Forth Estuary Transport Authority

FORTH ROAD BRIDGE

INSPECTION DEPARTMENT
DEFECTIVE NUT/BOLT REPLACEMENT. PP22 N/E SIDESPAN.
DATE: 27/04/09.

To change defective nut & bolt on cable band six bolter at PP22. north east side span. . Defective bolt was bolt No 8. established in group on bolt-scope B. and bolt "A" as per cable band bolt diagram.

This is an account of all information recorded.

Personnel. Present.

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Operation to fit **temporary cable band** began at approx 08.30 am. Personnel taken by access cradle under the supervision of spencers. All equipment remained stored on gantry No. 1.

Pressure increments similar to pressures applied on temporary cable band ie.: initial pressure applied to Ps 2 tensioners 3000 – 5000 psi. process as per method statement. Then to approx 8000 psi , 12000 and up to final load pressure of approx 17000psi. Bolts were allowed to settle. This process was carried out three times to ensure that specified load of 16610 would be maintained on bolt relaxation.

Work task completed at approx 10.30 am.

At approx 11.45 Began the change-out of the defective nut / new bolt at PP22 N/E. RSL torquing tool applied to dead side of bolt. Initially problems arose with trying to seat RSL 6 without incurring any damage to main cable.This was overcome with the application of a bridging support plate on top spaced between bolt "C" & bolt "E" on the dead side of the bolt.

At approx 11.45 Bolt de-tensioning began again . Slight problem arose . Bolt began to turn as pressure was applied . This was overcome by the application of a hardwood folding wedge and to metal plates being sandwiched between the north face of the nut and the south face of the cable band shoulder on the live side of the bolt.. This procedure backed up with a ring spanner of specified nut size applied to the live side of bolt "A" and supported on the top shoulder of bolt "C " proved

At approx 12.07 Bolt de-tensioning began again . defective nut was released, wedge & metal plates removed from live side of bolt.

At approx 12.10. At approx 10.35. bolt No 2. bolt "A" as per cable band bolt diagram was removed & new bolt fitted. New bolt information. (bolt no RAC. 0065. nut no1.short threaded end. RACN 0024 . nut no 2. RACN. 0104.)
On entering new bolt slight resistance was met by debris from old bolt removed approx 35mm from the live side. This was overcome by placing a hardwood wedge against the face of the new bolt on the dead side and with a gentle force applied by a mash hammer against the face of the hardwood wedge the new bolt was driven through.

All residual debris gathered on the threads of the new bolt was removed ,threads cleaned & visually checked for any damaged.

At approx 12.24. Brief discussion to place in relation to washer alignment.

ESM. & D Wilkinson happy with what they saw.

At approx 12.30. Ps 4. fitted & ESM requested that pressure be applied to 15225 psi. Tensioner tightened up and then pressure released. No load reading taken.

At approx 12.33. Bolt tensioned again to 15225 psi.. This time a bolt L" REF " was taken using new bolt- scan . this was recorded at 649.4mm. against an original " L REF " of 649.6mm recorded in inspectors office.

At approx 12.48. Against the " L. REF" of 649.4 mm taken a load reading was recorded at 639 Kn. With pressure released and Temperature recorded at 9.7c.

At approx 12.53. ESM requested Bolt was tensioned up to 17000psi. no load reading taken or recorded. Temperature recorded at 9.7c. pressure released.

At approx 12.57. ESM requested Bolt was tensioned up to 20000psi. no load reading taken or recorded. Temperature recorded at 9.7c. pressure released. Erratic readings being observed in Bolt-scope . ESM. Displayed his displeasure at findings being displayed and voiced his opinion of not having any confidence in the equipment being used. Because of these erratic readings being displayed, it was decided that the Ps 4 tensioner be removed to see if this would make a difference. . Again the Bolt-scope transducer was applied and once again Erratic readings being observed in Bolt-scope .

At approx 13.05. Load on new bolt was recorded at 831 Kn. At a temperature of 9.7c. Elongation recorded at. 2.08 mm

A decision was taken to record information on the original bolt scan machine used . Information recorded on boltscan machine 184 band No 1. Bolt No 22.
"L REF " was recorded at 662.01 using a gain value of 170. Load recorded at 658 Kn. With an Elongation recorded at 1.92mm. Readings taken at approx 14.40.

At approx 12.40.the the temporary cable bolts were de-tensioned at a pressure recorded at between 16,000 & 17,000psi. all PS.2 tensioners & associated equipment removed & stored safely on Gantry No.1.

All information recorded to my knowledge as given at time of works.

Bridge Inspector.

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