

Technical Note 173

Tensioning Hexagon Nuts on Lantern Mounting Bolts

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1 Introduction

This Technical Note addresses several issues that have arisen recently during the installation of traffic signal lanterns, which have caused damage to the lantern mounting bolt and compromised the support of lanterns.

The document also prescribes installation requirements and detailed procedures necessary for traffic lantern installation in order to avoid the potential damage.

All the apparatus such as traffic lantern, mounting strap and split-shell assembly shall comply with the requirements specified in MRTS253 *Traffic Signal Lanterns* and AS/NZS 2144.2014.

This Technical Note does NOT cover the requirements for Safety and Risk Management and shall be read in conjunction with *Electrical Safety Act 2002*, Electrical Safety Regulation, MUTCD Part 3 and MRTS253 *Traffic Signal Lanterns* as appropriate.

2 Referenced Documents

Table 2 lists documents referenced in the Technical Note.

Table 2 - Referenced documents

References	Title
AS/NZS 2144.2014	Traffic Signal Lantern
AS/NZS 2339.2017	Traffic signal posts and attachments
MRTS201	<i>General Equipment Requirements</i>
MRTS253	<i>Traffic Signal Lanterns</i>
SD1635	<i>Traffic signals - Traffic Signal Upper Mounting assembly and split shell assembly</i>

3 Background

The damage to the traffic signal lantern bolt resulted from two major causes. Those causes were:

1. Over-tightening of the hexagon nuts on the lantern mounting by using power tools, resulting in the damage to the mounting bolt and mounting spacer, as shown in Figure 3(a).
2. The mounting strap was placed directly on the support bracket, which damaged the end boss over a period of time as illustrated in Figure 3(b).

Figure 3(a) - Damaged mounting bolt

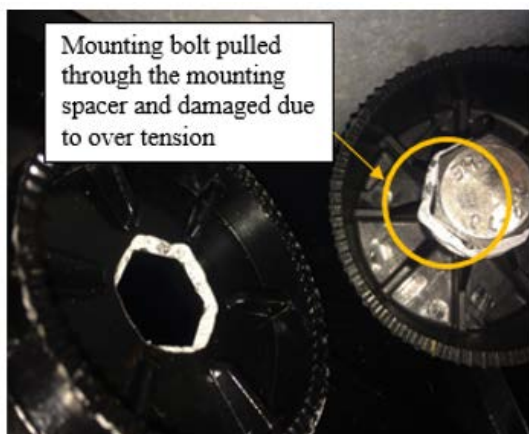
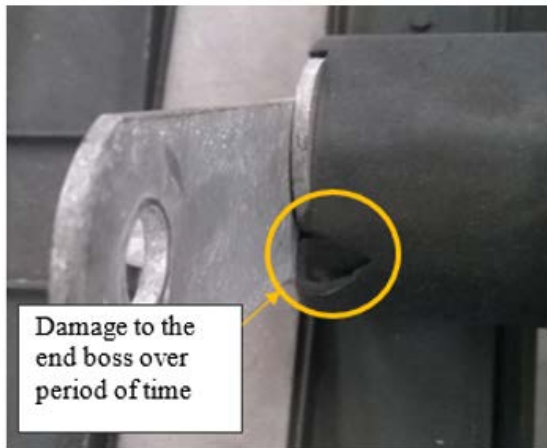


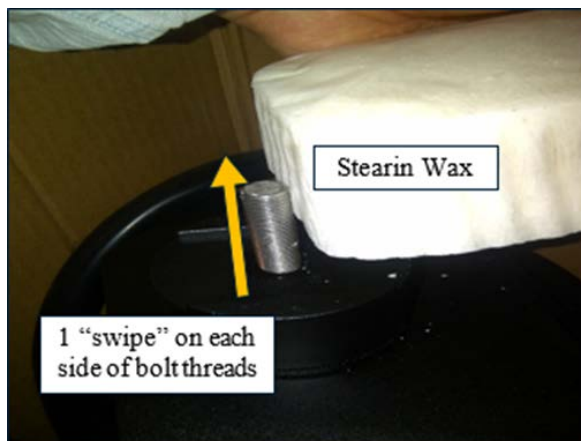
Figure 3(b) – Damaged end boss

4 Procedure to Install Traffic Signal Lanterns

To avoid the damage to traffic lanterns, it is strongly advised that lanterns should be installed in the following procedures.

4.1 Apply lubricant to the mounting bolt

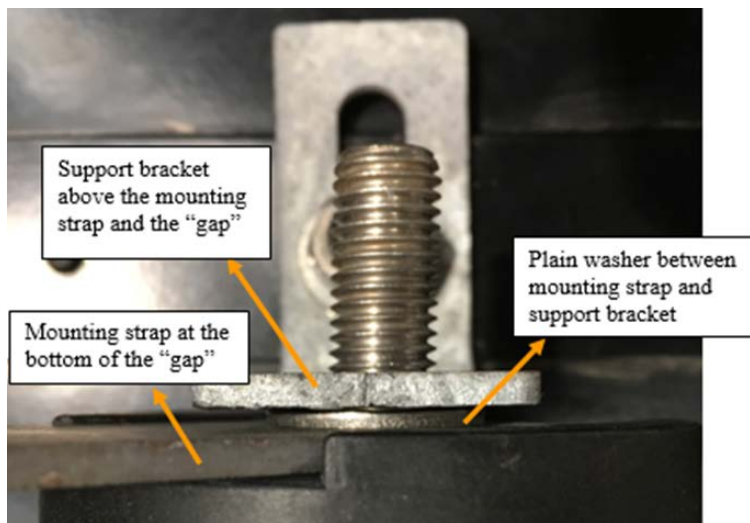
Check and make sure that the manufacturer has lubricated the bolt using Stearin Wax or Relton Stick Wax as specified in Clause 6.4 of MRTS253. Otherwise, lubricants, including Stearin Wax or Relton Stick Wax, shall be applied to the exposed bolt prior to installation. Please note that one “wipe” on each side of the bolt threads would be sufficient, as demonstrated in Figure 4.1. Do not over coat the bolt by applying multiple “wipes” on the threads.

Figure 4.1 - Coating bolt threads with stearin wax

4.2 Install mounting strap, support bracket and plain washer

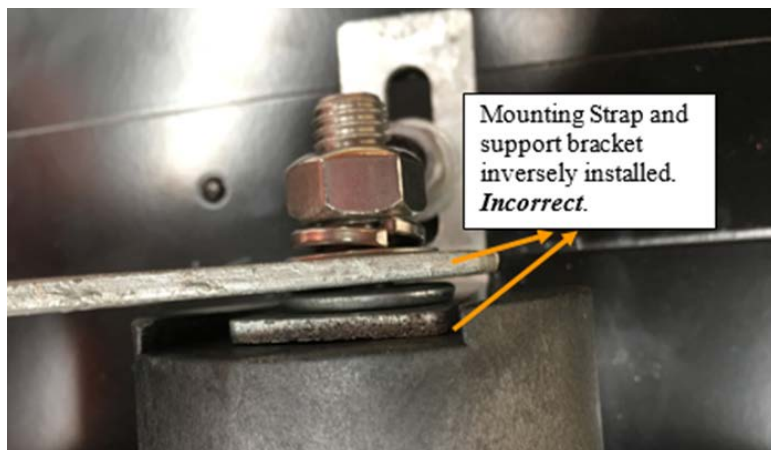
Insert one or two plain washers between the mounting strap and the support bracket to ensure that the support bracket sits slightly above the “gap” if the mounting strap is thinner than the depth of the “gap” (Refer to Figure 4.2(a)). The purpose of the plain washer is to prevent potential damage to the end boss caused by the support bracket after the lantern is installed over time (see Figure 3(b)). If the mounting strap is thicker than the depth of the “gap”, then there is no need to place the plain washer since the support bracket is already above the “gap”.

Figure 4.2(a) - Correct location of mounting strap, support bracket and plain washer



Note: That the mounting strap must be first installed at the bottom of the “gap”, and the support bracket must be placed above the mounting strap. Installing the mounting strap and the support bracket inversely will result in lanterns spinning easily (Refer to Figure 4.2(b)).

Figure 4.2(b) - Incorrect location of mounting strap and support bracket



4.3 Tighten hexagon nuts on the mounting bolt

To prevent over-tightening of hexagon nuts and causing damaged to the lantern housing, the hexagon nuts should only be tightened using manual tools instead of power tools. Furthermore, a spring washer shall be inserted between the support bracket and the lock nut (Refer to Figure 4.3(a) to 4.3(c) as a guide) to ensure that the hexagon nut is not overly tightened.

Figure 4.3(a) - Install a spring washer and a plain washer between support bracket and nut

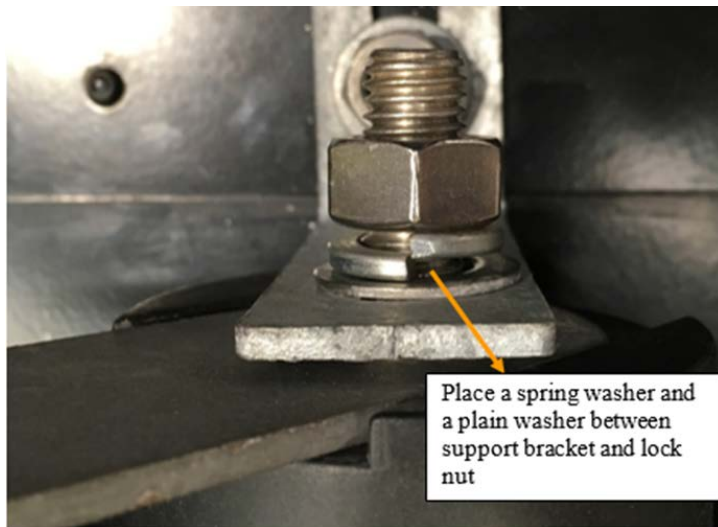


Figure 4.3(b) - Spring washer tightened to 50%

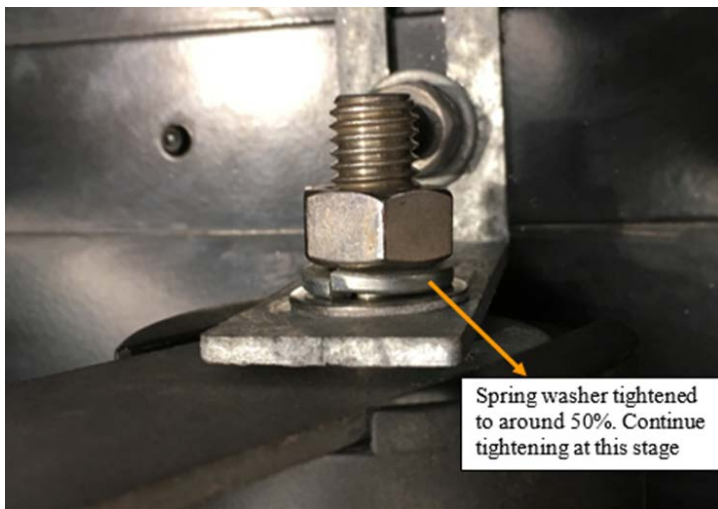
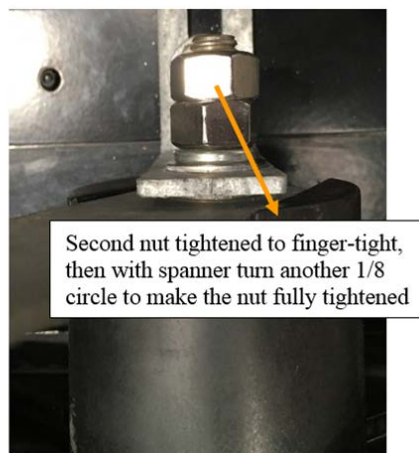


Figure 4.3(c) - Spring washer fully tightened



Note: That the bottom nut is called lock nut, which shall always be assembled on the bolt first. It shall be applied with only moderate initial torque without being severely tightened to produce a high tension

in the bolt. The second nut is then placed on the top of the lock nut and shall be wrenched on the full torque requirements as specified in Figure 4.3(c). The lock nut shall be held to prevent rotation by a spanner whilst the top nut is being tightened.

4.4 Install lanterns on a mounting bracket

If a lantern has dual columns, both of the mounting straps shall be installed to a lantern mounting bracket that provides four mounting bolts for the attachment of lantern mounting straps, as illustrated in Figure 4.4(a). Alternatively, the lantern can be mounted using T-configuration in Figure 4.4(b).

Figure 4.4(a) - Mounting Strap attached on Mounting Bracket (illustrated on a split-shell mounting bracket)

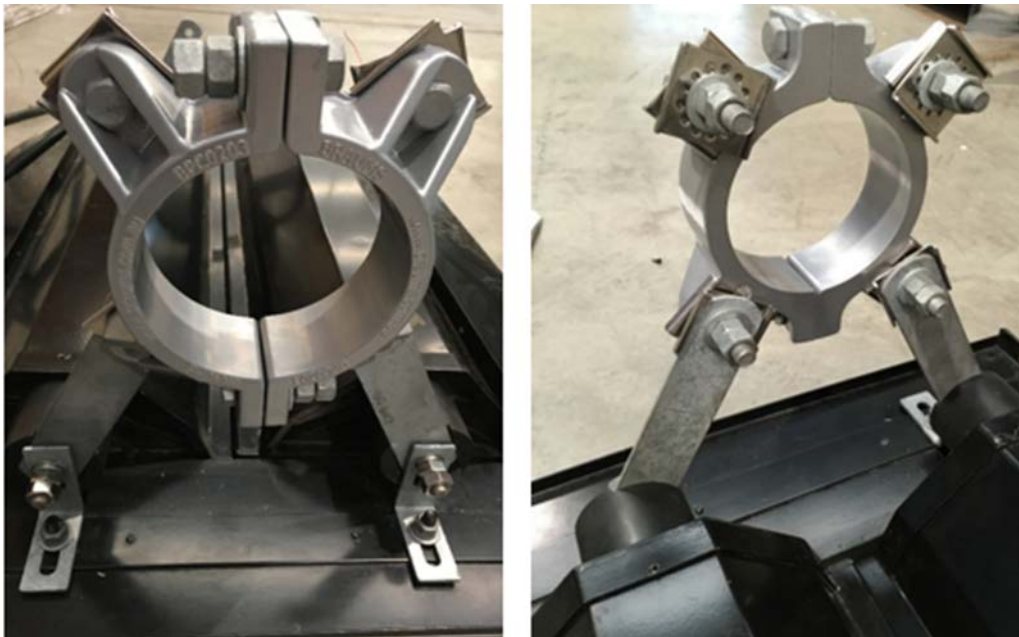


Figure 4.4(b) - T-configuration for Lantern Mounting

