LoStPReCon


Funding: European (Horizon 2020)
Duration: Nov 2015 - Oct 2017
Status: Complete
Total project cost: €183,455
EU contribution: €183,455

Call for proposal: H2020-MSCA-IF-2014
CORDIS RCN: 195921

Objectives:
The re-assessment of the collapse of the Koror-Babeldaob Bridge (in 1996), a pre-stressed bridge built by the cantilever method, concluded that this was due to excessive deflections that appeared and grew non-linearly some years after construction. Interestingly, similar trends were found for a group of 56 similar bridge spans, raising the question whether such concerns could influence the maintenance and service life of a high number of pre-stressed bridges in Europe and beyond. Although individual material and structural factors have been researched, this problem can only be solved by integrating physical and probabilistic models and benefiting from the increasing use of monitoring data. This proposal aimed to:

1. Review existing models for shrinkage and creep at specimen level,
2. Establish robust hybrid FE models for medium/long-term predictions,
3. Develop a novel monitoring approach based on Digital Image Correlation (DIC),
4. Formulate a time-dependent reliability assessment framework, addressing creep and shrinkage uncertainties,
5. Produce representative performance-time profiles for pre-stressed bridges based on the proposed framework and models.

The above was demonstrated via a case study – the Leziria Bridge – possessing a unique combination of factors:

1. available monitoring data,
2. pre-existing analysis models and
3. an intimate knowledge by Dr. Helder Sousa, the researcher, of its construction and behaviour.

The findings were directly relevant to the growing number of bridges with this problem, enhancing the European knowledge and competitiveness in the global infrastructure market. For this, an interdisciplinary research and training programme was set out, building on the researcher’s strong track record, expanding/honning his knowledge/skills, so that they could reach the forefront of highly qualified professionals able to solve problems in a creative/integrative manner, contributing to European expertise and wealth creation.

Parent Programmes:
H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Institute type: Public institution
Funding type: Public (EU)
Other programmes: MSCA-IF-2014-EF Marie Skłodowska-Curie Individual Fellowships (IF-EF)

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EU Contribution: €183,455

Technologies:
- Infrastructure management
- Design of bridges as an integrated whole within a Cooperative System Design Methodology

STRIA Roadmaps: Infrastructure
Transport mode: Multimodal transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Other specified
Geo-spatial type: Infrastructure Node