

DEVELOPMENT OF NOVEL INSPECTION SYSTEMS FOR RAILWAY WHEELSETS - SAFERAIL

M. Ph. Papaelias, C. L. Davis, C. Roberts (E-mail:m.papaelias@bham.ac.uk)

A significant proportion of all equipment related accidents in the rail industry is due to failed train wheels and axles. The continuous increase in train operating speeds means that catastrophic failure of a wheel or axle may result in very serious derailments, such as the one that took place in Eschede, Germany in 1998, causing loss of life, injuries, severe disruption in the operation of the network, damage to the tracks, unnecessary costs, and loss of confidence in rail transport by the general public. SAFERAIL seeks to minimise the number of wheelset failures by developing and successfully implementing a novel on-line system for the inspection of wheels and axles of moving trains, and a combined ultrasonic-electromagnetic system for faster and more reliable inspection of the quality of new and old wheelsets during their production and maintenance.



Photograph showing the InterCity Express high-speed train involved in the Eschede accident.



Photograph of a damaged train wheel

SAFERAIL is one of a number of research projects focused on the development of novel non-destructive testing equipment and inspection methodologies for the rail industry in which the Birmingham Centre for Rail Research and Education is currently involved.

The project aims to improve existing wayside monitoring capability by developing an integrated on-line system which will combine high-frequency vibration analysis, acoustic emission and thermography techniques. Each of these techniques complements the other and therefore increases the versatility of the overall integrated on-line system. The SAFERAIL consortium will also develop a novel non-destructive evaluation technique for inspection of wheelsets during production and maintenance by combining ultrasonic phased arrays with ACFM sensors. SAFERAIL is a focused research project partially funded by the European Commission which is coordinated jointly by TWI Ltd. and the University of Birmingham. It has an overall budget of €4.5M and involves the participation of 11 partners from 6 different EU member states. The project officially launched in October 2008 and is expected to end in September 2011.