and establish the policy and procedures to insure that the condition of Interstate routes is maintained at the level required by the purposes for which they were designed.