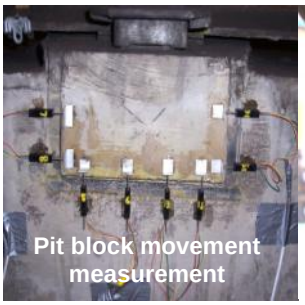
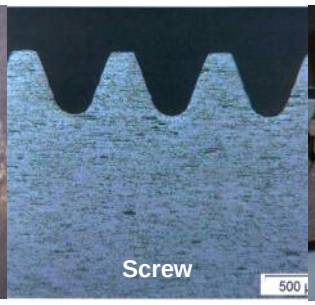

Pit block movement measurement


ed coupler


Screw


Transom plate

METALLURGICAL AND FAILURE INVESTIGATIONS

Failure of components is of serious concern to operators of equipment for several reasons including, lost operating revenue, risk of damage to associated equipment and the risk of serious injury to operational staff and customers. In the event of equipment failure, it is important to identify the cause so that measures can be put in place to prevent recurrences.

4-RAIL Services undertakes failure investigations associated with the rail industry and other industrial sectors. Our experienced and technically qualified staff; metallurgists, material scientists and chemists, collect important information on the specifications, operating conditions and history of a failed component and use a full range of metallographic, mechanical and analytical techniques to diagnose the causes of failure. The services offered include:

- Full visual inspection and measurement of fractured components for signs of deformation, cracking, elongation, corrosion, attrition, wear or impact. Indicative signs of any operating conditions that may contribute to failure can also be identified.
- Material microstructures can reveal features which identify the method of manufacture of components, in particular the forming method used and any subsequent heat treatment and/or damage.
- Analysis of component fracture surfaces to identify the failure mechanism. In most cases this can be achieved by a combination of visual examination, optical microscopy and technical experience.
- Examination by Scanning Electron Microscopy (SEM) coupled with elemental analysis to reveal features normally too small to be seen by the naked eye. These are often important in order to fully understand the events leading to failure.
- Measurement of mechanical properties of samples; these tests include hardness measurements, tensile, compressive and impact testing.
- Chemical and compositional analysis to characterise the material to determine if it meets the original specifications set out in engineering drawings. A range of techniques may be used including Energy Dispersive X-Ray Analysis, Optical Emissions Spectroscopy and Atomic Absorption Spectroscopy.
- Comparative evaluations against standards and/or ‘new’ versus ‘old’.
- Assessments of fitness for purpose, i.e. tolerances, compatibility, resistance to chemical attack etc.
- On site investigations, sampling and monitoring can also be conducted.

To discuss your particular requirements regarding these or other complementary services, contact us by emailing enquiries@4-rail.com or call us on 020 8955 1700

4-RAIL Services Limited is a recognised and leading UK Environmental and Materials Consultancy

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