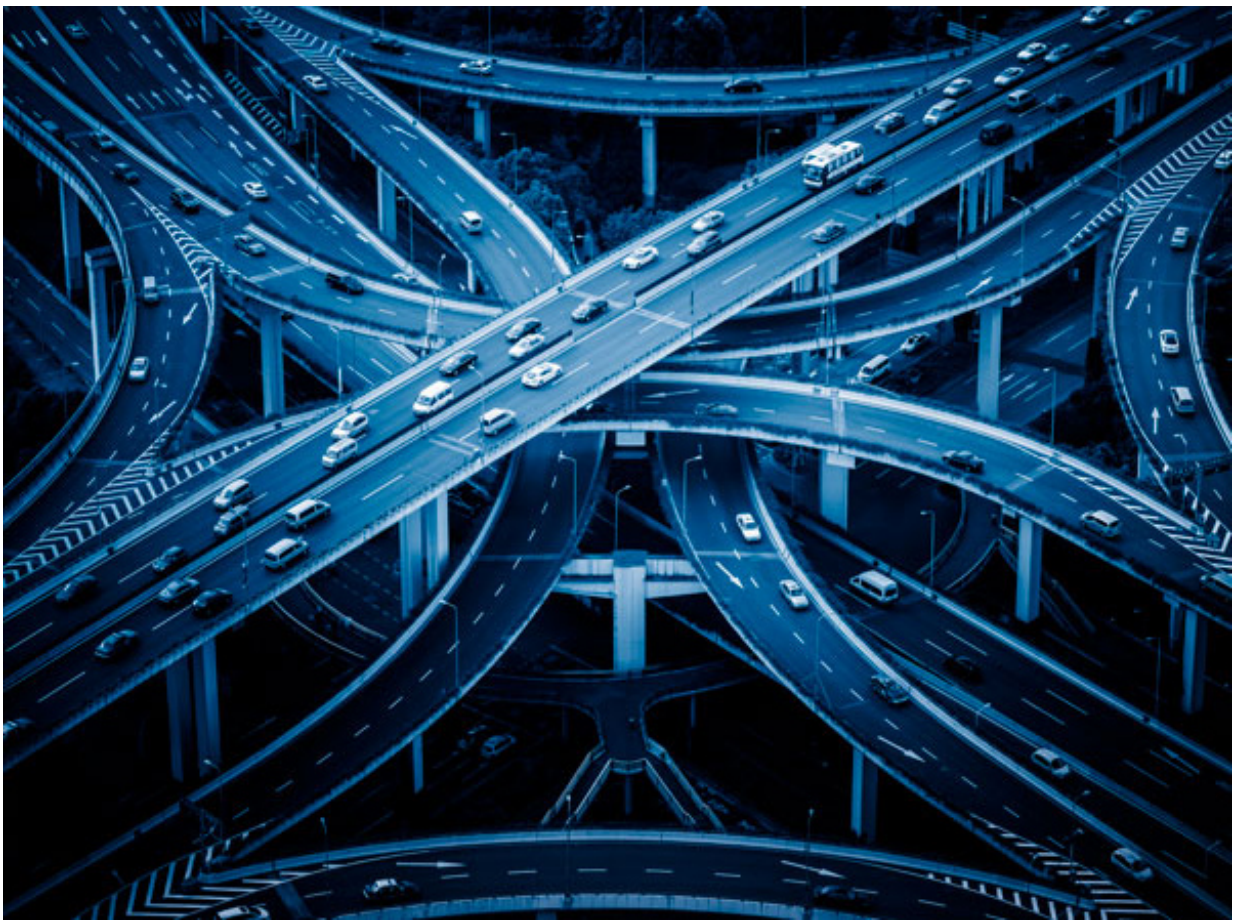


Moving existing reactive structural health monitoring systems towards a preventive model

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Credit: National Physical Laboratory

A team of researchers from the National Physical Laboratory (NPL) and the University of Strathclyde are carrying out research that will help move existing reactive structural health monitoring systems towards a preventive model. With over 10,000 road bridges in the UK, worth over £1 million, their structural integrity must be effectively and efficiently monitored to ensure safety, prevent accidents and improve maintenance.

Large-scale sensor networks for structural health monitoring are becoming increasingly common, but there is currently no implemented method for pinpointing problems before damage occurs.

The research published in *Smart Materials and Structures* demonstrates that the analysis of strain data can provide early indicators of cracking and structural transitions in reinforced concrete systems. The method provides a clear indication of when a concrete beam under gradual bending progresses from a linear to a nonlinear strain response, and can also provide an early warning signal of the appearance of cracks.

This research was originally developed for dynamical systems in geophysics, but also shows promising results for [structural health monitoring](#), in particular, for real-time observations of civil constructions, like bridges.

It is hoped that the algorithms developed in this study can be added to existing systems, helping to reduce the lifetime costs of maintenance of megastructures, making them more efficient and reducing visual inspections.

More information: M Perry et al. Tipping point analysis of cracking in reinforced concrete, *Smart Materials and Structures* (2016). [DOI: 10.1088/0964-1726/25/1/015027](https://doi.org/10.1088/0964-1726/25/1/015027)

Provided by National Physical Laboratory

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