

# 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.

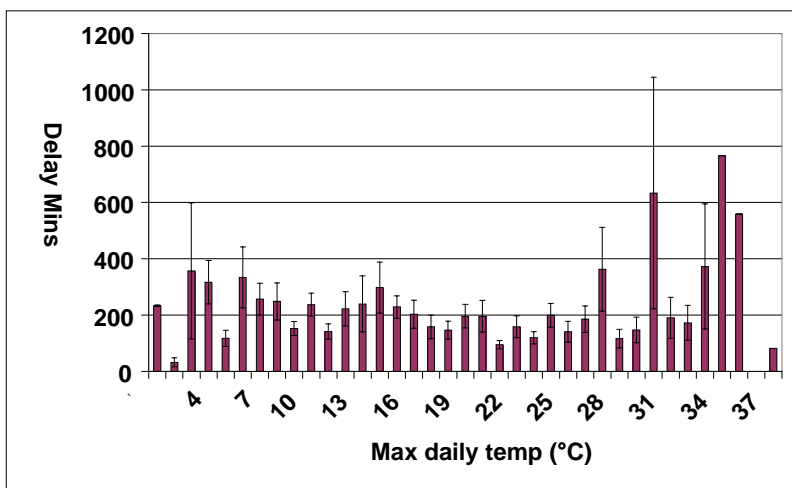


Figure 1: Average delay minutes per day for maximum daily temperatures in the range 1°C to 38°C, showing variability bars for each 1°C interval.



Figure 2: example of the damage caused by a buckled rail.

## 4 Progress

Necessary data has been gathered and proven reliable.

Methodology proven by analysing heat related delays in South East (Figure 1).

Mapping near completion.

## 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.

## 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

- Establish the impact of base line weather on the network.
- Use GIS to map weather conditions over network lines (Figure 3).
- Map the anticipated changes in the UK's climate and establish their effect(s) on the railway (Figure 2).

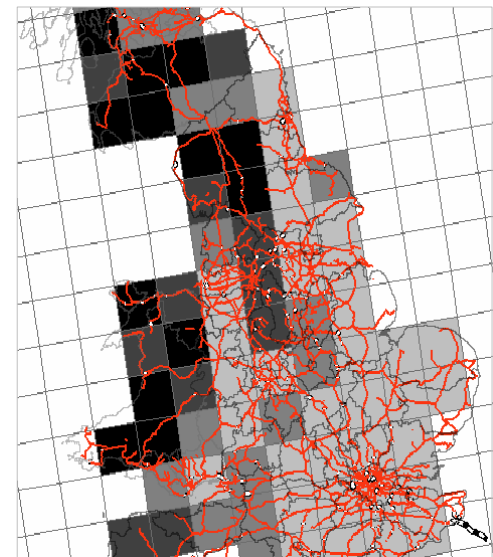


Figure 3: GIS showing rail network (red) UKCIP weather data.

## 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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