

## Quantifying the Effects of Climate Change (CC) on the Railway Network in the UK.

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### 1 Background

- ~20% of all unplanned rail delays are caused by weather (Thornes 2002).
- Anticipated changes due to CC and its effects on weather variation will bring new challenges for network operations.
- it is important to predict these impacts for the safe and efficient running of the network.

### 2 Objective

Establish possible impacts of CC on the UK's rail network, where they will occur, and cost incurred by the network in mitigation and maintenance.

### 3 Methodology

- Use GIS to map weather conditions over network lines (Figure 1).
- Compare the results to scientifically established thresholds.
- Map the anticipated changes in the UK's climate and establish their effect (s) on the railway (Figures 2, 3, & 4).



Figure 2: Effects of snow on rail track

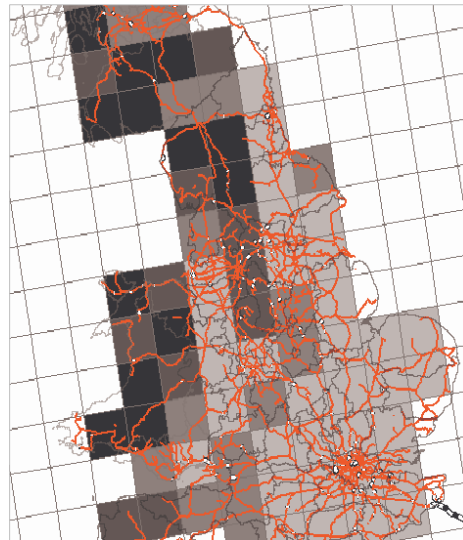


Figure 1: GIS map of UK's rail network (red) over an example of UKCIP data.



Figure 3: Buckled track



Figure 4: Sea breach on Dawlish line.

### 5 Novel Aspects

This is the first in-depth study of the impacts of CC on the rail network, it is novel in the use of GIS to map problem areas and in the application of a fiscal quantification.

### 4 Progress

- Compiled extensive literature
- A need for further research
- Successfully tested mapping of the rail network along with climate data
- Ideal datasets too costly, alternatives not as detailed but sufficient for project.

### 6 References

Thornes J.E. et al, "Mitigating the impact of weather and climate on railway operations in the UK", 2002 ASME/IEEE Joint Rail Conference

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