Collaborative Civil Engineering

CROSS-IT

Smart condition monitoring and prompt NDT assessment of large concrete bridge structures

- **Project budget: £890,000**
- **End Users: ATKINS**

Within the past 20 years, 50% of all bridges built worldwide have been of pre-stressed concrete and 25% with reinforced concrete, the remainder being made of steel construction. In the EU there are approximately 300,000 concrete bridges. High replacement, repair and strengthening costs indicate a clear need for improvements to preventative maintenance and inspection practice. In addition to the operational costs there are also big economic losses due to traffic disruption and insurance/compensation losses.

Project Aims

CROSS-IT project aims to develop an efficient and cost-effective monitoring technology based on Ground Penetrating Radar (GPR) to locate and Ultrasonic Guided Waves (UGW) to inspect the steel reinforcements of concrete structures

Existing NDT methods and Limitations

Early signs of deterioration are often not seen. High level of skill required to distinguish signals from noise. At present there is no single NDT technique capable of practical inspection of PST (Pre Stressed Tendons) throughout their length, existing NDT techniques such as visual inspection have major limitations.

Technical Project Objectives

- Modelling of UGW in concrete and tendons and the discovery of the optimum propagation mode(s).
- Design and build of UGW transducers to propagate the optimum mode(s) as determined from the modelling and experiments.
- Software and hardware to combine the GPR and UGW signals and to display the results to the operator (advanced signal processing).
- A prototype (portable) system for bridge inspection for locating the defects.

Potential Benefits of CROSS-IT Technology

- A new technology based on Ground Penetrating Radar (GPR) to locate and Ultrasonic Guided Waves (UGW) to inspect the steel reinforcements of concrete structures
- Quick and cost effective Structural Health Monitoring (SHM)
- No traffic interruption required during the inspection
- Replace unreliable periodic visual inspection
- Reduce the risk of catastrophic failures

www.crossit-project.eu

TWI Ltd
Granta Park, Gt Abington, Cambridge CB21 6AL
T: +44 (0) 1223 899000 **F:** +44 (0) 1223 890952
NDTinfo@twi.co.uk
www.twi.co.uk

SEVENTH FRAMEWORK PROGRAMME