Novel Sensor Systems for Infrastructure Applications

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Track Record: Sensor Integration

West Mill Bridge, Swindon

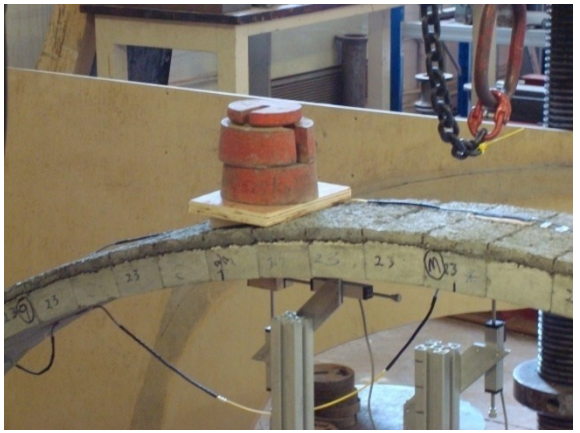
1 Bankside, London

NPL testbed footbridge

Over-wrapped concrete column

Instrumented autoclave

Vasai Creek bridge in Mumbai

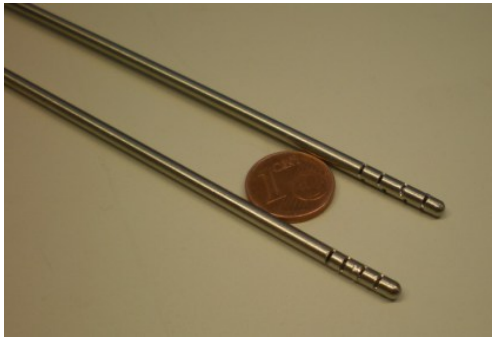


Loading of a flex-arch model bridge

Track Record: Sensor Types

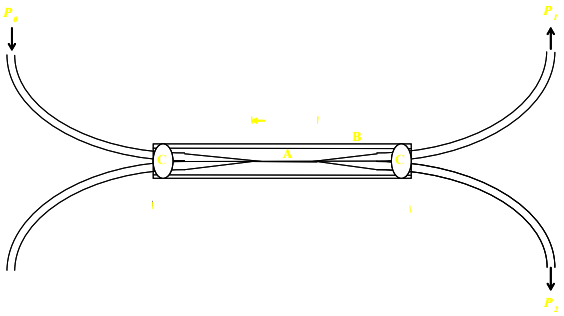
Bragg Gratings

Chirped Gratings

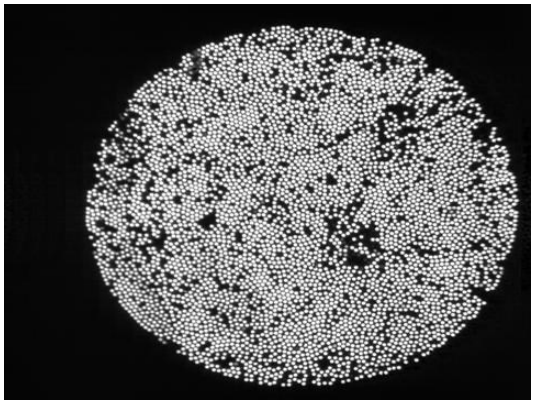


Humidity Sensor

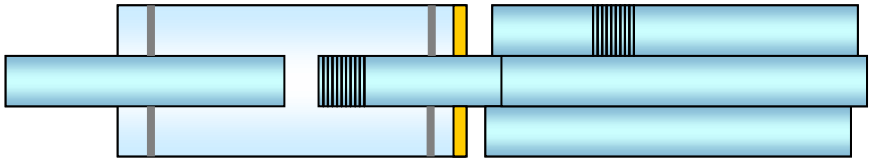
High pH sensor



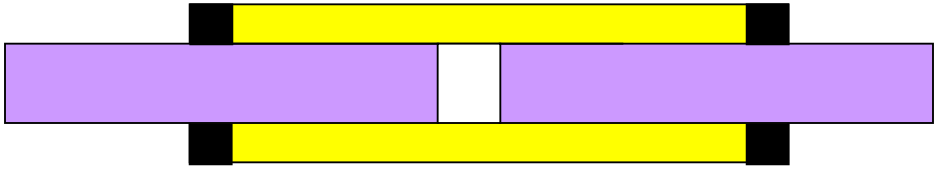
Acoustic Emission Sensor



Intensity-based Sensor

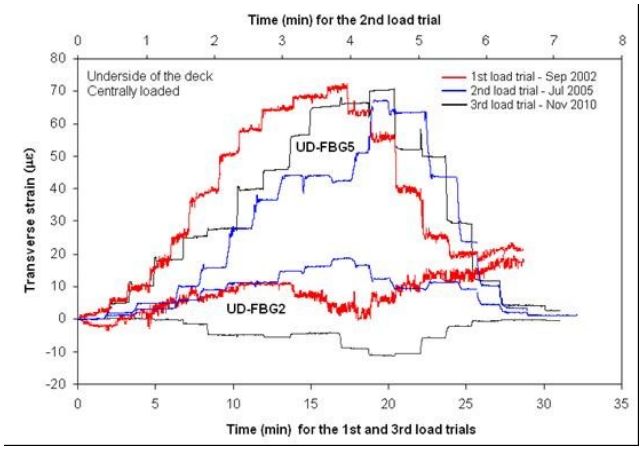


Multi-measurand Sensor

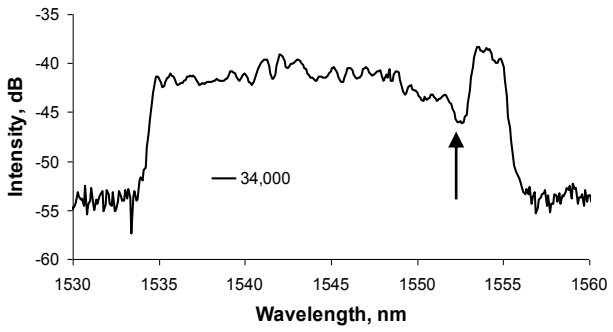


Extrinsic Fabry-Perot Sensor

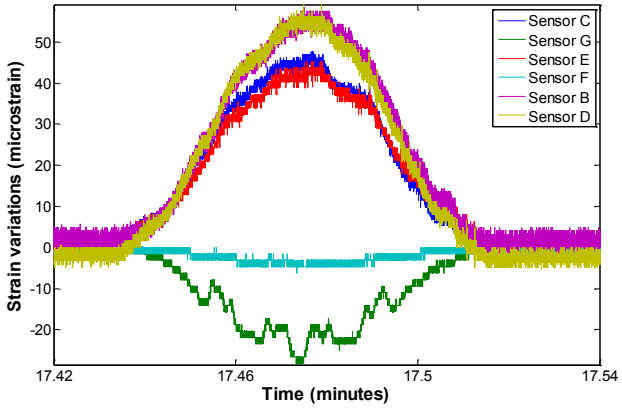
Track Record: Signal Processing



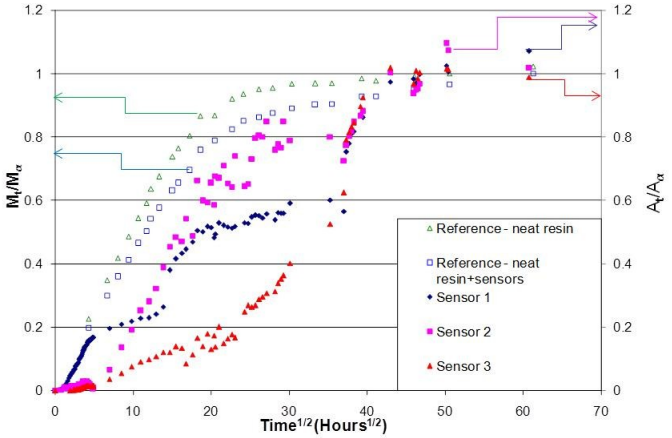
West Mill Bridge: 10-years on



Delamination monitoring: chirped grating

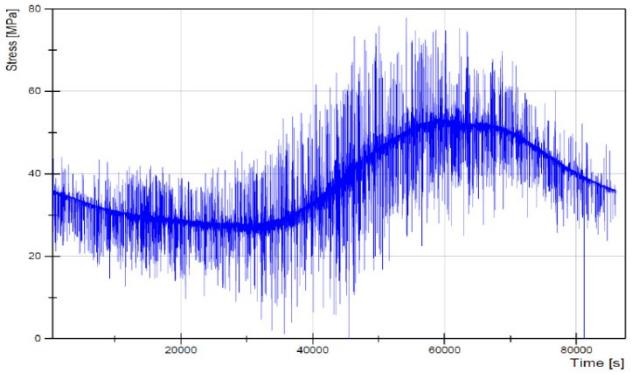


Dynamic traffic condition monitoring

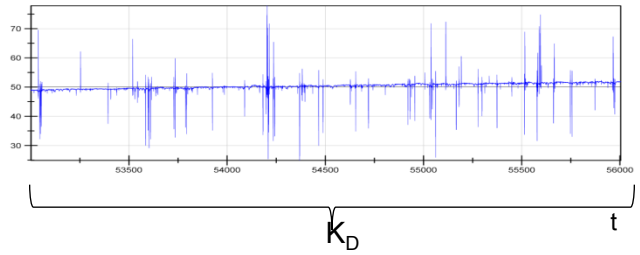


Monitoring the diffusion of water

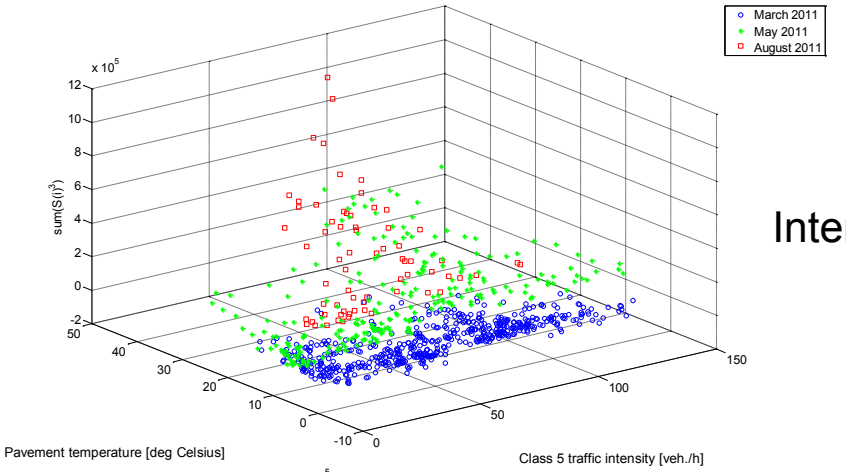
Track Record: Data Management



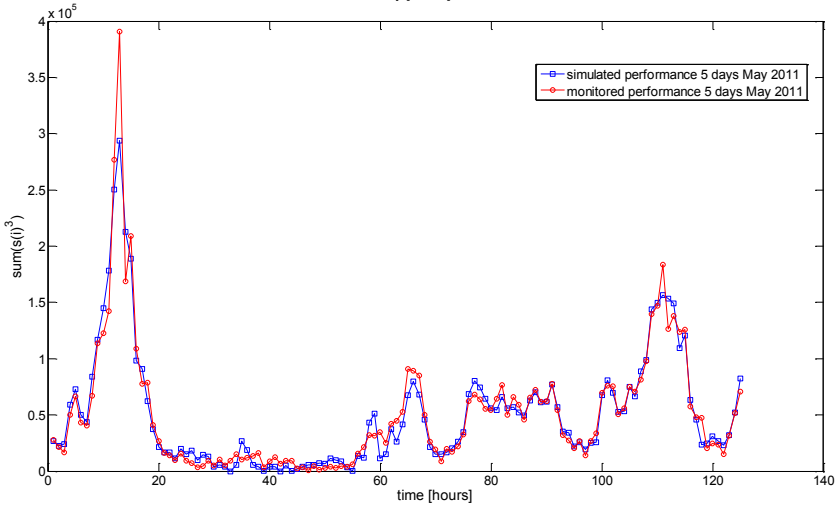
Ratio 1:360,000



Reduction



Interpretation



Prediction

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- Aims of the Proposal
  1. To design and develop a range of fit-for-purpose low-cost sensor systems for monitoring:
     - Moisture ingress
     - Strain
     - Temperature
     - Impact damage events
     - Corrosion products.

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- Aims of the Proposal

2. To design, model and fabricate practical sensor protection systems for embedding (new-build) and surface-mounting (retrofit) in/on concrete, composites, wood and metals.

3. To develop and define surface treatments for specified classes of sensors and substrates.

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- Aims of the Proposal

4. To study degradation processes in composites and composite repairs (residual stress, diffusion of moisture, delaminations and cracking), concrete (chloride and sulphate ingress) and metals (rebar corrosion) using specified sensor systems.

➢Aims of the Proposal

5. To integrate sensors into woven fabrics to enable large-area damage detection.

6. To develop protocols for specified classes of materials and structures to define the criteria for life-extension, renovation or replacement.

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➢Aims of the Proposal

7. To design and develop specified classes of multi-functional sensors for accessing multiple measurands.

8. To integrate sensor outputs into infrastructure management tools.

9. To demonstrate the benefits from an integrated approach through life-cycle assessment of selected assets.

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