CONSTRUCTION SPECIFICATION FOR GUIDE RAIL END TREATMENT – STEEL BEAM ENERGY ATTENUATING TERMINAL SYSTEMS

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732.01 SCOPE

This specification covers the requirements for the installation of steel beam energy attenuating terminal (SBEAT) systems.

732.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Material

OPSS 1601 Wood, Preservative Treatment, and Shop Fabrication

Ontario Ministry of Transportation Publications

Ontario Traffic Manual (OTM):
Book 6 - Warning Signs

ASTM International

A123/A123M-09 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A780/A780M-09 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings

732.04 DESIGN AND SUBMISSION REQUIREMENTS

732.04.01 Submission Requirements

One copy of the manufacturer's installation instructions and Working Drawings for each type of SBEAT system to be installed shall be submitted to the Contract Administrator.

Installation of the SBEAT system shall not commence until the Contract Administrator has received the copy of the installation instructions and Working Drawings.

732.05 MATERIALS

732.05.01 General

All supplied system components shall be according to the manufacturer's specifications.

732.05.02 U Channel Posts

Posts shall be 2.44 m long perforated steel U channel with 11 mm diameter holes spaced on 50 mm centres, minimum weight of 4.46 kg/m, and hot dip galvanized according to ASTM A123/A123M.

732.07 CONSTRUCTION

732.07.01 General

SBEAT systems shall be installed according to manufacturer's instructions at the locations specified in the Contract Documents.

When an SBEAT system is specified in the Contract Documents, the Contractor has the option of using one of the following systems that meet Manual for Assessing Safety Hardware (MASH):

a) MASH SoftStop Terminal System

b) MASH Sequential Kinking Terminal (MSKT) System

c) Max-Tension Terminal System

d) SPIG Gating End Terminal (SGET) System

e) Next Generation Terminal (NGT) System

A minimum 2 m wide area behind the posts, measured from the back of the posts shall be clear of all obstacles for the entire length of the SBEAT system.

732.07.02 Posts and Steel Foundation Tubes

All posts and steel foundation tubes shall be set to the depth and alignment at locations specified in the Contract Documents, regardless of the material encountered.

Wooden post tops shall be cut to the height and to the chamfer as specified in the Contract Documents.

All holes shall be drilled in the wooden posts prior to installation and in the steel posts prior to galvanizing.

The predrilled holes and the cut tops of the wooden posts shall be treated with two coats of an approved wood preservative according to OPSS 1601.

All lower hinge break away posts, steel foundation tubes, and soil plates shall be installed so that no more than 100 mm is exposed above finished grade.

732.07.03 Steel Beam Guide Rails

SBEAT systems shall be connected to new or existing steel beam guide rail as specified in the Contract Documents.

SBEAT system mounting heights shall be measured vertically from the top of the steel beam guide rail to the ground or gutter line. SBEAT system mounting heights shall be between 760 mm and 810 mm for all conditions.

Where curb with gutter is required, steel beam guide rail mounting height shall be measured:

a) Vertically at face of steel beam guide rail, when face of steel beam guide rail is more than 300 mm beyond gutter line.

b) Vertically at gutter line, when face of steel beam guide rail is 300 mm or less beyond the gutter line.

Channel shall not be used within the SBEAT system.

732.07.04 Damage to Galvanizing

Precautions shall be taken to protect galvanizing against damage. Minor abrasions shall be repaired according to ASTM A780/A780M. Components with major abrasions shall be replaced.

The method of repair for any damage shall be approved by the Contract Administrator prior to the commencement of such work.

732.07.05 Object Markers and Oversize Plow Markers

A Wa-33 object marker according to OTM Book 6, a Wz-2 oversize snow plow marker, and galvanized mounting hardware shall be installed at each energy attenuator.

When installed on a paved surface, the object marker and oversize snow plow marker shall be integrally attached to a surface mounted flexible post. The signs and post shall be supplied by the manufacturer as a complete unit. The post shall have the ability to bend 90 degrees from vertical and self-restore after impacts. The minimum outside diameter of the post shall be 60 mm. The post shall be anchored to the pavement according to the manufacturer’s recommendations.

When installed on a granular surface, the Wa-33 object marker and Wz-2 oversize snow plow marker shall be securely fastened to a U channel post and the post shall be direct buried to a minimum embedment depth of 900 mm.

Posts shall be installed at locations as specified in the Contract Documents.

732.07.06 Steel Beam Energy Attenuating Terminal System, Relocation

Relocation of the steel beam energy attenuating terminal shall include the dismantling, storage, transportation, and re-installation of steel beam energy attenuating terminals as specified in the Contract Documents.

732.07.07 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

732.09 MEASUREMENT FOR PAYMENT

732.09.01 Actual Measurement

732.09.01.01 Steel Beam Energy Attenuating Terminal System

For measurement purposes, a count shall be made of each complete steel beam energy attenuating terminal system installed, regardless of the type of steel beam energy attenuating terminal system placed.

732.09.01.02 Steel Beam Energy Attenuating Terminal System, Relocation

When used as part of a temporary barrier system, a count shall be made of each complete relocated SBEAT system.

Steel beam energy attenuating terminal systems that are temporarily surplus and are required for future stages shall be paid for as one relocation for the combined moves into and out of storage, including any off-site storage required due to on-site restrictions.

732.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the unit shown in the clause under Actual Measurement.

732.10 BASIS OF PAYMENT

732.10.01 Steel Beam Energy Attenuating Terminal System - Item
Steel Beam Energy Attenuating Terminal System, Relocation - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

Costs associated with any required removals and replacement or repairs of defective materials shall be the Contractor’s responsibility at no additional cost to the Owner.