

# A DATA-DRIVEN APPROACH TO ENHANCING THE CLIMATE RESILIENCE OF STRATEGIC ROAD PAVEMENTS

**ABSTRACT** National Highways (NH) are taking a proactive approach to respond to key risks for pavement assets linked to climate change. Climate projections indicate what the Strategic Road Network's (SRN) pavement asset will need to withstand in future. This paper describes two projects undertaken on behalf of NH to address specific climate risks for both asphalt and concrete pavements.

Compression failures (also called “blow-ups”) are a defect unique to concrete pavements which occur during periods of hot weather. They occur suddenly and without advanced warning and have the potential to lead to significant disruption.

This paper describes a strategy for predicting compression failures on the SRN. The method identifies locations with the highest likelihood and impact, to enable prioritisation and mitigation. The approach is summarised in Figure 1.

The approach focused on using Anomaly Analysis rather than multiple linear regression, due to the small number of known events. This enabled a predictive model to be produced alongside an asset management strategy for compression failures. The data can be easily interrogated by use of a visual dashboard.

The way asphalt pavements are designed and maintained also needs to be adapted to mitigate against the impacts of future climate change. Storms and heatwaves could occur more frequently in future. Higher ambient temperatures may cause asphalt deformation. Extreme rainfall must be drained away effectively to keep driving conditions safe and prevent premature deterioration.

This paper also describes an approach to assess the key risks that uses asphalt pavement condition data alongside past and future climate projections whilst considering the impacts of geographic variability (see Figure 2).

Modelling using the Mechanistic Empirical Pavement Design method has been undertaken to supplement the analysis. This paper describes the outcome of the modelling and potential adaptation measures to ensure a more resilient network.