

Case Study



ACTUATOR STUDBOLT—ALSTOM / NETWORK RAIL

Alstom considered various methods of securing the new generation of point actuators or back drives to concrete bearers. The principal of the Excalibur Screwbolt thread was selected and we were approached by Alstom with a view to assisting them in the preparation of a proposal of a bespoke fixing solution for Network Rail.

OVERVIEW OF THE SOLUTION AND PROCESS



The proposed solution involved very careful planning both with the design of a suitable anchor and the plastic insert, which would need to be cast into the bearer on the footprint of the actuator.

The Excalibur anchor, in its generic sense, comprises a parallel shank with a rolled thread and as the thread either cuts or de-forms the sub-strate to form the mating thread, it exerts no lateral stress. This principal therefore allows the bolt to have a snug fit in the insert, as the volume of raised (rolled) thread is equal to the valley formed during rolling, so that the specially selected plastic will flow into the valley, when the bolt is inserted.

In the manufacture of the plastic insert, an allowance (or draft) had to be made for withdrawing the insert from the moulding tool. Numerous hand made samples were prepared with various internal diameters. These were cast in resin into an available sleeper and bolts were inserted, starting with the larger diameter. This procedure was repeated, each time with a slightly smaller diameter bore and on each occasion, the torque required to set the bolt was noted.

It turned out that the optimum mean internal bore was just 0.75mm greater than the shank diameter. At this stage a few sample inserts of the selected size were manufactured. In conjunction with the preparation of inserts, Alstom were completing the design of the actuator and coverplate studbolts. A few samples of these were then manufactured.

A test bed was then prepared at a contractors pre-assembly yard, where an actuator was bolted to a prepared concrete bearer and the whole subjected to rigorous testing, conducted by Network Rail, Alstom and Excalibur. The studbolts form the mounting system for the actuator and the result of the test showed there to be less than 1mm lateral movement at the full working drive load of 8kN. These tests, proving successful, the go ahead was given for the placement of orders for both studbolts and inserts.

SUMMARY OUTCOME

The images below show the installation in January 08 of the new generation of actuators at Swindon incorporating the bespoke Excalibur studbolts. A large number of turnouts have already been installed up and down the country and will continue within an on going re-placement programme over the next 25 years.



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