



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

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

MAR 19 1996

Refer to: HNG-14

J. M. Essex, P.E.  
Vice President, Sales  
Energy Absorption Systems, Inc.  
One East Wacker Drive  
Chicago, Illinois 60601

Dear Mr. Essex:

Your March 1 letter to Mr. Gerald L. Eller requested the Federal Highway Administration's (FHWA) acceptance of the Alpha 70K Truck Mounted Attenuator (TMA) as a National Cooperative Highway Research Program (NCHRP) Report 350 test level 2 (TL-2) attenuator. Included with your submission were two test reports entitled "Alpha 70K TMA Crash Test Report" and "Alpha 70K TMA Crash Test Report, Optional Tests" both dated January 1996 and prepared by E-TECH Testing Services, Inc., of Rocklin, California, and two videotapes showing the tests that were conducted.

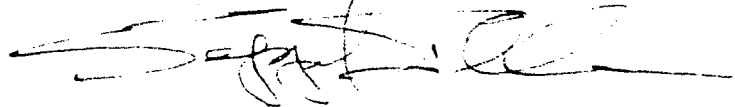
The Alpha 70K consists of three basic components: an aluminum cartridge with a separate nose assembly, a backup assembly, and a backup support structure. Total weight of the system is approximately 550 kg and its dimensions are as shown on the enclosed drawing. It is intended for use on trucks with gross vehicle weights between 5000 kg and 12000 kg. The supporting truck used in the four compliance tests was a dump truck weighing 8858 kg.

The information provided indicates that the Alpha 70K has been subjected to the appropriate crash tests. A summary of the four tests (NCHRP Tests 2-50, 2-51, 2-52 and 2-53) are enclosed. In all cases, the occupant impact velocities and ride down accelerations were below the maximum allowable values of 12 m/s and 20 g's, respectively, and all other acceptance criteria were met. Therefore, we consider the Alpha 70K to be acceptable for use as a TL-2 TMA on the National Highway System (NHS) when such use is requested by a highway agency. This acceptance is based on the Alpha 70K crash performance only and does not address the issues of vibration, moisture, or corrosion resistance. Based on the tests you conducted in these areas, each State will be able to make its own determination on the durability of the Alpha 70K.

Since it is a proprietary item, its use on Federal-aid highway projects, except exempt, non-NHS projects, is subject to the conditions set forth in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

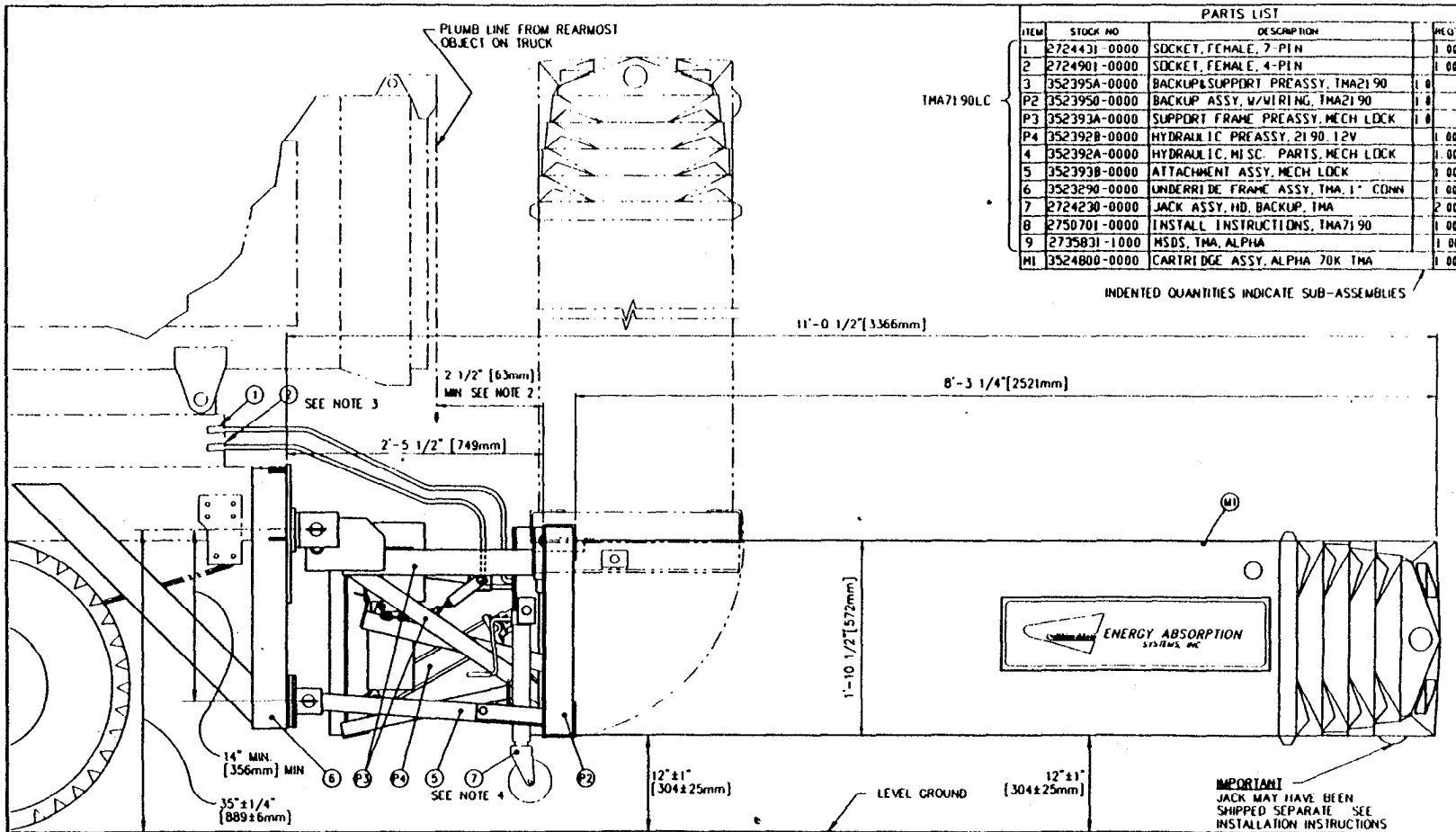
A copy of this letter, with enclosures, will be sent to FHWA field offices for information. Any questions concerning FHWA acceptance of the Alpha 70K may be addressed to Mr. Richard Powers of my staff at (202) 366-1320.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Seppo I. Sillan', written over a horizontal line.

Seppo I. Sillan, Acting Chief,  
Federal-Aid and Design Division

3 Enclosures



PARTS LIST			
ITEM	STOCK NO	DESCRIPTION	QTY
1	2724431-0000	SOCKET, FEMALE, 7-PIN	1.00
2	2724901-0000	SOCKET, FEMALE, 4-PIN	1.00
3	352395A-0000	BACKUP SUPPORT PREASSY, TMA2190	1.00
P2	352395A-0000	BACKUP ASSY, W/WIRING, TMA2190	1.00
P3	352393A-0000	SUPPORT FRAME PREASSY, MECH LOCK	1.00
P4	352392B-0000	HYDRAULIC PREASSY, 2190, 12V	1.00
4	352392A-0000	HYDRAULIC, HI SC. PARTS, MECH LOCK	1.00
5	352393B-0000	ATTACHMENT ASSY, MECH LOCK	1.00
6	3523290-0000	UNDERRIDE FRAME ASSY, TMA, 1" DOWN	1.00
7	2724230-0000	JACK ASSY, HD, BACKUP, TMA	2.00
8	2750701-0000	INSTALL INSTRUCTIONS, TMA7190	1.00
9	2735831-1000	MSDS, TMA, ALPHA	1.00
MI	3524800-0000	CARTRIDGE ASSY, ALPHA 70K TMA	1.00

INDENTED QUANTITIES INDICATE SUB-ASSEMBLIES

**NOTES:**  
 1 IT IS RECOMMENDED THAT THE ALPHA TMA BE MOUNTED TO TRUCKS RATED BETWEEN 10,000 LBS [4540kg] AND 25,000 LBS [11350kg] GVW (ACTUAL WEIGHT SHOULD RANGE FROM 10,000 LBS TO 15,000 LBS [6810kg]) FOR OPTIMUM IMPACT PERFORMANCE  
 2 TO ACHIEVE 2 1/2" MINIMUM CLEARANCE DIMENSION SOME TRUCKS MAY REQUIRE THAT AN EXTENSION BE WELDED TO THE EXISTING TRUCK FRAME.  
 3 LOCATE FEMALE CONNECTORS IN A CONVENIENT LOCATION ON TRUCK SO THAT LIFTING OR LOWERING TMA WILL NOT DAMAGE ELECTRICAL CABLE  
 4 JACK SHOWN IN VERTICAL POSITION FOR ILLUSTRATIVE PURPOSES. JACK SHOULD BE ROTATED TO HORIZONTAL POSITION WHENEVER TMA IS ATTACHED TO TRUCK

Revisions	Date	Rev	By	Chd	App	DESIGN SPEED	M.P.H.
CREATED FROM 75-02-53	1/2/96	1	KRM	7	7	AVERAGE G's	
						EST. FORCE ON BACKUP STRUCTURE	KIPS
						Designed	Date
						Drawn	01/22/96
						Checked	01/31/96
						Approved	02/01/96

REFERENCES	
Project No _____	Sales Order No. _____
Serial No _____	Color _____
UNDERRIDE FRAME ASSY	35-23-29
BACKUP JACK ASSY	35-22-36
SUPPORT FRAME ASSY	35-23-93
HYDRAULIC ASSY	35-23-92

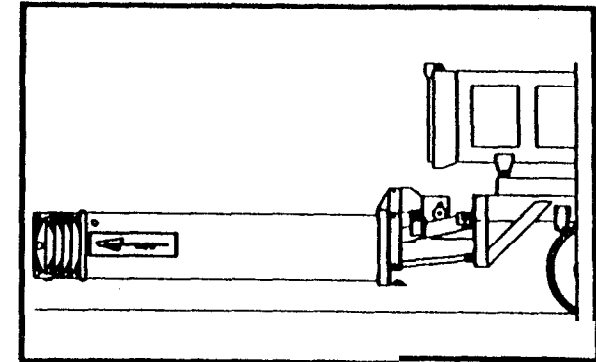
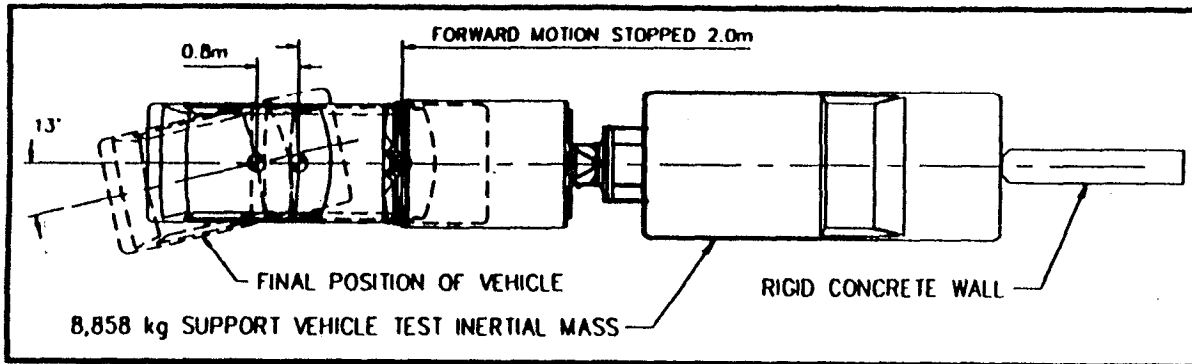
**MODEL TMA7190**

**ENERGY ABSORPTION SYSTEMS, INC.**  
 ENGINEERING AND RESEARCH DEPARTMENT

**TMA, ALPHA 70K, 90 TILT,  
 MECH LOCK**

SCALE (1:8)	DWG NO	REV	SHEET	TOTAL SHEETS
1/8"=1"	C	75-02-53A	1 OF 3	

ENCLOSURE 1



**General Information**

Test No ..... 183-005  
 Date ..... Dec. 19, 1995

**Test Article**

Type ..... ALPHA 70K TMA  
 Installation Length, m (ft) ..... NA  
 Size and/or dimension and material  
 of key elements ..... N/A

Soil Type and Condition ..... N/A

**Test Vehicle**

Type ..... Production Model  
 Designation ..... 820C  
 Model ..... Ford Festiva  
 Mass. kg (lb)  
 Curb ..... 818 (1800)  
 Test Inertial ..... 845 (1863)  
 Dummy(a) ..... 75 (165)  
 Gross Static ..... 920 (2028)

**Impact conditions**

Speed, km/h (mph) ..... 71.2 (44.2)  
 Angle (deg) ..... 0  
 Impact Severity, kJ (ft-kips) ..... 165.3 (121.9)

**Exit conditions**

Speed, km/h (mph) ..... NA  
 Angle, deg ..... NA

**Occupant Risk Values**

Impact Velocity, m/s (fps)  
 x-direction ..... 11.54 (37.86)  
 y-direction ..... 0.31 (1.02)  
 Rldedown Acceleration, g's  
 x-direction ..... -13.66  
 y-direction ..... -2.67

Acceleration Severity Index ..... 1.09

**Test Article Deflection, m (ft)**

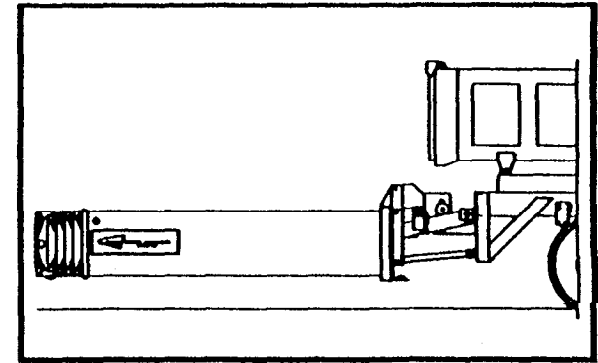
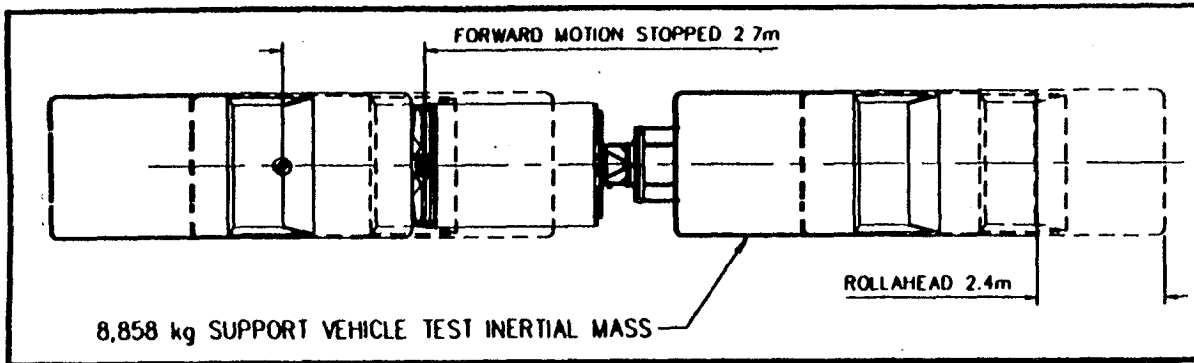
Dynamic ..... N/A  
 Permanent ..... N/A

**Vehicle Damage**

Exterior  
 V D S ..... FD-4  
 CDC ..... 12FDEW3  
 Interior  
 OC DI ..... AS0000000

**Post-Impact Vehicular Behavior**

Maximum Roll Angle deg ..... 2.49  
 Maximum Pitch Angle deg ..... 1.76  
 Maximum Yaw Angle deg ..... -13.36



**General Information**

Test No. .... 183-007  
 Date ..... Jan. 5, 1996

**Test Article**

Type ..... ALPHA 70K TMA  
 Installation Length, m (ft) ..... NA  
 Size and/or dimension and material  
 of key elements ..... N/A

Soil Type and Condition ..... NA

**Test Vehicle**

Type ..... Production Model  
 Designation ..... 2000P  
 Model ..... Ford F-250  
 Mass. kg (lb)  
 Curb ..... 2100 (4620)  
 Test Inertial ..... 2037 (4481)  
 Dummy(s) ..... NA  
 Gross Static ..... 2037 (448 I)

**Impact conditions**

Speed km/h (mph) ..... 68.3 (42.4)  
 Angle (deg) ..... 0  
 Impact Severity, kJ (ft-kips) ..... 366.1 (270.0)

**Exit conditions**

Speed. km/h (mph) ..... NA  
 Angle, deg. .... NA

**Occupant Risk Values**

Impact Velocity, m/s (fps)  
 x-direction ..... 9.00 (29.53)  
 y-direction ..... 0.08 (0.26)  
 Ridedown Acceleration, g's  
 x-direction ..... -18.07  
 y-direction ..... -1.91

Acceleration Severity Index ..... 1.28

**Test Article Deflection, m (ft)**

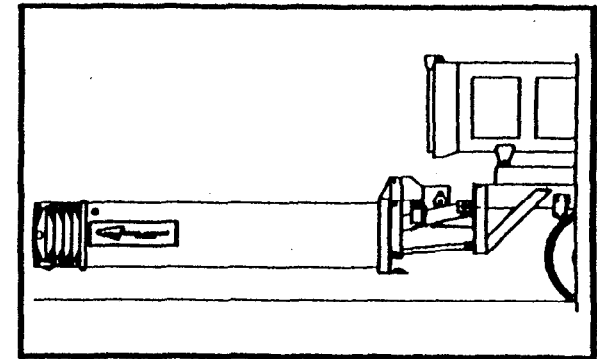
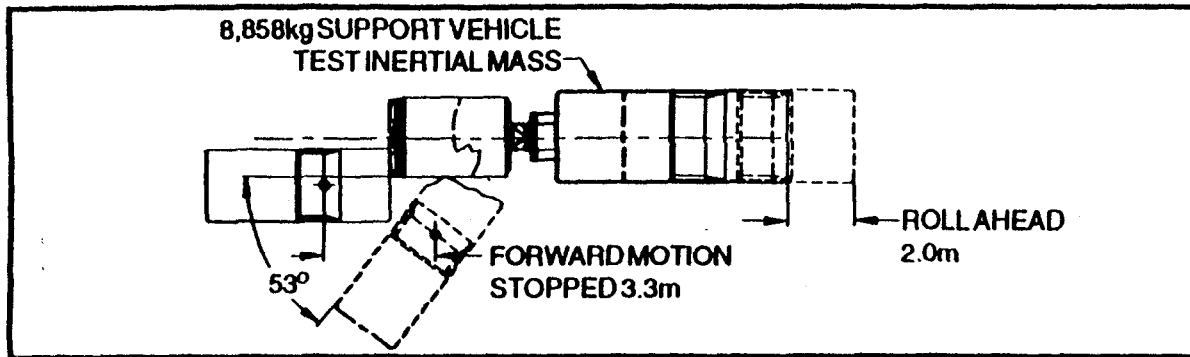
Dynamic ..... N/A  
 Permanent ..... N/A

**Vehicle Damage**

Exterior  
 V D S ..... FD-4  
 CDC ..... 12FDEW3  
 Interior  
 OCDI ..... AS0000000

**Post-Impact Vehicular Behavior**

Maximum Roll Angle, deg ..... 0.90  
 Maximum Pitch Angle, deg ..... -2.12  
 Maximum Yaw Angle, deg ..... 15.31



#### General Information

Test No. .... 183-008  
Date ..... Jan. 11, 1996

#### Text Article

Type ..... ALPHA 70K TMA  
Installation Length, m (ft) ..... NA  
Size and/or dimension and material  
of key elements ..... N/A

Soil Type and Condition ..... NA

#### Test Vehicle

Type ..... Production Model  
Designation ..... 2000P  
Model ..... Chevrolet C-20  
Mass. kg (lb)  
Curb ..... 2036 (4480)  
Test Inertial ..... 1967 (4337)  
Dummy(s) ..... NA  
Gross Static ..... 1967 (4337)

#### Impact conditions

Speed, km/h (mph) ..... 71.8 (44.6)  
Angle (deg) ..... 0  
Impact Severity, kJ (ft-kips) ..... 391.0 (288.6)

#### Occupant Risk Values

##### Impact Velocity, m/s (fps)

x-direction ..... 9.48 (31.10)  
y-direction ..... 1.03 (3.38)

##### Ridedown Acceleration, g's

x-direction ..... -11.43  
y-direction ..... 4.79

Support Vehicle, x-direction ..... 2.60

Acceleration Severity Index ..... 0.90

##### Test Article Deflection, m (ft)

Dynamic ..... N/A  
Permanent ..... N/A

#### Vehicle Damage

##### Exterior

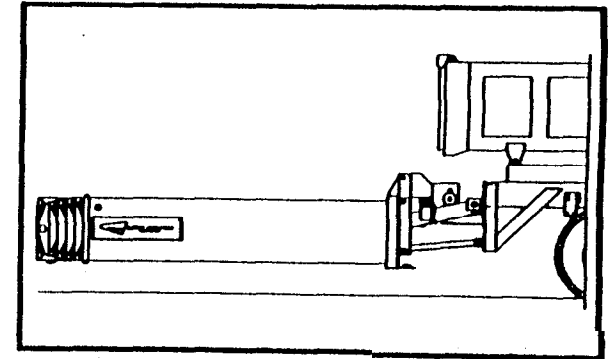
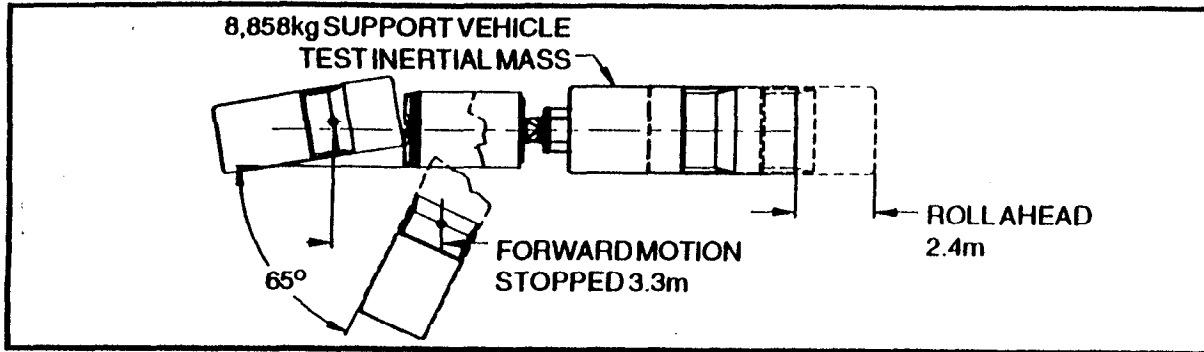
VDS ..... FD-4  
CDC ..... 12FDEW3

##### Interior

OCDI ..... AS0000000

#### Post-Impact Vehicular Behavior

Maximum Roll Angle, deg ..... -2.06  
Maximum Pitch Angle, deg ..... -3.92  
Maximum Yaw Angle, deg ..... -53.03



**General Information**

Test No..... 183-009  
 Date ..... Jan. 25, 1996  
 Test Article  
 Type ..... ALPHA 70K TMA  
 Installation Length, m (ft) ..... NA  
 Size and/or dimension and material  
 or key elements ..... N/A  
 Soil Type and Condition ..... NA

**Test Vehicle**

Type ..... Production Model  
 Designation ..... 2000P  
 Model ..... Chevrolet C-20  
 Mass, kg (lb)  
 Curb ..... 2118 (4660)  
 Test Inertial ..... 2021 (4456)  
 Dummy(r) ..... NA  
 Gross Stalk ..... 2021 (4456)

**Impact conditions**

Speed, km/h (mph) ..... 69.4 (43.1)  
 Angle (deg) ..... 10  
 Impact Severity, kJ (ft-kips) ..... 375.6 (277.2)

**Occupant Risk Values**

Impact Velocity, m/s (fps)  
 x-direction ..... 9.31 (30.54)  
 y-direction ..... 0.81 (2.66)  
 Ridedown Acceleration, g's  
 x-direction ..... -10.97  
 y-direction ..... 2.45  
 Support Vehicle, x-direction ..... 2.54  
 Acceleration Severity Index ..... 0.80

**Test Article Deflection, m (ft)**

Dynamic ..... N/A  
 Permanent ..... N/A

**Vehicle Damage**

Exterior  
 VDS ..... FD-4  
 CDC ..... 12FDEW3  
 Interior  
 OCDI ..... AS0000000

**Post-Impact Vehicular Behavior**

Maximum Roll Angle, deg ..... 6.61  
 Maximum Pitch Angle, deg ..... -3.39  
 Maximum Yaw Angle, deg ..... -55.49

**§635.411**

**23 CFR Ch. I (4-1-92 Edition)**

**Federal Highway Administration, DOT**

**§ 635.417**

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 the 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.

(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.

(23 U.S.C. 315, sec. 10 of Pub. L. 98-229, 98 Stat. 55, sec. 165 of Pub. L. 97-424, 96 Stat. 2136 and 49 CFR 1.48(b))

[48 FR 53104, Nov. 25, 1983, as amended at 49 FR 18821, 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

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 or 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,