

## Project A6: Wheel – Rail interface; Adhesion and Rail Crack Growth Modelling.

### Partners:

Newcastle University  
 Mechanical & Systems Engineering

### Researchers:

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 Supervised by: Dr. D. I. Fletcher, Prof. A. Kapoor

### Adhesion – Leaf films:

Leaves falling onto rails and run over by trains can form low adhesion leaf films. These cause operational difficulties resulting in delays to trains and have safety implications.



### Novel Aspects:

On track creation of leaf films.

Testing of rail head leaf film treatments under controlled and repeatable conditions.

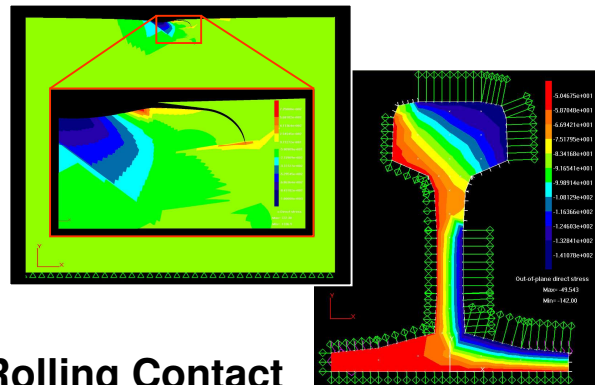


### Progress:

Testing of a series of rail head treatments has been completed.

Test method developed to compare effectiveness of different chemical treatments.

Acidity or alkalinity (pH) of treatment shown to be significant.



### Rolling Contact Fatigue Cracking:

Boundary Element modelling of shear mode crack growth.

Aiming to improve growth models for improved rail life prediction.

### Novel Aspects:

Modelling of:

- Thermal and Residual stresses.
- Curved crack geometry.
- Multiple cracks

### Progress:

Initial modelling indicates that including longitudinal thermal stress and residual stresses increases the predicted crack growth rate under wheel loading. Also, modelling curved cracks alters the stress cycle.

### Future work:

Modelling cracks in more detail, understanding trends and combinations of inputs.

### Contact:

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