TO:

SUPERSEDED BY EI 83-017 EFFECTIVE 4/5/83

ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: ITEM NO. 16654.25 - "LIQUID-FILLED CELL CLUSTER ATTENUATOR(STRUCTURES)"

Subject Code: 7.35-4

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Supersedes:

APPROVED: J. V. Hennigan

Deputy Chief Engineer (Structures)

Attached is Item No. 16654.25 - "Liquid-Filled Cell Cluster Attenuator (Structures)".

This item is for use when liquid-filled cell cluster attenuators are used on a structure.

The warrants and design criteria for the attenuators are given in Chapter 10 of the Highway Design Manual.

Attachment

ITEM NO. 16654.25 - LIQUID-FILLED CELL CLUSTER ATTENUATOR (STRUCTURES)

Description - The Contractor shall furnish and install Liquid-Filled Cell Cluster Attenuators On Structures in configurations shown on the plans.

Anchorage to the structural slab shall be made by core drilling followed by grouting anchor bolts.

Materials - The Liquid-Filled Cell Cluster Attenuator shall be as manufactured by Energy Absorption Systems, Inc., of Chicago, Illinois, or an approved equal.

The Contractor shall submit shop drawings to the DCE(S) for approval at least 60 days prior to the proposed installation of the attenuator. The drawings shall show all supports, connections, and miscellaneous parts necessary for the Liquid-Filled Cell Cluster Attenuator.

Shop Drawings shall meet the requirements of Section 2 of the Steel Construction Manual.

The exterior surfaces of the cells shall be yellow in color.

The liquid to be placed in the cells shall haye a freezing point acceptable to the Engineer, but, in no case shall the freezing point be aboye -20°F. (-29°C.).

The yellow reflectorized sheeting shall meet the requirements of Section 730-05.01, "Reflective Sheeting (Class A)", of the Standard Specifications.

A Safety-Flex Belt shall be provided as specified by the Manufacturer.

Steel shall be in accordance with the requirements of ASTM Designation A-36 and shall be galvanized in accordance with Subsection 719-01 of the Standard Specifications.

Concrete shall meet the requirements of Subsection 555 of the Standard Specifications, as approved by the Engineer.

Grout material shall meet the requirements of the following Subsections of Section 700, MATERIALS DETAILS:

Epoxy Polysulfide Grout 721-03

Or

Concrete Grouting Material 701-05

Construction Details - Equipment used for drilling holes shall be approved by the Engineer prior to use.

Drilling holes into a structural slab, or into any structural concrete element supported by a structural slab, shall be done by means of a core drill. In those instances where holes are to be drilled into a portion of the structural slab, (or structural concrete element), designated for subsequent removal, the holes may be made by any method satisfactory to the Engineer.

Drilling holes into any other structural element shall be done by methods satisfactory to the Engineer, unless a specific method is noted elsewhere in the Contract Documents.

Construction Details (Contd)

Drilling with a lubricant other than water shall not be permitted. Drilling methods shall not cause spalling or other damage to the concrete. Concrete spalled or otherwise damaged by the Contractor's operations shall be repaired in a manner approved by, and to the satisfaction of, the Engineer. Such repair shall be done at the expense of the Contractor. Holes shall be surface dry and shall have had all foreign and loose material removed immediately prior to grout placement.

Grout shall be mixed and placed in strict accordance with the Manufacturer's instructions, unless otherwise modified herein.

No grout placement shall be permitted when the ambient air temperature is 50°F, or below, during the working day. Grout material shall be thoroughly brushed into all surfaces of the hole immediately prior to the actual placement of the grout. Grout shall be inserted to a depth sufficient to insure complete filling of the hole after insertion of the anchor bolt..

Anchor bolts shall be clean and dry prior to insertion into the grouted hole. They shall be inserted full depth into the hole and shall be manipulated to insure complete coverage by the grout. After insertion of the anchor bolts, all excess grout shall be struck off flush with the concrete surface. Should the grout fail to fill the hole after anchor bolt insertion, additional grout shall be added to the hole to allow a flush strike-off.

The Attenuator shall bear upon a surface as shown on the plans with any necessary site preparation paid for under their respective items.

A six-inch wide band of yellow reflectorized material shall be placed horizontally on the Safety-Flex Belt, four inches down from the top of the cells, as ordered by the Engineer.

The Contractor shall be required to complete the Attenuator installation as soon as possible after the back-up installation so as not to expose vehicular traffic to the possibility of impact on the back-up structure.

Traffic protection devices which may include cones, signs, barricades, etc., as ordered by the Engineer, shall be provided under their respective items. These devices shall not be removed until the Attenuator installation is fully operative.

Method of Measurement - The work will be measured as a completed Liquid-Filled Cell Cluster Attenuator at each location.

Basis of Payment - The unit price bid shall include the cost of furnishing all labor and material including drilling and grouting anchor bolts and all equipment necessary, including the back-up system and necessary hardware, to complete the Liquid-Filled Cell Cluster Attenuator installation.

Necessary site preparation and necessary traffic protection devices shall be paid for under their respective items.