



1200 New Jersey Avenue, SE.
Washington, DC 20590

In Reply Refer To: HSSD/B-165

Malcolm H. Ray, P.E., Ph.D.
MDS LLC
186 Staples Hill Road
Canton, ME 04221

Dear Dr. Ray:

This letter is in response to your request for Federal Highway Administration (FHWA) acceptance of roadside safety systems for use on the National Highway System (NHS).

Name of systems: **MDS-4** and **MDS-5**
Type of systems: Steel longitudinal barriers/bridge railings
Test Level: NCHRP Report 350 and MASH-08
Testing conducted by: German Federal Highway Research Institute (BAST)
Date of request: August 1, 2007
Date of follow-up: February 16, 2008

You requested that we find this system 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".

Requirements

Longitudinal barriers should meet the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features". FHWA memorandum "ACTION: Identifying Acceptable Highway Safety Features" of July 25, 1997 provides further guidance on crash testing requirements of longitudinal barriers. You have also chosen to anticipate the adoption of MASH-08, an option that FHWA has offered with the understanding that additional testing may need to be done if changes to the test criteria are made before MASH-08 is formally adopted.

Product description

The MDS-4 and MDS-5 are all-steel safety-shape barriers. The barrier has a unique sliding base assembly that is bolted directly to the bridge deck. The base plate is attached to the deck using four deck anchor bolts that may either be drilled through the deck or epoxyed into the deck depending on the deck design requirements. Six meter long (19.7 ft) 980-mm (38.6 in) high safety-shape panels made of 4 mm (0.1575 inch) thick steel plate are attached to the sliding base



and a circular steel tube top rail is mounted to the top of the bridge panels. During an impact, the sliding base is activated in the impact area. This base design allows the panels to push backwards in the impact area dissipating energy while also greatly minimizing the forces experienced by the bridge deck.

The safety-shape panels have dimensions that place it between the conventional dimensions of the New Jersey shape and the F-shape. The barrier is available in two varieties: a 1.240 m (4.1 ft) high system suitable for NCHRP Report 350 Test Level 4 (TL-4) conditions, called the MDS-4, and a 1.595 m (5.2 ft) high system suitable for NCHRP Report 350 Test Level 5 (TL-5) conditions, called the MDS-5. Both versions of the MDS barrier can be used with or without optional noise barriers that are attached to the rear face of the safety barrier. The noise barrier does not contribute to the safety performance of the railing. Design details of MDS-4 and MDS-5 are provided in Enclosure 1.

Testing

NCHRP Report 350 requires that in order for longitudinal barriers to meet TL-4 or TL-5 criteria they must successfully pass Tests 10 and 12 and Test 11 may be optional. The NCHRP Report 350 recommends that the results of Test 12 be carefully examined prior to deciding whether Test 11 is needed. Moreover, it notes that satisfactory performance in Test 12 does not assure satisfactory performance in Test 11.

The MDS-4 and MDS-5 barriers were developed in Europe and underwent full crash testing to the European criteria EN 1317. According to the information you provided, all tests were successful (summary of test results is presented in the enclosed tables numbered 2 through 5), however, none of the tests you submitted for our review exactly matched the tests recommended in NCHRP Report 350. In your report you argued that the conducted tests show that: the MDS-4 barrier satisfies both the NCHRP Report 350 and MASH-08 for TL-4 conditions; and that the MDS-5 barrier satisfies both the NCHRP Report 350 and MASH-08 for TL-5 conditions. Specifically, you provided the following table comparing the test conditions to the each of the above standards.

Parameter	Report 350	MASH-08	EN1317
Test	4-10/5-10	4-10/5-10	TB-11
Vehicle Type	Passenger Car	Passenger Car	Passenger Car
Vehicle Mass (kg)	820	1100	900
Vehicle c.g. height (mm)	550		490
Impact Velocity (km/hr)	100	100	100
Impact Angle (deg)	20	25	20
Impact Severity (kJ)	37,007	75,797	40,617
Test	4-12	4-12	TB-51
Vehicle Type	Single Unit Truck	Single Unit Truck	Bus
Vehicle Mass (kg)	8,000	10,000	13,000
Vehicle c.g. height (mm)	1,250	1,700	1400
Impact Velocity (km/hr)	80	90	70
Impact Angle (deg)	15	15	20
Impact Severity (kJ)	132,320	209,334	287,478
Test	5-12	5-12	TB-81
Vehicle Type	Tractor Trailer	Tractor Trailer	Tractor Trailer
Vehicle Mass (kg)	36,000	36,000	38,000
Vehicle c.g. height (mm)	Not specified	1,850	1,900
Impact Velocity (km/hr)	80	80	65
Impact Angle (deg)	15	15	20
Impact Severity (kJ)	595,438	595,438	724,562

Based on the comparison of the test conditions, we concur that the results of EN 1317 tests TB-11 (passenger car) and TB-51 (bus) conducted on MDS-4 barrier are indicative of the performance in Tests 4-10 and 4-12 of the NCHRP Report 350 and MASH-08. Likewise, it seems reasonable to accept the results of EN 1317 Tests TB-11 and TB-81 conducted on MDS-5 barrier as indicative of the performance of the barrier in Tests 5-10 and 5-12 of the NCHRP Report 350 and MASH-08.

However, none of the tests conducted on MDS-4 and MDS-5 barriers are indicative of the performance of the barrier with the pick-up truck in Tests 4-11 and 5-11. We concur that the shape of the barrier face is within the range of previously tested safety shapes. However, in your initial submission the plates forming the face of the barrier were of thinner sheet steel. We expressed our concern that rigid elements of the pick-up truck's suspension or wheel assembly could deform that steel and result in a hard snag. We recommended an increase in thickness of those steel plates to 4 mm and you agreed.

Based on the results of the conducted tests and their comparability to the tests recommended by NCHRP 350 and MASH-08, we consider the MDS-4 and MDS-5 barriers acceptable for use on the NHS as NCHRP 350 MASH-08 TL-4 and TL-5 barriers, respectively, without a pickup truck test. The above systems may be used at all appropriate locations on the NHS when selected by the contracting authority, subject to the provisions of Title 23, Code of Federal Regulations, Section 635.411, as they pertain to proprietary products.

Please note that this acceptance is for MDS-4 and MDS-5 barriers proper and currently there are no transitions to this barrier accepted to NCHRP 350 criteria. Until crashworthy transitions can be designed and tested, an approach consisting of a w- or thrie-beam transition to a concrete safety shape may be used, with the MDS barriers anchored to the end of the concrete section. Also, this acceptance is based on the reported crash performance of the barrier and is not meant to address its installation, maintenance or repair characteristics.

Because it is a steel product, the MDS-4 and MDS-5 barriers are subject to Section 635.410 (Buy America) of Title 23, U.S. Code of Federal Regulations, and cannot be permanently incorporated into any federally funded project unless it is made in the U.S. from U.S. steel.

Because MDS-4 and MDS-5 barriers are currently made in Europe and detailed drawings in standard U.S. dimensions and nomenclature are not currently available, you will be expected to certify to any users that the barrier provided for installation is identical to that which was tested, particularly in regard to material specifications and anchorage details.

Standard provisions

Please note the following standard provisions that apply to FHWA letters of acceptance:

- This 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 described in this letter, we reserve 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 it will meet the crashworthiness requirements of the FHWA, NCHRP Report 350, and the AASHTO MASH-08.
- To prevent misunderstanding by others, this letter of acceptance is designated as number B-165 and 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 MDS-4 and MDS-5 barriers are patented products and considered proprietary. If proprietary devices are specified by a highway agency 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 the 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.
- 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,

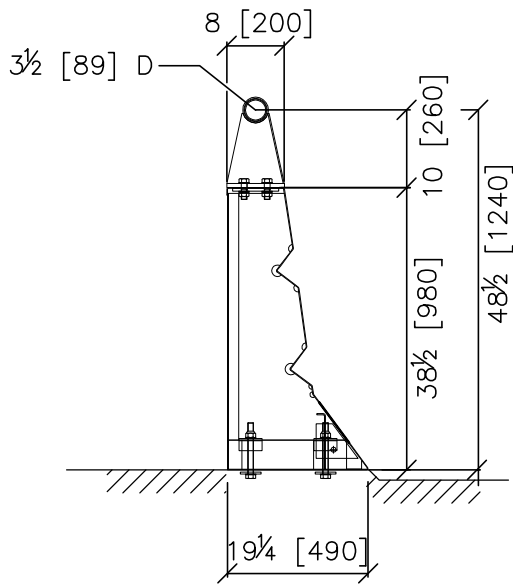
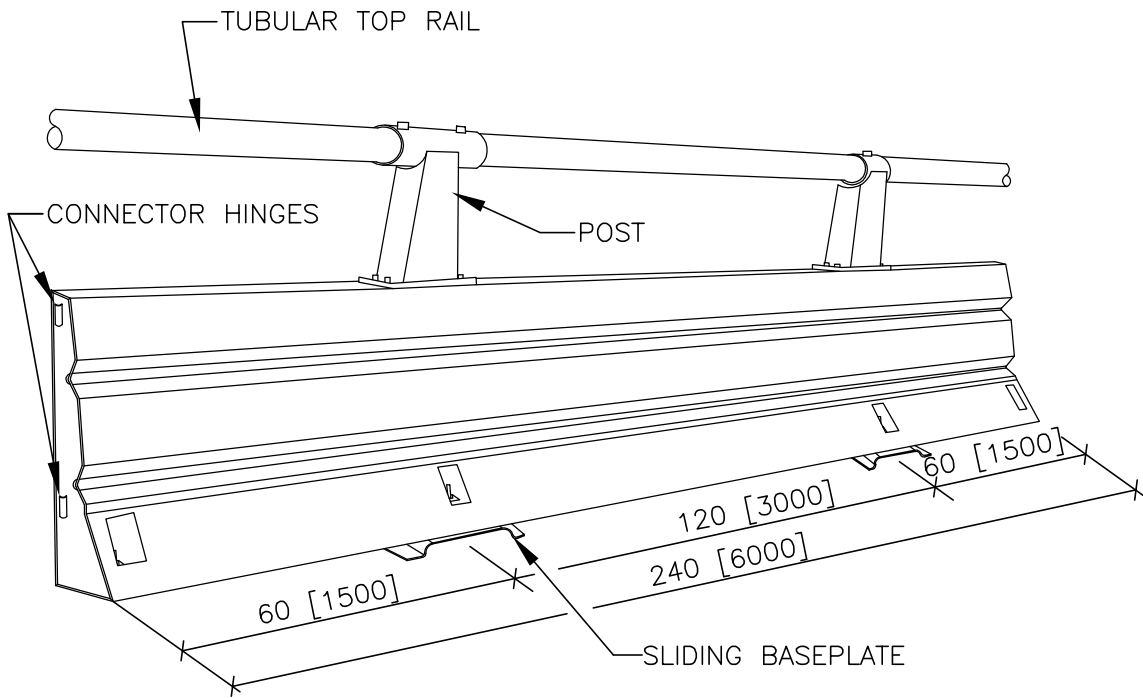
David A. Nicol, P.E.
Director, Office of Safety Design
Office of Safety

Enclosures

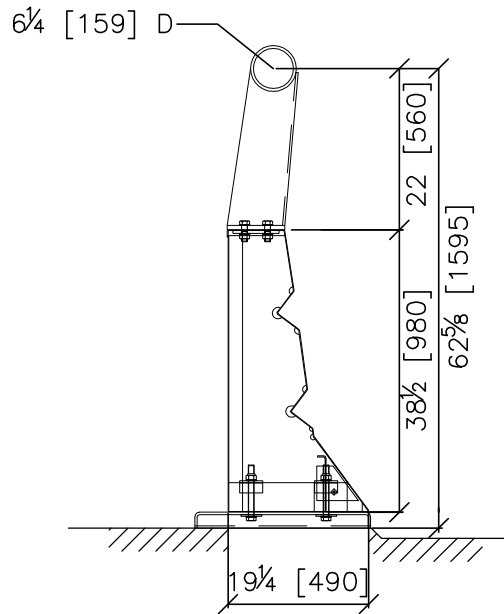
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cc: HSSD (Reader, HSA; Chron File, HSSD; N.Artimovich, HSSD;
M.McDonough, HSSD)



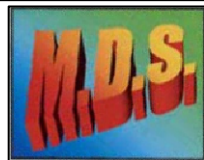
SBS01d



SBS01e

NOTE: STEEL PLATES ON THE TRAFFIC FACE ARE 4 [1/32] THK

MDS BRIDGE RAILING



SB001d-e

SHEET NO.	DATE:
1 OF 2	2008

Table 5. Safety Evaluation Summary – Test BAST/2006 7D 04/HK (Report 350 5-12) of the MDS-5 Barrier.

Evaluation Factors	Evaluation Criteria	Result												
Structural Adequacy	A. Test article should contain and redirect the vehicle; the vehicle should not penetrate, underride, or override the installation although controlled lateral deflection of the test article is acceptable.	Pass												
	B. The test article should readily activate in a predictable manner by breaking away, fracturing or yielding.	NA												
	C. Acceptable test article performance may be by redirection, controlled penetration or controlled stopping of the vehicle.	NA												
Occupant Risk	D. Detached elements, fragments or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment, or present an undue hazard to other traffic, pedestrians or personnel in a work zone. Deformations of, or intrusions into, the occupant compartment that could cause serious injuries should not be permitted.	Pass												
	E. Detached elements, fragments or other debris from the test article, or vehicular damage should not block the driver's vision or otherwise cause the driver to lose control of the vehicle.	NA												
	F. The vehicle should remain upright during and after the collision although moderate roll, pitching and yawing are acceptable.	NA												
	G. It is preferable, although not essential, that the vehicle remain upright during and after collision.	Pass												
	H. Occupant impact velocities should satisfy the following: <table border="1" data-bbox="541 1087 1153 1257"> <thead> <tr> <th colspan="3">Occupant Impact Velocity Limits (m/s)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>9</td> <td>12</td> </tr> <tr> <td>Longitudinal</td> <td>3</td> <td>5</td> </tr> </tbody> </table>	Occupant Impact Velocity Limits (m/s)			Component	Preferred	Maximum	Longitudinal and Lateral	9	12	Longitudinal	3	5	NA
	Occupant Impact Velocity Limits (m/s)													
	Component	Preferred	Maximum											
	Longitudinal and Lateral	9	12											
	Longitudinal	3	5											
	I. Occupant ridedown accelerations should satisfy the following: <table border="1" data-bbox="541 1283 1153 1417"> <thead> <tr> <th colspan="3">Occupant Ridedown Acceleration Limits (g's)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>15</td> <td>20</td> </tr> </tbody> </table>	Occupant Ridedown Acceleration Limits (g's)			Component	Preferred	Maximum	Longitudinal and Lateral	15	20	NA			
Occupant Ridedown Acceleration Limits (g's)														
Component	Preferred	Maximum												
Longitudinal and Lateral	15	20												
J. (Optional) Hybrid III dummy responses.	NA													
Vehicle Trajectory	K. After collision it is preferable that the vehicle's trajectory not intrude into adjacent traffic lanes.	Pass												
	L. The occupant impact velocity in the longitudinal direction should not exceed 12 m/sec and the occupant rideown acceleration in the longitudinal direction should not exceed 20 G's.	NA												
	M. The exit angle from the test article preferable should be less than 60 percent of test impact angle, measured at the time of vehicle loss of contact with test device.	0° < 0.6 · 20° Pass												
	N. Vehicle trajectory behind the test article is acceptable.	NA												

NA = Criterion not applicable to this test condition.

Table 4. Safety Evaluation Summary – Test BAST/2006 7D 03/HK (Report 350 5-10) of the MDS-5 Barrier.

Evaluation Factors	Evaluation Criteria	Result												
Structural Adequacy	A. Test article should contain and redirect the vehicle; the vehicle should not penetrate, underide, or override the installation although controlled lateral deflection of the test article is acceptable.	Pass												
	B. The test article should readily activate in a predictable manner by breaking away, fracturing or yielding.	NA												
	C. Acceptable test article performance may be by redirection, controlled penetration or controlled stopping of the vehicle.	NA												
Occupant Risk	D. Detached elements, fragments or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment, or present an undue hazard to other traffic, pedestrians or personnel in a work zone. Deformations of, or intrusions into, the occupant compartment that could cause serious injuries should not be permitted.	Pass												
	E. Detached elements, fragments or other debris from the test article, or vehicular damage should not block the driver's vision or otherwise cause the driver to lose control of the vehicle.	NA												
	F. The vehicle should remain upright during and after the collision although moderate roll, pitching and yawing are acceptable.	Pass												
	G. It is preferable, although not essential, that the vehicle remain upright during and after collision.	NA												
	H. Occupant impact velocities should satisfy the following: <table border="1" data-bbox="536 1123 1149 1287"> <thead> <tr> <th colspan="3">Occupant Impact Velocity Limits (m/s)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>9</td> <td>12</td> </tr> <tr> <td>Longitudinal</td> <td>3</td> <td>5</td> </tr> </tbody> </table>	Occupant Impact Velocity Limits (m/s)			Component	Preferred	Maximum	Longitudinal and Lateral	9	12	Longitudinal	3	5	5.7 Pass 6.5 Pass NA
	Occupant Impact Velocity Limits (m/s)													
	Component	Preferred	Maximum											
	Longitudinal and Lateral	9	12											
	Longitudinal	3	5											
	I. Occupant ridedown accelerations should satisfy the following: <table border="1" data-bbox="536 1319 1149 1453"> <thead> <tr> <th colspan="3">Occupant Ridedown Acceleration Limits (g's)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>15</td> <td>20</td> </tr> </tbody> </table>	Occupant Ridedown Acceleration Limits (g's)			Component	Preferred	Maximum	Longitudinal and Lateral	15	20	6.2 Pass 9.3 Pass			
Occupant Ridedown Acceleration Limits (g's)														
Component	Preferred	Maximum												
Longitudinal and Lateral	15	20												
J. (Optional) Hybrid III dummy responses.	NA													
Vehicle Trajectory	K. After collision it is preferable that the vehicle's trajectory not intrude into adjacent traffic lanes.	Pass												
	L. The occupant impact velocity in the longitudinal direction should not exceed 12 m/sec and the occupant rideown acceleration in the longitudinal direction should not exceed 20 G's.	NA												
	M. The exit angle from the test article preferable should be less than 60 percent of test impact angle, measured at the time of vehicle loss of contact with test device.	5° < 0.6 · 20° Pass												
	N. Vehicle trajectory behind the test article is acceptable.	NA												

NA = Criterion not applicable to this test condition.

Table 3. Safety Evaluation Summary – Test Bast/2004 7D 34/HB (Report 350 4-12) of the MDS-4 Barrier.

Evaluation Factors	Evaluation Criteria	Result	
Structural Adequacy	A. Test article should contain and redirect the vehicle; the vehicle should not penetrate, underride, or override the installation although controlled lateral deflection of the test article is acceptable.	Pass	
	B. The test article should readily activate in a predictable manner by breaking away, fracturing or yielding.	NA	
	C. Acceptable test article performance may be by redirection, controlled penetration or controlled stopping of the vehicle.	NA	
Occupant Risk	D. Detached elements, fragments or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment, or present an undue hazard to other traffic, pedestrians or personnel in a work zone. Deformations of, or intrusions into, the occupant compartment that could cause serious injuries should not be permitted.	Pass	
	E. Detached elements, fragments or other debris from the test article, or vehicular damage should not block the driver's vision or otherwise cause the driver to lose control of the vehicle.	NA	
	F. The vehicle should remain upright during and after the collision although moderate roll, pitching and yawing are acceptable.	NA	
	G. It is preferable, although not essential, that the vehicle remain upright during and after collision.	Pass	
	H. Occupant impact velocities should satisfy the following:		
	Occupant Impact Velocity Limits (m/s)		
	Component	Preferred	Maximum
	Longitudinal and Lateral	9	12
	Longitudinal	3	5
	NA	NA	
I. Occupant ridedown accelerations should satisfy the following:			
Occupant Ridedown Acceleration Limits (g's)			
Component	Preferred	Maximum	
Longitudinal and Lateral	15	20	
NA			
J. (Optional) Hybrid III dummy responses.		NA	
Vehicle Trajectory	K. After collision it is preferable that the vehicle's trajectory not intrude into adjacent traffic lanes.	Pass	
	L. The occupant impact velocity in the longitudinal direction should not exceed 12 m/sec and the occupant rideown acceleration in the longitudinal direction should not exceed 20 G's.	NA	
	M. The exit angle from the test article preferable should be less than 60 percent of test impact angle, measured at the time of vehicle loss of contact with test device.	7.1° < 0.6 · 20° Pass	
	N. Vehicle trajectory behind the test article is acceptable.	NA	

NA = Criterion not applicable to this test condition.

Table 2. Safety Evaluation Summary – Test Bast/2004 7D 33/HB (Report 350 4-10) of the MDS-4 Barrier.

Evaluation Factors	Evaluation Criteria	Result												
Structural Adequacy	A. Test article should contain and redirect the vehicle; the vehicle should not penetrate, underide, or override the installation although controlled lateral deflection of the test article is acceptable.	Pass												
	B. The test article should readily activate in a predictable manner by breaking away, fracturing or yielding.	NA												
	C. Acceptable test article performance may be by redirection, controlled penetration or controlled stopping of the vehicle.	NA												
Occupant Risk	D. Detached elements, fragments or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment, or present an undue hazard to other traffic, pedestrians or personnel in a work zone. Deformations of, or intrusions into, the occupant compartment that could cause serious injuries should not be permitted.	Pass												
	E. Detached elements, fragments or other debris from the test article, or vehicular damage should not block the driver's vision or otherwise cause the driver to lose control of the vehicle.	NA												
	F. The vehicle should remain upright during and after the collision although moderate roll, pitching and yawing are acceptable.	Pass												
	G. It is preferable, although not essential, that the vehicle remain upright during and after collision.	NA												
	H. Occupant impact velocities should satisfy the following: <table border="1" data-bbox="530 1123 1146 1293"> <thead> <tr> <th colspan="3">Occupant Impact Velocity Limits (m/s)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>9</td> <td>12</td> </tr> <tr> <td>Longitudinal</td> <td>3</td> <td>5</td> </tr> </tbody> </table>	Occupant Impact Velocity Limits (m/s)			Component	Preferred	Maximum	Longitudinal and Lateral	9	12	Longitudinal	3	5	6.7 Pass 5.7 Pass NA
	Occupant Impact Velocity Limits (m/s)													
	Component	Preferred	Maximum											
	Longitudinal and Lateral	9	12											
	Longitudinal	3	5											
	I. Occupant ridedown accelerations should satisfy the following: <table border="1" data-bbox="530 1323 1146 1455"> <thead> <tr> <th colspan="3">Occupant Ridedown Acceleration Limits (g's)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and Lateral</td> <td>15</td> <td>20</td> </tr> </tbody> </table>	Occupant Ridedown Acceleration Limits (g's)			Component	Preferred	Maximum	Longitudinal and Lateral	15	20	7.2 Pass 6.2 Pass			
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Component	Preferred	Maximum												
Longitudinal and Lateral	15	20												
J. (Optional) Hybrid III dummy responses.	NA													
Vehicle Trajectory	K. After collision it is preferable that the vehicle's trajectory not intrude into adjacent traffic lanes.	Pass												
	L. The occupant impact velocity in the longitudinal direction should not exceed 12 m/sec and the occupant rideown acceleration in the longitudinal direction should not exceed 20 G's.	NA												
	M. The exit angle from the test article preferable should be less than 60 percent of test impact angle, measured at the time of vehicle loss of contact with test device.	$11^\circ < 0.6 \cdot 20^\circ$ Pass												
	N. Vehicle trajectory behind the test article is acceptable.	NA												

NA = Criterion not applicable to this test condition.

Title 23, Code of Federal Regulations

§ 635.410 Buy America requirements.

(a) The provisions of this section shall prevail and be given precedence over any requirements of this subpart which are contrary to this section. However, nothing in this section shall be construed to be contrary to the requirements of §635.409(a) of this subpart.

(b) No Federal-aid highway construction project is to be authorized for advertisement or otherwise authorized to proceed unless at least one of the following requirements is met:

(1) The project either: (i) Includes no permanently incorporated steel or iron materials, or (ii) if steel or iron materials are to be used, all manufacturing processes, including application of a coating, for these materials must occur in the United States. Coating includes all processes which protect or enhance the value of the material to which the coating is applied.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel and iron 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 and iron materials which comply with the following requirements. Any procedure for obtaining alternate bids based on furnishing foreign steel and iron 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 and iron 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 and iron materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel and iron materials by more than 25 percent.

(4) When steel and iron materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel and iron 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 and iron 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 and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

(2) A request for waiver, accompanied by supporting information, must be submitted in writing to the Regional Federal Highway Administrator (RFHWA) 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 RFHWA 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 RFHWA 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 RFHWA 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.

§ 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 transportation department 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 transportation department 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 transportation department 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.

(f) In the case of a design-build project, the following requirements apply: 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 Request for Proposals document unless the conditions of paragraph (a) of this section are applicable.