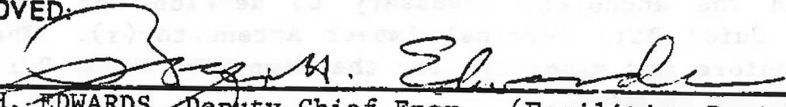


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<p>APPROVED:</p> <p></p> <p>R. H. EDWARDS, Deputy Chief Engr., (Facilities Design Division)</p>	<p>Date: <u>12/27/85</u></p> <p>Supersedes:</p>

We are transmitting herewith the following specification for temporary guide rail terminal impact attenuators:

15619.40XX Temporary Guide Rail Terminal Impact Attenuators

This is a new specification for the GREAT CZ manufactured by Energy Absorption Systems, Inc. This attenuator is especially suited to shield rigid objects in narrow construction zones where the use of temporary inertial barrier modules (sand-filled inertial barrier systems) is not feasible. When used to provide end treatment for temporary concrete median barrier, the guidelines given in Engineering Instruction 84-2 should be followed. The designer should note that this specification is proprietary and a justification for its use must be submitted with the PS&E in accordance with Engineering Instruction 84-49.

The Federal Highway Administration (FHWA) recently sponsored vehicle crash tests of the GREAT "Hex-Foam" Crash Cushion. The tests were conducted in conformance with NCHRP 230 "Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances". As a result of these tests FHWA has made certain design recommendations. The temporary guide rail terminal impact attenuator specifications being transmitted with this engineering instruction conform to these recommendations.

The designer should select the impact attenuator from the list of temporary guide rail terminal impact attenuator items found at the end of the specification. He should base his selection on the anticipated free flow operating speed during nonworking hours. However we do not intend to provide barriers for more than 60 mph which is 5 mph above the statewide speed limit.

This specification will supersede all regional specifications for the GREAT CZ effective with the letting of May 15, 1986 but may be used immediately.

ITEM 15619.40XX TEMPORARY GUIDE RAIL TERMINAL IMPACT ATTENUATORS

Description. The Contractor shall furnish, install, move and remove Temporary Guide Rail Terminal Impact Attenuators at locations and in configurations shown on the plans or where directed by the Engineer.

30 days prior to erecting the attenuator(s), the Contractor shall submit to the Engineer detail drawings showing supports, connections, miscellaneous parts, back up plates, and the anchorage necessary to develop the full potential of the Temporary Guide Rail Terminal Impact Attenuator(s). The drawings shall be approved before any materials for the Temporary Guide Rail Terminal Impact Attenuator(s) are ordered.

Materials. The Temporary Guide Rail Terminal Impact Attenuator shall be the GREAT GZ Impact Attenuator manufactured by Energy Absorption Systems, Inc. of Chicago, Ill. or an approved equal. Each attenuator shall be complete and contain all external and internal parts necessary to give satisfactory service.

The Temporary Guide Rail Terminal Impact Attenuator components shall conform to the following requirements:

A. Portable Platform

The attenuator shall be positioned on top of a portable platform consisting of the following:

1. Two parallel angles to which are attached the restraining chains and gusseted backstop.
2. Two parallel channels which support the attenuator during lifting.
3. A 7/8" diameter, 6 x 25 galvanized steel wire rope restraining cable which is rigidly secured at the front and rear of the portable platform.
4. Eight lifting lugs for lifting the unit.

The angles, channels, restraining cables, and lifting lugs shall be detailed in the detail drawings.

B. Hex-Foam Cartridges

The cartridge box shall be manufactured from cross linked polyethylene plastic with an average wall thickness of .080 inches. The bottom of the box shall be stapled in place with galvanized W18-1/2" staples. Handles shall be stapled on each side of the cartridge box and sealed with hot melt glue. The Hex-Foam material inside the box shall be protected by a polyethylene bag and woven debris containment bag.

The Hex-Foam material shall consist of 28-1 inch thick pieces of a paper honeycomb material placed in an alternating cross ply orientation. The honeycomb material shall have class #1 fire retardant polyurethane foam filling within the honeycomb cell volume.

C. Hex-Foam Cartridge Brackets

Hex-Foam Cartridges shall only be installed in G-R-E-A-T attenuators equipped with "Hex-Foam" cartridge brackets and cable restraint systems.

D. Diaphragms

The diaphragms shall be made from standard 10 gauge steel triple corrugated beam. The length of each diaphragm shall be as required for each application. Two support legs shall be welded to the bottom of the support legs. The front two diaphragms shall be restrained with the 7/8" diameter restraining cable.

Metal tabs for supporting cartridges shall be bolted or welded to the bottom of the diaphragm.

After fabrication, the diaphragms shall be hot dipped galvanized in accordance with 719-01, TYPE 1 of the Standard Specifications.

E. Fender Panels and Transition Panels

The fender panels and transition panels shall be fabricated from 10 gauge steel triple corrugated beam guiderail sections. Each fender panel shall be drilled and slotted in accordance with the manufacturer's specifications so that when assembled in the field, the front end shall be bolted to a diaphragm by means of the two horizontally placed 3/4" bolts. The back end of each triple corrugated beam fender panel shall overlap and be connected to the fender panel of the next bay by means of bolts which fit through the long horizontal slot in the forward fender panel and the short vertical slot in the overlapped fender panel. (The bolt shall have a nut and square washer on the inside.) This permits movement, front and back, of one set of fender panels relative to the panels in the following bay.

F. Restraining Chains

The restraining chains shall be galvanized 1/2" proof coil chain ASTM A413 and galvanizing shall be in accordance with the requirements of Subsection 719-01, Type II of the Standard Specifications for forged articles and shall have an average coating of 1.50 oz./square foot with a minimum of 1.25 oz./square foot.

G. Nose Cover

The nose cover shall be made from a high density polyethylene plastic material federal yellow in color.

H. Metal Work

All metal work shall be fabricated from either M1020 Merchant Quality or ASTM A-36 steel. After fabrication all metal work shall be hot dip galvanized in accordance with subsection 719-01, Type I of the Standard Specifications. All welding shall be in accordance with the New York State Steel Construction Manual.

I. Fasteners

All bolts used within the Guide Rail Terminal Impact Attenuator shall be American Standard Regular Bolts unless otherwise specified.

Construction Details The Contractor shall furnish, install, maintain move and remove temporary guide rail terminal impact attenuators as required by the plans or directed the Engineer.

The Contractor shall install the Temporary Guide Rail Terminal Impact Attenuators only after authorization by the Engineer.

The portable platform for the Temporary Guide Rail Terminal Impact Attenuator shall bear upon the pavement or a smooth surface as shown on the plans.

The Contractor shall be required to complete the attenuator installation within 3 days after the installation of the portable platform. The attenuator and all necessary assembly equipment shall be shielded with traffic protection devices such as, signs, barricades, cones, lights and other forms of delineation as directed by the Engineer during its erection and these devices may not be removed until the unit is fully operational.

The Contractor shall be required to maintain the Temporary Guide Rail Terminal Impact Attenuator and he shall be responsible for a continuous 24 hour operation. If for any reason an attenuator is out of operation the Contractor shall provide delineation, as described above, acceptable to the Engineer until repairs are made.

Method of Measurement. Temporary Guide Rail Terminal Impact Attenuators shall be measured by the number of units erected and removed in accordance with these specifications and directions by the Engineer.

Basis of Payment. The unit price bid shall include the cost of furnishing all labor, material, and equipment necessary to erect, maintain and remove an attenuator. Repair of attenuators damaged by public traffic shall be paid for by dividing the number of bays plus one by the unit bid price of the damaged attenuator and multiplying the resulting figure by the number of bays damaged. Nose units, if damaged, shall be considered to be a bay. No direct payment will be made to the Contractor for any attenuator damaged by his operations.

Whenever the Engineer directs that the attenuator be moved to a new location, payment will be made in the same manner as if it were a new attenuator. Minor movements within a single site, such as movements to realign adjust, maintain, etc., will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

After an attenuator is placed and is operational, payment will be made for ninety (90) percent of the unit bid price, the remaining ten (10) percent will be paid upon removal.

Payment will be made under:

Item No.	Item	Pay Unit
15619.4003	Temporary Guide Rail Terminal Impact Attenuators (3 Bay) (40 MPH Operating Speed)	Each
15619.4004	Temporary Guide Rail Terminal Impact Attenuators (4 Bay) (45 MPH Operating Speed)	Each
15619.4005	Temporary Guide Rail Terminal Impact Attenuators (5 Bay) (50 MPH Operating Speed)	Each
15619.4006	Temporary Guide Rail Terminal Impact Attenuators (6 Bay) (55 MPH Operating Speed)	Each
15619.4008	Temporary Guide Rail Terminal Impact Attenuators (8 Bay) (60 MPH Operating Speed)	Each