

In-Service Track Condition Monitoring An Overview

University of Birmingham Graeme Yeo



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Aims of the Project

- K Vehicle mounted instrumentation
- Logs inertial measurements to hard disk
- Collection of data from day-to-day operation of the vehicle
- Main goals:

Identification of track degradation at critical zones (bridges, transitions, etc)

Analysis of effectiveness of maintenance





Current in-service project

Southern Class 377 Electrostar







Work to Date

- All Southern equipment designed and built
- All equipment now installed on train
- Vertical displacement processing complete
- Further processing in development
- Focused study on a site in Fishbourne, Sussex, UK





Data Processing

- · Data management software
 - Allows extraction of every pass of a train through a specified area
- Matlab processing is progressing well
 - Calculation of vertical displacement
 - Model based on bogie dynamics
 - Alignment of waveforms in same location
 - Work in progress for automated fault detection and assessment



Data Management Software



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Case Study

Fishbourne, Sussex



















Improvement

- The match to the NMT data is good but not perfect
- · Data uses pitch-rate gyroscope only
- Accelerometer gives better short wavelength results
- Kalman filter used to model the bogie and 'blend' the accelerometer and gyro together







Also plan to account for primary suspension and damping





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1 - Peaks and troughs found





Comparing multiple passes

- Now waveforms can be aligned we can compare them
- Can see degradation over a period of several weeks or months





