P3.48 SBEnrc ARC LP160100528 Project

Bridge performance assessment through advanced sensing and modelling

January 2017 - July 2020

The primary aim of this project is to develop new techniques in creating cyber infrastructure, for bridges in particular, to improve current performance assessment and future capacity estimation. Current sensor data interpretation approaches are weak in assessing the actual infrastructure performance and evaluating the reserve capacity, especially where high levels of systematic modelling uncertainties are not adequately accounted for. A key focus of the project is to ease the current scientific bottleneck in data interpretation. The expected outcome is to optimise infrastructure management and maintenance planning, reduce redundant interventions, guide infrastructure modifications and improve future design.

Objectives

The aim of this project is to develop an innovative approach for assessment of bridge infrastructure performance, based on advanced sensing, modelling and data interpretation technologies, by:

1. Creating an automated 3D Model through Point Cloud
2. Designing a robust wireless measurement system
3. Developing an effective data interpretation approach
4. Validating the cyber infrastructure platform

Industry Outcomes

The anticipated outcomes of this project, including model digitalisation, will benefit different industry roles including asset owners, asset maintainers and technology providers.

1. For asset owners or maintainers, the proposed approach will improve upon the conventional methods for bridge maintenance, reducing labour cost and time required for inspections and helping to establish efficient training processes for inexperienced engineers through efficient modelling, robust analysis and intuitive visualisation. A significant increase in return on investment can be gained through the digitalisation approach.

2. For technology providers, adapting laser scanning, wireless sensor networks, or other sensing and tracking-related products for bridge performance assessment opens up a new market in infrastructure digitalisation. In addition, technology providers can learn about specific requirements in civil infrastructure maintenance and thus refine and improve their related technical support products to fulfil market needs.

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