

Proposal for BDDM – Seismic Retrofit Cable - 1

Prepared by Craig Shike, September 17, 2009

Revise Sections 1.1.11.2(5) and 1.1.11.6 to read as follows:

1.1.11.2 Information for Restrainer Design - (continued)

(5) Wire Rope:

See Section 1.2.5 for a complete discussion of Structural Wire Rope, Wire Rope Connections & Turnbuckles.

$F_t = (0.95)(176.1 \text{ ksi})(\text{area}) = 0.95(\text{minimum breaking strength})$.

Note: Yield strength is approximately equal to minimum breaking strength.

Diameter	Area	Minimum Breaking Strength	Design Load
1/2"	0.119 in ²	23.9 kips	22.7 kips
3/4"	0.268 in ²	52.9 kips	50.2 kips
7/8"	0.361 in ²	71.6 kips	68.0 kips
1"	0.471 in ²	93.0 kips	88.3 kips
1 3/8"	0.906 in ²	173.0 kips	164.0 kips

The area values above are based on ASTM A 603. The minimum breaking strength above is based on ASTM A 1023. The design load above is based on 0.95 x the minimum breaking strength. For sizes other than 7/8" diameter, ASTM A 1023 is likely to be used. For 7/8" A 603, the current ODOT stockpile of 7/8" diameter wire rope (purchased in September 2000) has been certified to 80,000 pounds. Therefore, the A 1023 loads can be used for all seismic retrofit applications. If a newer stockpile of A 603 wire rope is procured by ODOT, the actual breaking strength will need to be verified and the design load may require minor adjustment.

E for wire rope = 10,000 ksi

f_y for wire rope = 176.1 ksi

ASTM A 603 lists the E for structural wire rope as 20,000 ksi for "prestretched" wire rope. Wire rope used for seismic applications will not be prestretched, however, so an E of 10,000 ksi should be used.

1.1.11.6 Use of State Stockpile Wire Rope (Cable) for Seismic Retrofit

To achieve economy and supply stability, Bridge Section has purchased a quantity of structural wire rope (cable) to be used on future seismic retrofit projects. The wire rope is stockpiled in Portland. Before using stockpile wire rope, contact the Concrete Bridge Standards Engineer, Bridge Engineering Headquarters to verify availability. See 1.2.5 for general notes and special provisions to be used with the stockpile wire rope.

For projects requiring quantities beyond the available stockpile, contact the Concrete Bridge Standards Engineer to discuss whether an additional quantity of wire rope can be purchased.

Background and Resulting Impact

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Deleted: See Section 1.1.11.6, "Use of State Stockpile Cable for Seismic Retrofit."

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Diameter (in) ... [1]

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Deleted: (1) Introduction –

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(2) In the General Notes:¶
<#>Cable for seismic restraint devices will be furnished by the Department.¶
<#>See Section 00160.30 of the Special Provisions.¶
¶
(3) In Section 00160.30 of the Special Provisions:¶
¶
<#>0.875" diameter structural wire rope (cable) will be provided by the Department. The cable is stored at the following location:¶
c/o District 2B Manager¶
Oregon Department of Transportation¶
9200 SE Lawnfield Rd¶
Clackamas, OR 97015¶ ... [2]

There have been significant changes to the industry specifications for structural wire rope. These BDDM revisions are necessary to ensure designers have the latest and most accurate information available.

Specification terminology has been revised to use the term “wire rope” rather than “cable” to match the terminology used by industry.

For simplicity, designers are referred to article 1.2.5 for technical information regarding structural wire rope.

Diameter (in)	Area (in ²)	Design Load (kips)
0.500	0.119	19.9
0.750	0.268	44.8
0.875	0.361	60.4

(2) In the General Notes:

Cable for seismic restraint devices will be furnished by the Department.
See Section 00160.30 of the Special Provisions.

(3) In Section 00160.30 of the Special Provisions:

0.875" diameter structural wire rope (cable) will be provided by the Department. The cable is stored at the following location:

c/o District 2B Manager
Oregon Department of Transportation
9200 SE Lawnfield Rd
Clackamas, OR 97015
Phone: (503) 653-3086

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1.1.11.6 Use of State Stockpile Cable for Seismic Retrofit – (continued)

Notify Bridge Section of the quantity of cable removed within 24 hours. Follow up this notification with a written memo documenting the time of removal, quantity removed (to the nearest foot), and the project for which it will be used. Send the memo to:

Craig Shike, Concrete Design Standards and Practice Engineer
Oregon Department of Transportation
355 Capitol St. NE, Room 301
Salem, OR 97301-3871
Phone: (503) 986-3323
Fax: (503) 986-3407

The quantity of cable included for use in this project, including both testing and installation, is () linear feet. This quantity of cable will be provided at no cost to the Contractor. Any additional cable required by the Contractor due to fabrication errors and/or waste must be purchased from the Department at the Department's cost as established by the Engineer.