

THE COLD EXPANSION OF RAIL END BOLT HOLES – AN ECONOMIC APPRAISAL

Fatigue cracking at the rail end bolt holes (the “star-crack”) is a serious rail failure problem, with approximately 300 cracked or broken rail ends occurring in the middle speed range of heavily loaded track. The cracks are not repairable; thus the minimum action is to replace the rail. This is very expensive, thus research has been ongoing to solve the problem of fatigue cracking at rail end bolt holes.

A new hole expansion process (sleeve expansion), which allows a far more consistent and extensive compression of steel has been tested in the laboratory. It has shown promising results despite efforts to introduce extremely disadvantageous conditions in the test programme. Whilst further work is required to prove the technique, the report gives consideration to cost and implementation.

The results of the cost analysis indicate that the implementation of the sleeve-expansion process could result in a saving. The savings are modest and break-even points are unlikely to be achieved until a few years post implementation. However, the solution, offering the possibility of improved saving and less traffic disruption at no extra cost, is an attractive one.