



*Florida Department of Transportation*

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KEVIN J. THIBAUT  
SECRETARY

May 14, 2019

Khoa Nguyen  
Director, Office of Technical Services  
Federal Highway Administration  
3500 Financial Plaza, Suite 400  
Tallahassee, Florida 32312

Re: State Specifications Office  
Section:  
Proposed Specification: **6490500 Galvanized Steel Poles, Mast Arms, and Monotube Assemblies.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Cheryl Hudson of the State Structures Design Office to modify the language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to [dan.hurtado@dot.state.fl.us](mailto:dan.hurtado@dot.state.fl.us).

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Dan Hurtado, P.E.  
State Specifications Engineer

DH/dt

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**GALVANIZED STEEL POLES, MAST ARMS, AND MONOTUBE ASSEMBLIES.****(REV ~~3-26-194~~ 3-195-14-19)**

ARTICLE 649-5 is deleted and the following substituted:

**649-5 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 full contact which is referred to as snug-tight. Snug-tight is defined as the maximum nut rotation resulting from the full effort of one person using a 12 inch long wrench or equivalent. 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 uniform contact pressure on the faying surfaces during snugging and turn-of-nut process, by using 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.

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 has elapsed since earlier lubrication, or if the anchor bolts and leveling nuts have become wet since they were first lubricated. ~~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 one person on using a 12 inch long ordinary spud wrench, without employing a pipe extension on the wrench handle.~~

2. ~~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 has elapsed since earlier lubrication, or if the anchor bolts and leveling nuts have become wet since they were first lubricated.~~ 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 one person using an 12 inch long 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 ~~the top~~ full or half-size anchor nuts onto the anchor bolts.

6. Tighten ~~top~~ anchor 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. Before final tightening of the top nuts, mark the reference position of each tip nut in a snug-tight condition with a suitable marking on one flat with a corresponding reference mark on the base plate at each bolt. Then incrementally turn the top nuts using a star pattern until achieving the required nut rotation specified in Table A. Turn the nuts at least 2 full tightening cycles (passes). After tightening, verify the nut rotation. Do not exceed the Table A value by more than 20 degrees.~~

~~98.~~ Tighten each full-size retainer ~~or jam~~ nut until it is in firm contact with the top surface of the anchor ~~bolt~~ nut; then while preventing the anchor ~~bolt~~ nut from rotating, tighten the ~~jam~~ retainer nut until it is snug tight using a star pattern. Before final tightening of the retainer nuts, mark the reference position of each snug-tight nut on one flat with a corresponding reference mark on the anchor nut and base plate on each bolt. Then while preventing the anchor nut from rotating, incrementally turn the retainer nuts using a star pattern until achieving the required nut rotation specified in Table 1. Turn the nuts at least 2 full tightening cycles (passes). After tightening, verify the nut rotation. Do not exceed the Table 1 value by more than 20 degrees.

~~109.~~ Install a screen over the gap between the base plate and foundation concrete in accordance with 649-6, or place a structural grout pad in accordance with 649-7.

Table <u>A1</u>	
Anchor Bolt Diameter (inches)	Nut Rotation from Snug-Tight Condition
$\leq 1-1/2$	1/3 turn
$> 1-1/2$	1/6 turn

**649-5.1 Camera Lowering Device Installation:** Meet the requirements of 641-4.4.

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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 has 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 nuts onto the anchor bolts.

6. Tighten anchor 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. Tighten each full-size retainer nut until it is in firm contact with the top surface of the anchor nut; then while preventing the anchor nut from rotating, tighten the retainer nut until it is snug tight using a star pattern. Before final tightening of the retainer nuts, mark the reference position of each snug-tight nut on one flat with a corresponding reference mark on the anchor nut and base plate on each bolt. Then while preventing the anchor nut from rotating, incrementally turn the retainer nuts using a star pattern until achieving the required nut rotation specified in Table 1. Turn the nuts at least 2 full tightening cycles (passes). After tightening, verify the nut rotation. Do not exceed the Table 1 value by more than 20 degrees.

9. Install a screen over the gap between the base plate and foundation concrete in accordance with 649-6, or place a structural grout pad in accordance with 649-7.

Table 1	
Anchor Bolt Diameter (inches)	Nut Rotation from Snug-Tight Condition
$\leq 1\text{-}1/2$	1/3 turn
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**649-5.1 Camera Lowering Device Installation:** Meet the requirements of 641-4.4.