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 The Texas A&M University System
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 College Station, TX 77843-3135

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MASH-16 Compliance Assessment

Sponsor Information

Date:	September 6, 2020
Name:	Roadside Safety Pooled Fund
Company:	N/A
Address:	N/A
City, ST Zip:	N/A
Country:	United States of America

Texas A&M Transportation Institute (TTI) evaluated the product described below and found it to meet the appropriate evaluation criteria in MASH-16.

Device & Testing Criterion

System Type	Device Name/Variant	Testing Criterion	Test Level
Longitudinal Barriers	Oregon F-Shape Concrete Median Barrier (free-standing condition)	MASH-16	TL3

Disclosure of Financial Interest

- TTI has no financial interest beyond payment for services for design and/or evaluation of this product.
- Other (describe):

Product Description

- New Hardware
 Significant Modification to Existing Hardware
 Non-significant Modification to Existing Hardware

The Oregon F-Shape Concrete Median Barrier (free-standing condition) is comprised of 12 ft-6 inch long precast concrete barrier segments that are connected to each other using pin-and-loop connections. The standard barrier configuration is 32 inches tall, and the tall barrier configuration is 42 inches tall. Attachment A shows a detailed drawing of the Oregon F-Shape Concrete Median Barrier (free-standing condition).

Evaluation Results

Any full-scale crash testing performed by TTI as part of this evaluation was done in compliance with MASH-16.

MASH Test Number	Description/Justification	Evaluation Results
3-10 (1100C)	<p>MASH Test 3-10 was successfully performed on the 32-inch tall Oregon F-Shape Concrete Median Barrier (free-standing condition) and is documented in Report No. 607911-1&2, "MASH TL-3 Testing and Evaluation of Free-Standing Portable Concrete Barrier."</p> <p>MASH Test 3-10 has not been conducted on the 42-inch tall Oregon F-Shape Concrete Median Barrier (free-standing condition). However, the 42-inch tall barrier has the same profile as the 32-inch tall barrier and has a greater height. Thus, the 42-inch tall barrier can be considered less critical than the 32-inch tall barrier when considering vehicle stability, structural adequacy, and occupant risk.</p> <p>The 32-inch tall and 42-inch tall Oregon F-Shape Concrete Median Barriers (free-standing condition) can be considered satisfactory according to MASH Test 3-10 evaluation criteria.</p>	Non-critical, not performed
3-11 (2270P)	<p>MASH Test 3-11 was successfully performed on the 32-inch tall Oregon F-Shape Concrete Median Barrier (free-standing condition) and is documented in Report No. 607911-1&2, "MASH TL-3 Testing and Evaluation of Free-Standing Portable Concrete Barrier."</p> <p>MASH Test 3-11 has not been conducted on the 42-inch tall Oregon F-Shape Concrete Median Barrier (free-standing condition). However, the 42-inch tall barrier has the same profile as the 32-inch tall barrier and has a greater height. Thus, the 42-inch tall barrier can be considered less critical than the 32-inch tall barrier when considering vehicle stability, structural adequacy, and occupant risk.</p> <p>The 32-inch tall and 42-inch tall Oregon F-Shape Concrete Median Barriers (free-standing condition)</p>	Non-critical, not performed

	can be considered satisfactory according to MASH Test 3-11 evaluation criteria.	

Signature(s)

- New Hardware or Significant Change to Existing Hardware:* By signature below, the researcher has determined that the critical crash test(s) for this device was (were) conducted in accordance with MASH-16 criteria. The researcher has determined that no additional crash tests are necessary to determine MASH-16 compliance.
- Non-significant Change to Existing Hardware:* By signature below, the researcher has determined that the modification to existing hardware is deemed non-significant.

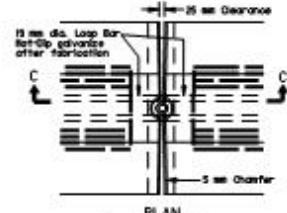
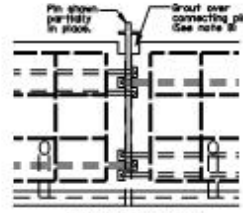
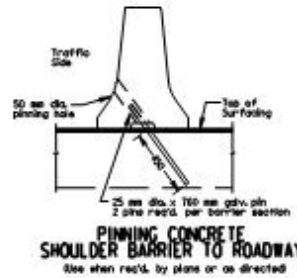
Researcher Name:	Sana Moran, E.I.T.
Researcher Signature:	<i>Sana Moran</i>
Company:	Texas A&M Transportation Institute
Address:	3135 TAMU
City, ST Zip:	College Station, TX 77843-3135
Country:	USA

TTI Crash Testing Performed: Yes (lab signature required) No (lab signature not required)

Laboratory Name:	
Laboratory Signature:	
Address:	
City, ST Zip:	
Country:	
Accreditation Certificate Number and Dates of Current Accreditation Period:	

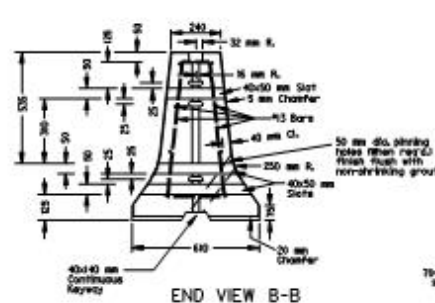
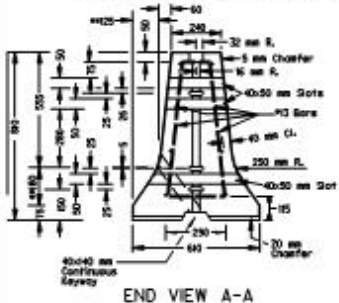
Attachment A

Detailed Drawing of the Oregon F-Shape Concrete Median Barrier



PIN AND LOOP CONNECTION

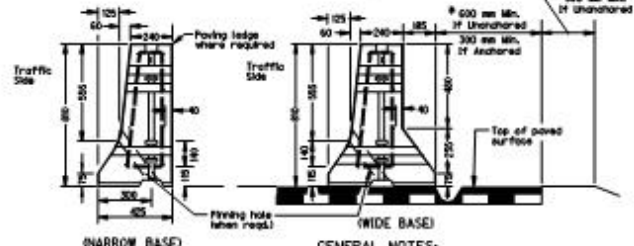
Dimensions worked thus are to the intersection point of the barrier slopes. Construct the 250 mm radius to provide a smooth transition between the slopes.



- Pin Notes:**
1. Washer shall be forged as integral part of pin or shall be welded as shown.
 2. Pin shall be galvanized after fabrication.
 3. Pins that conform to critical dimensions, pin length & dia., washer dia. & thickness acceptable if an approved top configuration for lifting the pin is provided.
 4. Pins shall conform to ASTM A443.

SHOULDER BARRIER

For assembly details and dimensions, see median barrier of left.
* Barrier used as shoulder barrier and placed in areas where these dimensions cannot be obtained shall be pinned or otherwise anchored.

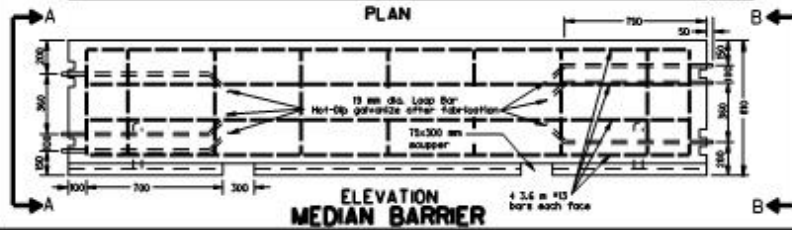
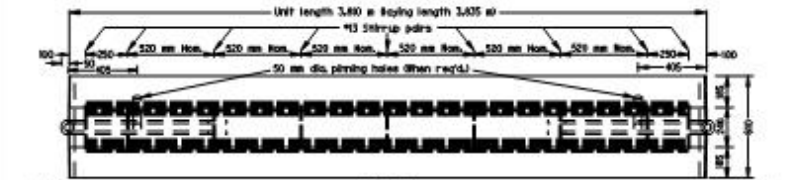
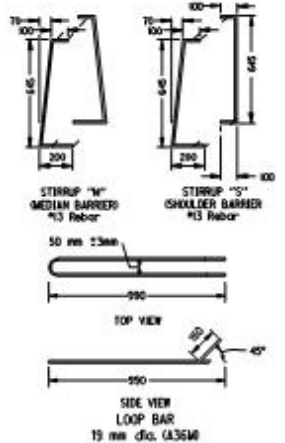
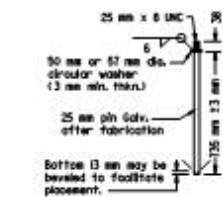


GENERAL NOTES:

1. All steel reinforcement shall be 50 mm clear of nearest face of concrete unless otherwise shown.
2. Maximum chord length for curves with a 435 m radius or less shall be 3.80 m. Maximum chord length for curves with radii exceeding 435 m shall be 7.620 m.
3. Normal use of precast barrier units is restricted to curvatures with radii greater than 235 m.
4. Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
5. Concrete median barrier is an acceptable alternate to wide base shoulder barrier.
6. Temporary concrete barrier to be precast concrete median barrier with pin and loop assembly.
7. When scuppers are not required, plug them with a minimum 50 mm of grout.
8. Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be a non-shrinking grout, weak in strength and of thick consistency.
9. Precast barrier used as permanent median barrier in median less than 2.4 m in width shall be anchored to the roadway. See 3rd. Div. No. RD56 for details.

All dimensions are in mm unless otherwise noted.

PIN DETAIL

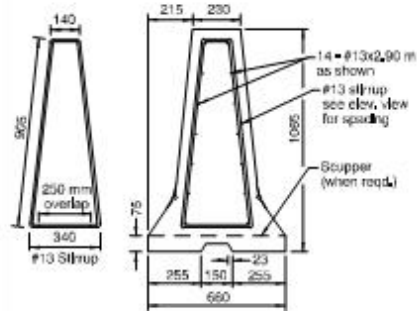


NOTE: All material and workmanship shall be in accordance with the current State of Oregon Standard Specifications for Highway Construction.

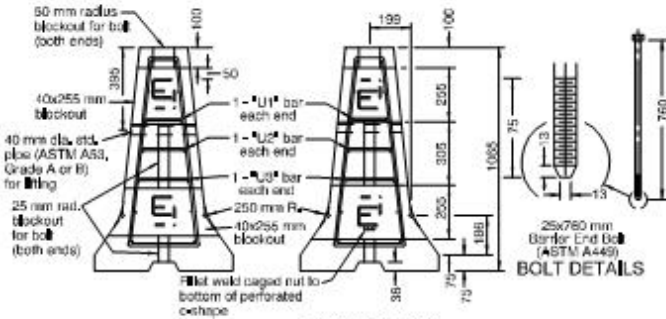
OREGON DEPARTMENT OF TRANSPORTATION
STANDARD PRECAST CONCRETE BARRIER
PIN AND LOOP ASSEMBLY
JANUARY 1996

DATE	REVISION	APPROVED
12-93	REVISED DETAIL AND NOTE	<i>[Signature]</i>
8-90	REVISED DIMENSIONS	STANDARD ENGINEER
11-83	REVISED DETAILS	

DRG. NO. RD500



TYPICAL SECTION



END VIEW A-A

END VIEW B-B

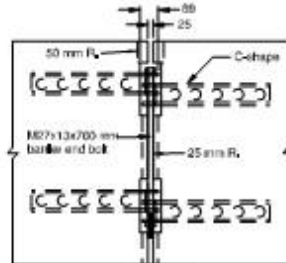


U-BAR DETAIL
* Vertical back barrier #13 bar

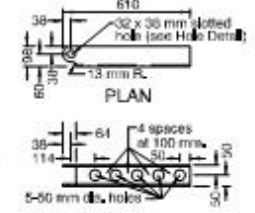
BOLT DETAILS



PLAN

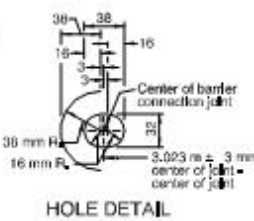


SECTION C-C



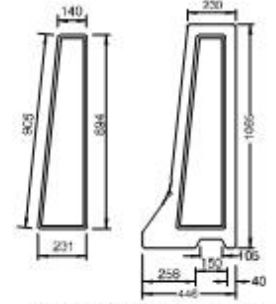
ELEVATION
PERFORATED C-SHAPE

Cut from 7.9 mm thick steel plate or bar (AASHTO M183M, ASTM A36M).
Hot dip galvanized after fabrication. (See note 5 for coating instructions).



HOLE DETAIL

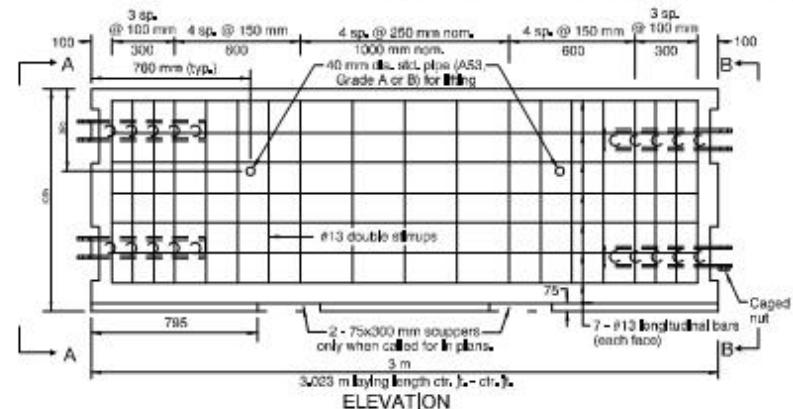
- GENERAL NOTES**
- All reinforcing steel shall conform to ASTM A708M or AASHTO M31M (ASTM A615M) Grade 420. All bars shall be full length as shown and shall be placed 50 mm clear of the nearest face of concrete unless shown otherwise.
 - All structural steel including fasteners shall be hot-dip galvanized after fabrication.
 - Normal use of precast tall median barrier is restricted to curves with radii greater than 220 m.
 - Chamfer all edges 20 mm (typical).
 - Perforated C-shape shall be placed in location shown to a tolerance of 2 mm.
 - Estimated barrier weight is 2880 kg per 3 m unit length. Estimated vertical backed barrier weight is 2340 kg.



NARROW BASE BARRIER

Only use against retaining walls or as directed.
(For details not shown see other barrier details on this sheet.)

- All dimensions are in mm unless otherwise noted.



ELEVATION



NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS	
PRECAST TALL (1065 mm) CONCRETE BARRIER	
DATE	REVISIONS (DATE)