ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

DATE: JANUARY 25, 2005

To: Mr. Jerry Westerman, Materials Engineer

From: Mr. Stan Glover, Resident Engineer

Subject: DTI Squirter Washer Test Job 050021
FAP: NH-0034 (28)
Hwy. 18-North (Structure) (S)
Hwy. 67 Section 15
White County

Attn: Mr. Mark Headley

Two bridges on this project were used to test the use of DTI Squirter Washers that were supplied by Applied Bolting Technology Products, Inc. This product works in the same manner as other DTI's with the exception that a visual indicator is seen when the required tension is obtained. Orange colored silicone is squirted out around the washer when the tension is obtained.

The first bridge using the product was Br. 06727 on Hwy. 18. On this test the DTI's were sent to the job and used with little or no instructions on the proper installation procedure. Because of this, the test showed limited success in using the washer. Our Inspector did not know how to determine at what point in the "squirting" process required tension was obtained. It appears that ultimately we gained nothing by using the DTI's.

The second test was on Br. 06730 on Co. Rd. 41. We requested some help from the manufacturer on educating us and the Contractor on the proper use of the DTI prior to installation. Chris Curvan with Applied Bolting came to the work site and demonstrated how the product was to be used. Please reference the attached product literature, which is an excellent summary of his presentation. The presentation was very effective in educating both contractor's personnel and our inspectors in the proper way to use the squirter washers.

The squirters performed very well. The visual training that is outlined in the product literature was easy for the construction workers to catch on to, and therefore correctly use the squirters. One of the most important things demonstrated was that torque applied to a bolt is not always an accurate determination of bolt tension. Small variations in the condition of each bolt would cause varying results. For example, slight rust on the bolt could result in lower bolt tension even if the required torque as determined by the Skidmore was applied. This fact alone would indicate the need to look at our specification that uses torque to determine bolt tension. The squirters also proved to perform well as indicators. When the connection was tested with a feeler gauge (as described in the literature), in all but a few cases, when the amount of silicone extruded looked like the test in the Skidmore, the test passed.

I feel this a very good and reliable product and worth considering for implementation as a part of the specifications. I think it is definitely more accurate than the existing torque method.

Some observations to consider:

- Training is not difficult, but critical to both the Contractor and Inspector.
- Air impact wrenches did not perform as well as electric wrenches. In this case the Contract borrowed an electric wrench from the supplier of the squirters and found it to perform much better. The smooth uniform rotation of the electric wrench allowed the extrusion of the silicone to squirt out at a uniform rate as opposed to a more jerking method with the air impact wrench. This made visual inspection easier. The Contractor said they intend to buy this type in the future whether the squirters are required or not. The electric wrenches are also less expensive.

If you have questions or need additional information, please call

SRG:pj
cc:Dist.
Construction
Chris Curvan, Applied Bolting
File