**HIGH STRENGTH STEEL ANCHOR ROD INSTALLATION TENSIONING RECORD**

Wisconsin Department of Transportation

DT2321 10/2018

**Purpose:** Submit this form to ensure proper installation under the standard specifications for sign bridges and overhead sign supports (641); type 9, 10, 12 and 13 poles (657); high mast light poles (660); camera poles (677). Requires “Yes” answers to steps 1 thru 7.

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| **PROCEDURE** | **QUESTION** | **YES NO** |
| **Step 1** Verify F1554 anchor bolts are grade 55 or other grade as required**(a)**. Verify nuts are ASTM A563 heavy hex and washers are F436. | Were the correct grade of anchor rod, nut and washer used? | [ ] [ ]  |
| **Step 2** Verify anchor rods are clean and not damaged and plumb – not more than 1:40 slope or 1/4" in 10" (if rods are out of plumb or damaged call central office for instructions). | Was anchor rod clean and undamaged and slope ≤ 1:40 or 1/4" in 10"? | [ ] [ ]  |
| **Step 3** Lubricate (wax based) anchor rods (within 24 hours of tensioning) and turn nut down to foundation – this should run freely with little resistance ≈ 20 ft.-lbs. or less. | Was wax based lubrication applied and did leveling nut run down freely? | [ ] [ ]  |
| **Step 4** Level leveling nuts – make sure nuts are less than one anchor rod diameter from the foundation (unless stated otherwise on the plans). | Were the leveling nuts installed ≤ 1 anchor rod diameter from the foundation? | [ ] [ ]  |
| **Step 5** Install structure with an F436 washer below and above base plate and snug top nuts. When snugging use 20% to 30% of verification torque on both the top nut and leveling nut**(b)** following the star pattern on this form. Two cycles of snugging shall be performed prior to the next step. | Was snugging (2 cycles) performed properly? | [ ] [ ]  |
| **Step 6** Mark the nuts and adjacent base plate and turn the minimum required turn (1/3 turn for bolts 1 1/2" diameter or less and 1/6th turn for all larger bolts). | Was turn of the nut performed properly? | [ ] [ ]  |
| **Step 7** Confirm verification torque was achieved per Table 1, or continue to turn nut until verification torque is achieved. | Was verification torque per Table 1 confirmed? | [ ] [ ]  |
| **Step 8** Install Jam nuts if shown on shop drawings. | Were Jam nuts installed correctly per Table 1? (answer only if Jam nuts are required) | [ ] [ ]  |
| **(a)** If other than grade 55 rods are being used call central office for installation instructions.**(b)** Torque on leveling nut may be estimated – not requiring open ended torque wrench adaptor.Central Office Contact: Steven Doocy (608) 261-6063. |

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| **Table 1** |
| Bolt size (dia.) in inches | **Snugging** 20% to 30% of Verification Torque in ft.-lbs. | Verification Torque in ft.-lbs. | Jam nut Torque in ft.-lbs. |
| 3 | 1,614 to 2,421 | 8,877 | 404 |
| 2 3/4 | 1,221 to 1,832 | 6,716 | 305 |
| 2 1/2 | 900 to 1,350 | 4,950 | 225 |
| 2 1/4 | 657 to 986 | 3,614 | 164 |
| 2 | 452 to 678 | 2,486 | 113 |
| 1 3/4 | 301 to 452 | 1,656 | 75 |
| 1 1/2 | 189 to 284 | 1,040 | 48 |
| 1 1/4 | 110 to 165 | 605 | 28 |
| 1 1/8 | 77 to 115 | 421 | 25 |
| 1 | 54 to 81 | 297 | 25 |
| 7/8 | 37 to 55 | 202 | 25 |
| 3/4 | 23 to 34 | 124 | 25 |

 | **STAR PATTERN** **graphic dt2321a graphic dt2321b** **Figure 1** **Figure 2** |

Verification Torque = 110% (0.12\* nominal diameter \*Minimum Installation Pre-Tension) = 110% [0.12\* nominal diameter \*(0.60 (75000psi)
(net anchor rod area))] per NCHRP report 469.

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| Make, Model and Serial Number of Torque Wrench       |
| Torque Wrench Calibration Date (m/d/yyyy) *(Calibration Date MUST be Within 1 Year)*      | Structure ID Number      | Project ID      |
| Contractor Name      |
| Date (m/d/yyyy)      | Contractors Representative (QC) Name      | Contractors Representative (QC) Signature**X** |
| Date (m/d/yyyy)      | Wisconsin Department of Transportation Representative (QA) Name      | WisDOT Representative (QA) Signature**X** |
| Comments      |