

WORK INSTRUCTION

FOR SLIP BASE POLE FLANGE BOLT RETROFIT

**RETRO-FIT OF BOLTS, NUTS AND WASHERS AT
FLANGE PLATES OF SLIP BASE POLE INSTALLATIONS
(WITHOUT LIFTING POLE)****Scope**

This work instruction is provided as a guide for replacing existing slip base pole, flange bolts washers and double nut bolts. The work instruction covers the process for removing each bolt, re-installing the bolting assembly (including 10 mm rectangular washers and half nut) and tightening of the nuts to the correct tension.

Note: This instruction covers the replacement of washers, bolts and nuts ONLY. It does not cover any electrical work e.g. "safe to touch procedures". To ensure that the pole is safe to work on, please follow your company procedures. All instructions herein assume no live loads.

This work instruction can be used for:

- adjusting tightness of bolts
- turning bolts so that nuts are uppermost;
- inserting washers of correct type and size;
- adding locknuts at correct position as appropriate

This work instruction intends to achieve the optimum design installation condition when bolts are installed to the existing design. The installers will need to give attention to achieving optimum bolt position relative to the slip washer and to the vee of the base plates.

This work instruction should only be carried out during calm weather or conditions of low wind velocity. This work instruction should not be carried out if the wind speed exceeds or is likely to exceed 20 km/hour.

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A minimum of two operators are required to carry out this work instruction.

**Note: The work instruction must only be carried out on one bolt at a time.
The pole is not required to be lifted.**

Tools

The following information and tools are required to carry out this procedure.

- a) Excavation tools – shovel, crow bar, rake, brush, etc
- b) Flange Base band



- c) Marking pen
- d) Three G-clamps, each certified to a minimum SWL of 30 kN, or Hydraulic “C” clamp (5 tonne) and hand pump



- e) Steel packers for use with clamps
- f) One 46 mm ring spanner to fit M30 Grade
a. 4.6 bolt head
- g) One 46 mm open-ended spanner to fit M30
a. Grade B half nut
- h) 46 mm socket to fit M30
a. Grade C nut



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- (i) Torque wrench, with certificate of calibration, covering the range of 0 to 200 Nm
- (j) Socket drive and load arm
- (k) Supply of components for the bolting assembly, as below.
- (l) Personnel protective equipment.



Components for one slip-base pole bolt assembly retro-fit

This procedure requires three M30 Grade 4.6 bolt assemblies. Each assembly shall include:

- one M30 Grade 4.6 bolt, to AS/NZS 1111, 120 mm long,
- two flat rectangular 60 x 100 mm Grade 250 steel washers, 10 mm thick with 33.0 mm hole,
- one M30 Grade B half nut, 15 mm high, to AS/NZS 1252.1, and
- one M30 Grade C main nut, 26 mm high, to AS/NZS 1252.1.

NOTE : All components shall be hot-dip galvanized to AS/NZS 1214.

For new installations, all components for the bolt assembly shall be supplied with the pole.
For retro-fit of existing installations, the existing bolt (if a minimum of 115 mm long) and the main nut may be re-used if there is no damage or wear to these items.

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Installation task steps

The following process does not require the pole to be lifted. At each slip-base pole:

Step 1. Inspect the pole for presence of three bolt assemblies, and ensure that sufficient components are available for installing the bolt assembly as listed above.

Step 2. Ensure clearance of bolts from soil and vegetation, using excavation tools as appropriate to remove soil; and debris. A minimum clearance of 100 mm below the lower base plate is required to fit the clamps, remove and replace the bolts and to fit the ring spanner to the bolt head.



Step 3. Install the flange base band around the pole base and tighten the band nuts to finger tight, ensuring that the bolt threads protrude through the nuts. Ensure that the tabs on the band are resting on top of the pole flange surface and the inspection slots align with the pole bolts.



Step 4. Clamp the assembly using three G-clamps of minimum SWL 15kN x 2 = 30kN; or the hydraulic "C" clamp and hand pump to the correct pressure (2 tonne) next to the bolt to be removed. Use steel packers to prevent damage to the galvanized base plates.



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Step 5. Select one existing bolt and release the full nut, and any locknut if present.

Step 6. Remove the one bolt, the full nut, and any locknut if present. These items may be re-used if undamaged and compliant with the Components list described earlier.

Step 7. Check that all components for the new bolt assembly, as described in the component list above and including any re-used items, are present prior to commencing installation. Ensure that:

- All components are clean, use a wire/stiff brush to ensure parts are free of dirt and debris
- The 10 mm thick rectangular washers are flat to within 0.5 mm over the 100 mm length.



Step 8. Before installing the bolt, run the locknut up and down the length of thread to be used to remove potential excess galvanizing and develop a consistent friction in the threads. The flange bolt assembly must be replaced if the nut cannot run freely along the bolt. Using some heavy duty anti-seize lube or lightly oiling the threads will assist.



Step 9. Place one flat rectangular 60 x 100 mm Grade 250 steel washer, 10 mm thick at the lower side of the joint and install the M30 Grade bolt, with the head lowermost. It is better to install the bolt closer to the inner most position of the vee of the base plate.



Step 10. Place the second flat rectangular 60 x 100 mm Grade 250 steel washer, 10 mm thick, on the upper side of the joint. Both washers should be parallel to the Vee opening.

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Step 11. Fit the half nut (15 mm high) to hold the assembly in position.



Step 12. Align the rectangular washers so that the long edge of the washers does not protrude past the pole flange edges and is parallel to the Vee opening.

The photo opposite shows an unsuitable position, washer edge not parallel to the Vee opening.



Step 13. Use the torque wrench and the ring spanner to tighten the half nut to a snug-tight condition, so that all joint members are in contact with each other and gaps are closed. Torque shall not exceed 40 Nm.



Step 14. Install the main nut (26 mm high) to finger tight position.



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Step 15. Slowly reduce the clamp pressure to one tenth of the initial value, i.e. to 200 kg. This step is required to simulate the clamping force that is slightly less than that applied when the bolt assembly is tightened to 95 Nm.



Step 16. Mark the position of both nuts with respect to the bolt and washer, using a marking pen. The mark is to extend in a continuous line from the end of the bolt, down the sides of the two nuts and onto the washer. The mark is to show that the main nut has rotated relative to the bolt and that the half nut has remained fixed relative to the bolt.



Step 17. Fit the open-ended spanner to the half nut.

Step 18. Fit the ring spanner to the M30 Grade 4.6 bolt head

Step 19. Hold both spanners firm while tightening the main nut.



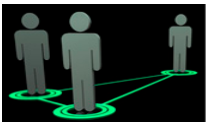
Step 20. Tighten the main nut as follows (by the second operator):

- Ensure that the torque wrench is set to the correct torque (95 Nm).
- Fit the socket of the torque wrench to the main nut.
- Apply the appropriate torque, 95 Nm, to tighten the main nut.

Cease applying the torque when the trip indicator operates.

Do not exceed the required torque value of 95 Nm.





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Step 21. Repeat Steps 6 to 20 at each bolt position (three in total) to remove, re-install, snug tighten the half nut and fully tighten the main nut.

*****Do not remove, re-install and tighten more than one bolt at a time.*****

Step 22. Re-check tightening torque of each bolt assembly, and adjust upwards only if required.

Step 23. Observe that the mark on each bolt lines up with the mark on the half nut and that only the mark on the main nut is displaced. Record observations. If the half nut is displaced relative to the bolt, as evidenced by the marks, the clamping force on the plates is not correct. If the main nut is not displaced relative to the bolt, the clamping force has not been applied. In both cases, recommence the procedure at Step 7.



Step 30. Remove the three G-clamps or the hydraulic C clamp.

Step 32. Re-instate work site, clean up and pack away tools and equipments.

Step 34. If a hazard is identified and for any reason the procedure has not been carried out or the work has not been completed, notify the supervisor.

Possible reasons include:

- defective slip plane washers,
- electrical hazard on the pole,
- structural hazard on the pole,
- unable to access flange bolt assembly because of soil, debris or concrete covering.

If possible, make the situation safe within the limits of practicality, this may include tightening the bolts to a torque of at least 200 Nm to control the predominant hazard of a potential pole fall.

***** end of procedure *****

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