

ORIGINATION FORM

Specification: 649-5, 649-6 and 700-2.5.3

Subject: 649-5, Galvanized Steel strain poles, mast arms and monotube assemblies – Installation
649-6, Vermin Screen Installation
700-2.5.3, Highway signing – Overhead Sign Structures – Installation

Origination date: 5/14/08

Originator: Steven Plotkin

Office/Phone: (904) 360-5501

Problem statement: (649-5 and 700-2.5.3) Specification revisions that were implemented not too long ago require overhead sign and traffic signal structure Contractors to meet bolting procedures that previously only applied to the erection of bridge superstructures and this has created unnecessary effort and expense.

(649-6) The gap beneath base plates of steel poles for signs and traffic signals is currently grouted or is covered with vermin screens: however, the grout has been failing at numerous locations statewide in spite of efforts to prevent the failures.

Proposed solution: (649-5 and 700-2.5.3) Careful study of this problem has revealed that bridge bolting procedures in the current specification are not required for sign and traffic signal structures; therefore, these revisions delete the procedures which in turn eliminate the unnecessary effort and expense that Contractors are incurring.

(649-6) These revisions eliminate the use of grout and instead require the installation of vermin screens which have a reliable and consistent performance record.

Information source: Rafiq Darji, Andre Pavlov, Charles Harvey, Jeff Pouliotte

Recommended Usage Note: Use on all projects with overhead sign and traffic signal structures

Estimated fiscal impact, if implemented: Implementation of these revisions will save construction costs for the Department.

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

Specifications Office Use Only

Begin date: June 1, 2008

File Number: 6490500

Scheduled completion date: August 29, 2008

Implementation team member: Dwayne Moore



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

MEMORANDUM

DATE: July 3, 2008
TO: Specification Review Distribution List
FROM: Rudy Powell, Jr., P.E., State Specifications Engineer
SUBJECT: Article 6490500-Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies

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

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 July 31, 2008 may not be considered. Your input is encouraged.

RP/dm

Attachment

GALVANIZED STEEL STRAIN POLES, MAST ARMS AND MONOTUBE ASSEMBLIES.

(REV 5/14/08) ~~5-10-07~~ ~~(FA 6-6-07)~~ ~~(9-07)~~

ARTICLE 649-5 (Pages 703 and 704) is deleted and the following substituted:

649-5 Installation.

Install foundations for strain poles, mast arm and monotube assemblies in accordance with Section 455. Do not install the mast arm pole, strain poles or monotube pole until the foundation has cured for a minimum of seven days. 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 by 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 bolt, nut and washer assemblies, except nuts on anchor rods, in accordance with Section 460.~~ *Install ASTM 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 that 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 the full effort of an ironworker using an ordinary spud wrench to bring the faying surfaces of the assembly into full contact which is referred to as "snug tight." snug tight. After bringing the faying surfaces to a snug tight condition, tighten nuts in accordance with the turn-of-nut method in Table 460-7 of Specification Section 460-5. 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.*

Use anchor bolt assemblies that are free of rust and corrosion, and lubricate these assemblies prior to installation so that the nut turns easily by hand the entire length of the bolt thread. Install nuts on anchor bolts/rods in accordance with the sequence that follows: use anchor bolt assemblies that are free of rust and corrosion, and lubricate these assemblies prior to installation so that the nut moves freely by hand through the full length of the thread. Ensure that the base plate is level by incrementally adjusting the leveling nuts all of which must be in direct contact with the bottom surface of the base plate at the conclusion of the leveling process. Tighten all the anchor bolt nuts so they are in direct contact with the top surface of the base plate and are "snug tight." snug tight. Snug tight is attained by applying the full tightening effort of an ironworker using an ordinary spud wrench. If the top surface of the base plate has a slope that exceeds 1:40, use a beveled washer under the anchor bolt nut. Tighten the leveling nuts until they are snug tight. Match mark the anchor bolt nut relative to the anchor bolt to ensure that the anchor bolt nut is rotated by the fraction of a turn specified in Table A649-1 and apply the turn to the nut. Do not exceed the Table A649-1 value by more than 20 degrees. Tighten each "retainer" retainer or "jam" 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 nut until it is snug tight. During each stage of leveling nut, anchor bolt nut and jam nut tightening, use a pattern of tightening that, as nearly as possible, produces a balanced distribution of clamping

forces on the base plate as tightening progresses. Bring the lower top anchor nuts on the anchor rods to a “snug tight” condition defined as: the tightness that is attained with a few impacts of an impact wrench or the full effort of an ironworker using an ordinary spud wrench such that more than 75% of the faying surfaces are in firm contact. Before snugging the lower top anchor nuts, all bottom leveling nuts shall be leveled. After snugging the lower top anchor nuts, all bottom leveling nuts shall be tightened to the base plate by full effort of an ironworker using an ordinary spud wrench. Use a beveled washer if outer face of the base plate is sloped more than 1:40 or if necessary to attain “snug tight” condition. After attaining “snug tight” condition, additionally tighten the lower top anchor nuts on the anchor rods in accordance with Table A. Nut rotation is relative to anchor rod, tolerance is plus 20 degrees. Install the upper top anchor nuts on the anchor rods on top of the lower top anchor nuts using the tightness that is attained with a few impacts of an impact wrench or the full effort of an ironworker using an ordinary spud wrench. During the tightening of the upper top anchor nuts, the lower top anchor nuts shall be restrained from movement by using an ordinary spud wrench.

Anchor Bolt Rod Diameter (in.)	Nut Rotation from Snug Tight Condition
≤ 1 1/2	1/3 turn
> 1 1/2	1/6 turn

SUBARTICLE 649-6 (Page 704) is deleted and the following substituted:

649-6 Vermin Screen Installation Grouting.

Install a screen that will prevent vermin from entering the gap between the bottom of the base plate and the top of the concrete foundation. Cover the entire gap with a wire screen, the bottom horizontal wire of which shall be in full contact with the surface of the concrete foundation and the top horizontal wire of which shall be at or above the top surface of the base plate. For the screen, use standard grade plain weave galvanized steel wire cloth with 1/2 inch x 1/2 inch mesh and 0.063 inch diameter wires. Vertical screen wires shall not extend beyond the top and bottom horizontal wires of the screen. Use one continuous section of screen with only one overlapping splice where the ends come together and overlap the layers 3 inches minimum. Attach the screen to the vertical side of the base plate with self-tapping stainless steel screws (#8-1/2 inch long) with stainless steel washers (1/4 inch inside diameter). Drill pilot holes into the base plate to facilitate screw installation. Install screws on 9 inch centers maximum and at least one screw shall be installed through the overlapping splice to clamp the layers together. Also clamp the overlapping splice layers together just above the concrete foundation with an all stainless steel fastener assembly consisting of a machine screw (#8-5/8 inch long), nut and 2 flat washers (1/4 inch inside diameter) and lock washer. Tightly clamp the screen layers between the flat washers.

649-6.1 Alternatives to Grouting: Optional alternatives to grouting may be allowed by the Engineer where such alternatives are described as an option in the contract plans.

649-6.2 Preparation: Flush the top of the foundation with clean water to remove any dirt and debris. Immediately before grouting, saturate the concrete surfaces by ponding or by placement of saturated rags for a minimum period of two hours. Remove all freestanding water before beginning the grouting operation.

All Jobs with Overhead Sign and Traffic Signal Structures

~~———— **649-6.3 Forming:** Use watertight non-absorbent forms with a form release agent applied to all interior surfaces. Maintain a 1 inch clearance between the forms and the base plate. Extend the form a minimum of 1 inch above the bottom of the base plate. Attach a head box with a 45 degree slope on the form for grout placement.~~

~~———— **649-6.4 Mixing:** Use only fresh unopened full bags of grout. Mix the grout in a clean, power driven mortar mixer or with a heavy duty drill (850 RPM maximum) using a commercial mixing paddle. Mix the grout in accordance with the manufacturer's instructions. Test the fluidity of the grout using the ASTM C 939 Flow Cone Method. Use grouts that meet the efflux time of 20 to 30 seconds. Do not remix grouts that have begun to set.~~

~~———— **649-6.5 Placing and Curing:** Pour the grout from only one side of the base plate through the head box until the grout has filled the entire form and extends a minimum of 1/4 inch above the bottom of the base plate. Do not allow the grout to overtop the base plate. Do not vibrate grout. Clean excess grout off the base plate after the grout has reached initial set (two to four hours). Cure the grout for a minimum of six hours by covering the entire grout surface with clean saturated rags. Remove the forms after verifying the grout is self supporting by penetration with a pointed masons trowel or other sufficient tool. Cure all exposed grout with a membrane curing compound.~~