ORIGINATION FORM
Proposed Revisions to the Specifications
(Please provide all information - incomplete forms will be returned)

Date: 6/22/23
Office: Structures Design Office
Originator: Andre Pavlov
Specification Section: 649
Telephone: 850-414-4293
Article/Subarticle: 649-7
Email: Andre.Pavlov@dot.state.fl.us
Associated Section(s) Revisions: None

Will the proposed revision require changes to the following Publications:

Publication	Yes	No	Office Staff Contacted	Date
Standard Plans Index	◉	○	Rick Jenkins/Joshua Turley	6/22/23
Traffic Engineering Manual	○	◉	Mariano Amicarelli	6/22/23
FDOT Design Manual	○	◉	DeWayne Carver	6/22/23
Construction Project Administration Manual	○	◉	Patrick Overton	6/22/23
Basis of Estimate/Pay Items	○	◉	Ryan Gray	6/22/23
Structures Design Guidelines	○	◉	Ben Goldsberry	6/22/23
Approved Product List	○	◉	Karen Byram	6/22/23
Materials Manual	○	◉	Susan Musselman/Brad Pearson	6/22/23
Maintenance Specs	○	◉	Deanna Hutchison	6/22/23

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction (DCE Memo)** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? YES

Synopsis: Summarize the changes:

Update base plate installation procedure based on latest research findings. Some terminology clarifications and corrections are needed.

Justification: Why does the existing language need to be changed?

These changes are being made to ensure that hardware is correctly installed during initial construction and will not become loose during the service life of the structure.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Contact the State Specifications Office for assistance completing this form.

Daniel Strickland 850-414-4130 Daniel.Strickland@dot.state.fl.us, Darla Hunsicker 850-414-4114 Darla.Hunsicker@dot.state.fl.us,
Jennifer Burnsed 850-414-4101 Jennifer.Burnsed@dot.state.fl.us, MaryElizabeth Parker 850-414-4155 MaryElizabeth.Parker@dot.state.fl.us

1. Are changes in line with promoting and making meaningful progress on improving safety, enhancing mobility, inspiring innovation, and fostering talent; explain how?

Properly installed hardware that does not loosen over time will result in improved safety and enhanced mobility.

2. What financial impact does the change have; project cost, pay item structure, or consultant fees?

No financial impact.

3. What impacts does the change have on production or construction schedules?

Construction schedules can be improved by minimizing confusion in the field on installation procedures.

4. How does this change improve efficiency or quality?

Quality is improved by ensuring that hardware is correctly installed during initial construction and will not become loose during the service life of the structure.

5. Which FDOT offices does the change impact?

Construction.

6. What is the impact to districts with this change?

No impact to districts.

7. Does the change shift risk and to who?

This change does not shift risk.

8. Provide summary and resolution of any outstanding comments from the districts or industry.

Comments and Responses are available on the Track the Status of Revisions hyperlink located on the Specifications landing page: https://www.fdot.gov/programmanagement/Specs.shtm.

9. What is the communication plan?

Through the established specification revision process (e.g., Internal and Industry Review).

10. What is the schedule for implementation?

The Standard Specifications e-Book and Workbook are effective July 1st every year.

GALVANIZED STEEL POLES, MAST ARMS, AND MONOTUBE ASSEMBLIES.
(REV 6-22-23)

ARTICLE 649-7 is deleted and the following is substituted:

649-7 Installation.

Install foundations in accordance with Section 455. Do not install poles, mast arm poles, or monotubes until the foundation has achieved 70% of the specified 28-day concrete strength and verifying test results have been submitted to the Engineer. Determine concrete strength from tests on a minimum of two test cylinders prepared and tested in accordance with ASTM C31 and ASTM C39. Before erecting the pole, clean the top of the foundation of any laitance, oils, grease or any other deleterious materials. Erect strain poles in an orientation which considering the rake and the application, cable forces will produce a plumb pole. Erect monotubes plumb at the time of installation. Plumb the pole supporting mast arms after the mast arms, traffic signals or sign panels have been placed.

If the traffic signals and/or sign panels are not in place within two working days after the mast arm is erected, furnish and install a 3 foot x 2 foot blank sign panel on the bottom of each mast arm within 6 feet of the mast arm tip and plumb the pole. Re-plumb the pole supporting mast arms after installation of traffic signals and sign panels.

Install ASTM F3125, Grade A325 bolt, nut, and washer assemblies in accordance with the following. Use bolt, nut and washer assemblies that are free of rust and corrosion and are lubricated properly as demonstrated by being able to easily hand turn the nut on the bolt thread for its entire length. Tighten nuts to a snug-tight condition to bring the faying surfaces of the assembly into firm contact with plies solidly seated against each other, but not necessarily in continuous contact. Snug-tight is defined as the maximum nut rotation resulting from the full effort of a person using an ordinary spud wrench. Visually inspect the connection after snugging all bolts, ensuring firm contact has been achieved at a minimum between faying surfaces beneath bolts within one bolt diameter of bolt hole edges. Re-snug bolts in a connection where faying surfaces are not in firm contact. After bringing the faying surfaces to a snug-tight condition, tighten nuts in accordance with Table 460-7, Nut Rotation from the Snug-Tight Condition. Maintain as close to uniform contact pressure as possible on the faying surfaces during snugging and turn-of-nut process by utilizing suitable erection methods and a bolt tightening pattern that balances the clamping force of each bolt, as closely as possible, with the equal clamping force of a companion bolt.

For this Specification, the retainer nuts (half-height or full-height) are installed on top of the plate washers and below the anchor nuts (full-height). Base plate installation steps are as follows:

1. Clean and lubricate the exposed threads of all anchor bolts. Clean and lubricate the threads and bearing surfaces of all leveling nuts. Re-lubricate the exposed threads of the anchor bolts and the threads of the leveling nuts if more than 24 hours haves elapsed since earlier lubrication, or if the anchor bolts and leveling nuts have become wet since they were first lubricated.

2. Verify that the nuts can be turned onto the bolts past the elevation corresponding to the bottom of each in-place leveling nut and be backed off by the effort of a

person using an ordinary spud wrench, without employing a pipe extension on the wrench handle.

3. Turn the leveling nuts onto the anchor bolts and align the nuts to the same elevation less than or equal to one bolt diameter from the top of the foundation.

4. Place structural plate washers on top of the leveling nuts; one washer corresponding to each anchor bolt.

5. Install the base plate onto the leveling nut washers, place structural plate washers on top of the base plate; one washer corresponding to each anchor bolt~~,~~ and turn ~~full or half-size anchor~~retainer nuts onto the anchor bolts.

6. Tighten ~~anchor~~retainer nuts against the top of the base plate to a snug-tight condition in a star pattern. A star tightening pattern is one in which the nuts on opposite or near opposite sides of the bolt circle are successively tightened in a pattern resembling a star. For an 8 bolt circle with bolts sequentially numbered 1 to 8, tighten nuts in the following bolt order: (1, 5, 7, 3, 8, 4, 6, 2).

7. Tighten leveling nuts to a snug-tight condition in a star pattern. The distance from the bottom of the leveling nuts to the top of the concrete must not exceed one anchor bolt diameter after tightening.

8. Turn anchor nuts onto the anchor bolts and ~~T~~tighten each ~~full-size retainer nut~~ until it is in firm contact with the top surface of the ~~anchor~~retainer nut; then while preventing the ~~anchor~~retainer nut from rotating, tighten the ~~retainer~~anchor nut until it is snug~~-~~-tight using a star pattern. Before final tightening of the ~~retainer~~anchor nuts, mark the reference position of each snug-tight retainer nut on one flat with a corresponding reference mark on the anchor nut and base plate on each bolt. Assure the retainer nut stays in this final position. Then while preventing the ~~anchor~~retainer nut from rotating, incrementally turn the ~~retainer~~anchor nuts using a star pattern until achieving the required nut rotation specified in Table 649-1. Turn the anchor nuts at least two full tightening cycles (passes). After tightening, verify the anchor nut rotation with respect to the retainer nut and verify the retainer nut has not rotated from its snug-tight condition with respect to the plate washer and base plate. Do not exceed the Table 649-1 value by more than 20 degrees. The final condition is a retaining nut that is snug-tight with respect to the plate washer, and an anchor nut that is rotated with respect to the reference mark on the retaining nut, plate washer, and base plate in accordance with Table 649-1.

9. Install a screen over the gap between the base plate and foundation concrete in accordance with 649-8, or place a structural grout pad in accordance with 649-9.

Table 649-1

Anchor Bolt Diameter (inches)	Nut Rotation from Snug-Tight Condition
≤ 1-1/2	1/3 turn
> 1-1/2	1/6 turn

649-7.1 Camera Lowering Device Installation: Meet the requirements of 641-4.4.