ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR (The person who receives or originates the issue and needs to forward the issue for action.)

Specification: 634

Subject: Span Wire Assembly

Origination date: November 7th, 2008

Originator: Charlie Harvey
Office/Phone: Structures Design Office

Problem statement: FDOT has adopted AASHTO 2001 LTS design specification. The higher design wind loads by the specification mandate larger catenary wires. FDOT has also made changes to Design Standard 17727.

Proposed solution: Added ½ inch catenary wire specifications. Revised sections to be consistent with Design Standard 17727.

Information source: Charlie Harvey, Structures Deign Office, 850-414-4300

Recommended Usage Note: N/A

Estimated fiscal impact, if implemented: None

Implementation of these changes, if and when approved, will begin with the July 2009 letting.

For State Specifications Office Use Only

Begin date: November 13, 2008
File Number: 6340000
Scheduled completion date: February 10, 2009
Implementation date: July 2009
Implementation team member: Frances
Usage Note: All jobs

Notes:

1. There is a supplemental to this Section.

Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

M E M O R A N D U M

DATE: December 2, 2008

TO: Specification Review Distribution List

FROM: Rudy Powell, Jr., P.E., State Specifications Engineer

SUBJECT: Proposed Specification: 6340000 Span Wire Assembly

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Charlie Harvey, State Structures Design Office, to add ½ inch catenary wire specifications and revise section to be consistent with Design Standard 17727.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at ST986RP or rudy.powell@dot.state.fl.us. Comments received after December 30, 2008 may not be considered. Your input is encouraged.

RP/ft
Attachment

SPAN WIRE ASSEMBLY.
(REV 11-13-08)

SECTION 634 (pages 691 – 696) is deleted and the following substituted:

SECTION 634
SPAN WIRE ASSEMBLY

634-1 Description.

Install a span wire assembly for supporting traffic signals, signs, and/or other traffic control devices. Provide fiberglass insulators when required.

634-2 Materials.

634-2.1 General Requirements: The specific components of a span wire assembly are a catenary wire, a messenger wire, and, when required, a tether wire. Use catenary wire to support the imposed dead and wind loads from the attached signs and traffic signals. For a single point attachment, use ~~messenger~~*catenary* wire to support the signal conductor cables and interconnect cables, and to stabilize signal heads, signs and other traffic control devices.

For a two point attachment, use messenger wire to resist a significant portion of the imposed wind load in addition to the loads the wire supports in a single point attachment.

Use tether wire for maintaining the alignment of optically programmed signal heads when installed on the span wire assembly or when specified in the plans for overhead signs.

634-2.2 Wires: For span wire assemblies, only use wire cables of seven wire strands manufactured and provided with a Class A zinc coating in accordance with ASTM A 475.

Provide Utility Grade catenary wires.

Provide Utility Grade messenger wires. The Contractor may use Siemens-Martin Grade only for single point attachments. Use Siemens-Martin Grade tether wires. Meet the following additional requirements for span wire assembly strands:

Span Wire Assembly Strand Type	Nominal Diameter Inch	Required Minimum Breaking Strength Pounds
~~Catenary Wire *~~	~~3/8~~ ~~7/16~~	~~11,500~~ ~~18,000~~
Catenary Wire or Messenger Wire *~~*~~	1/4 3/8 7/16 1/2	3,150 11,500 18,000 25,000
Tether Wire	3/16	1,900

*Supply catenary *or messenger* wire of the nominal diameter *as* specified in the ~~plans~~*contract documents*. ~~Use the diameters shown as the standard diameters.~~
~~** Use messenger wire having a nominal diameter of 1/4 inch for single point attachments and use messenger wire of the diameter specified on the plans for two point attachments.~~

634-2.3 Hardware and Fittings: For Utility or Siemens-Martin Grade wires, use the connection hardware as specified herein and in 634-~~3.4~~*3.3*(f). For installations that use other grades of wire, provide the hardware and fittings indicated on the plans. Provide only hardware

and fittings made of galvanized steel or non-corrosive metal unless the fiberglass insulators specified in 634-2.4 are also required. Provide hardware and fittings of sufficient strength to resist the breaking strength of the wire with which they are used.

Connect the automatic compression dead-end clamps of the catenary wire ~~(or wires)~~ to the *wood or concrete* strain poles with 3/4 inch diameter oval eye bolts, except as noted in 634-3.3(f). ~~For single point attachments, attach the automatic compression dead-end clamp of the messenger wire to the same oval eye bolt as the catenary wire.~~ For two point attachments, connect the *automatic compression dead-end clamps of the* messenger wire to *the wood or concrete poles with* 3/4 inch diameter oval eye bolts at the lower attachment location, except as noted in 634-~~3.4~~*3.3*(f). Do not use thimbleye bolts for these connections.

Only use thimbleye and oval eye bolts, 3/4 inch in diameter, minimum, to connect the automatic compression dead-end clamps of tether wires to *wood or concrete* strain poles.

Only use "S" hooks, 5/16 inch in diameter, minimum, when connecting the tether wire to all poles.

Ensure that other hardware and fittings, as required for the attachment of a span wire assembly to support poles or structures, are in accordance with the details shown in the Design Standards.

634-2.4 Fiberglass Insulators: Install fiberglass insulators of the length specified in the plans on span wire assemblies located within 6 feet of overhead electric power lines.

Use a fiberglass insulator of a cylindrical shape, fabricated from epoxy-resin impregnated fiberglass strands and having a breaking strength 50% greater than that of the structural support wire to which it is to be attached. Equip the insulator with thimbleye fittings on each end for attachment of the wire. Furnish all fittings and hardware necessary for the complete installation with the insulator and ensure that such fittings and hardware are of at least equal strength to the insulator.

634-3 Installation Requirements.

634-3.1 Span Wire Assembly Types: Use ~~span wire assemblies~~ *either* of the following ~~types~~*span wire assemblies as shown in the contract documents*:

(a) ~~Two Wire Assembly: This type assembly requires a catenary wire and a messenger wire.~~*Single Point Attachment Assembly: This type of assembly requires a catenary wire with an optional tether wire (if shown in the contract documents).*

(b) ~~Three Wire Assembly: This type assembly requires a catenary wire, a messenger wire, and a tether wire.~~*Two Point Attachment Assembly: This type of assembly requires a catenary wire, a messenger wire and an optional tether wire (if shown in the contract documents).*

~~The Contractor may supply either of these types for single or two point attachments.~~

634-3.2 Span Types: Install span wire assemblies on the following span types:

(a) Perpendicular Span: Use this type span at an intersection to support a single span wire assembly upon which traffic signals, signs, and/or other traffic control devices are attached. Attach the span wire assembly to two support poles or structures, located on opposite sides of the roadway, and extend the assembly across the roadway at an angle of approximately 90 degrees to the roadway approach.

(b) Diagonal Span: Use this span type at an intersection to support a single span wire assembly upon which traffic signals, signs, and/or other traffic control devices are attached. Attach the span wire assembly to two poles, located in opposite quadrants of the intersection, and extend the assembly across the intersection at an angle of approximately 45 degrees to the

approach lanes of the intersection. Locate traffic control devices for all approaches at appropriate locations on the span wire assembly.

(c) Box Span: Use this span type at an intersection to support a perimeter system of four span wire assemblies upon which traffic signals, signs and/or other traffic control devices for each approach to the intersection are attached. Attach the span wire assemblies to four poles, one located in each quadrant of the intersection, and extend each span wire assembly between two poles at an angle of approximately 90 degrees to the roadway approaches. Place traffic control devices for an approach on the span wire assembly on the far side of the intersection.

(d) Special Design Span: Use this span type to support two or more span wire assemblies upon which traffic signals, signs and other traffic control devices for one or more roadway approaches are attached. Attach the span wire assemblies to three or more poles.

634-3.3 General Requirements:

(a) Provide a span wire assembly with catenary, messenger and tether wires of one continuous length of wire cable with no splices except when an insulator is required by 634-2.4. Connect the insulator, if required, to the cable with automatic compression dead-end clamps.

(b) Attach the span wire assemblies to the support poles or structures by means of automatic compression clamps and accessory hardware.

(c) Assemble the washer and nut on the oval eye bolt with the flat washer next to the pole. Tighten the nut sufficiently to prevent the oval eye bolt from rotating.

(d) ~~For single point attachment, supply tension to the messenger wire with the signal conductor cables attached to eliminate any appreciable sag.~~

For two point attachments, install the messenger wire with the following tensions per 100 feet. Linearly prorate cable tensions for other lengths from these values:

Cable Size Inch	Wire Tension Lbs.
3/8	340.0
7/16	500.0
1/2	645.0

(e) Install the catenary wire to the following initial wire tensions:

For 3/8 inch diameter:

Span Feet	Initial Wire Tension Lbs.
0 to 100	50.0
101 to 125	75.0
126 to 150	85.0
151 to 175	100.0
176 to 200	115.0
201 to 225	125.0
226 to 250	140.0
251 to 275	150.0
276 to 300	175.0
over 300	200.0

For 7/16 inch diameter:

Span Feet	Initial Wire Tension Lbs.
0 to 100	75.0
101 to 125	100.0
126 to 150	125.0
151 to 175	150.0
176 to 200	175.0
201 to 225	175.0
226 to 250	200.0
251 to 275	225.0
276 to 300	250.0
over 300	275.0

For 1/2 inch diameter:

Span Feet	*Initial Wire Tension Lbs.*
0 to 100	*100.0*
101 to 125	*125.0*
126 to 150	*155.0*
151 to 175	*185.0*
176 to 200	*200.0*
201 to 225	*225.0*
226 to 250	*260.0*
251 to 275	*300.0*
276 to 300	*325.0*
over 300	*350.0*

(f) ~~Connect a maximum of two 3/8 inch diameter catenary wires to a strain pole with one 3/4 inch diameter oval eye bolt.~~ Connect a maximum of one 7/16 inch diameter catenary wire to a *wood or concrete* strain pole with one 3/4 inch diameter oval eye bolt.

Use a 3/4 inch diameter alloy steel eyebolt (ASTM F 541, Type 2) and a 3/4 inch heavy hex nut ASTM A 563, Grade C or D), both zinc coated in accordance with ASTM A 153, Class C, to ~~connect more than one 7/16 inch diameter catenary wire or~~ one 1/2 inch diameter messenger or catenary wire to a single *wood or concrete* strain pole. Alternatively, the Engineer may design a special connection for this case.

(g) Install the span wire assemblies in accordance with the Design Standards, Index No. 17727, and at a height on the support poles which will provide a clearance from the roadway to the bottom of the signal head assemblies as specified in 650-4*3*.

(h) Connect all span wires to the pole grounding system in accordance with Section 620.

(i) Obtain and meet all provisions of the National Electric Safety Code (ANSI-C2) regarding clearance from electric lines, contacting of utility owners, and safety requirements prior to span wire installation.

(j) Prior to installation of the span wire assembly, submit the method of providing the required tension in the catenary wire and the messenger wire in two point attachments to the Engineer for approval.

634-4 Method of Measurement.

634-4.1 General: Measurement for payment will be in accordance with the following work tasks.

634-4.2 Furnish and Install: The Contract unit price per intersection for Span Wire Assembly and per foot of Fiberglass Insulator, furnished and installed, between supporting poles and structures will include furnishing all materials and hardware as required in 634-2, and all labor, equipment, and miscellaneous materials necessary for a complete and accepted installation.

634-4.3 Furnish: The Contract unit price per intersection for Span Wire Assembly and per foot of Fiberglass Insulator, furnished, will include the cost of the required materials and hardware as required in 634-2, and all handling and delivery of these items to the site designated by the Department in the Contract Documents.

634-4.4 Install: The Contract unit price per intersection for Span Wire Assembly and per foot of Fiberglass Insulator, installed, will include all labor, equipment, and miscellaneous materials necessary for a complete and accepted installation.

The Engineer will supply all materials and hardware as required in 634-2 for the span wire assembly.

634-5 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 634-	4-	Span Wire Assembly - per intersection.
Item No. 634-	5-	Fiberglass Insulator - per foot.