PROJECT PROFILE

Title	**Development of a bridge network life-cycle cost model**
Contractor	Trinity College Dublin
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Status	On-going
Type of project	Research Fellowship: 3-year PhD project: Tara Reale
Project reference	RFP014/09

Description	The Irish bridge stock is an eclectic mix of structural types, ranging from modern well-engineered steel and concrete structures to the very old stone arch bridge built hundreds of years ago. Careful management of these important and valuable assets is required if maximum service life is to be achieved. Since the introduction of the EIRSPAN in 2001 the visual defects highlighted in Principal Inspection reports have heavily influenced the decision-making process for bridge repair and rehabilitation expenditure. A simple ranking system identified the bridges with the worst condition index carrying the highest traffic volumes. Whole-life costing is available to bridge managers on a bridge-specific level whole-life costing on a network level basis has not been implemented in EIRSPAN. The aim of the project is to develop a model which considers the deterioration parameters which affect the full range of structure types and materials on the Irish national bridge network. It will consider bridges of all ages and exposure conditions as well as other parameters relative to Irish conditions. It will be used to both identify budget requirements going forward, and highlight the likely financial impact of investment restrictions. The model will ultimately influence bridge management expenditure decisions on a network level which will further improve how bridge management is carried out.
Objectives	The objective of the research is to develop an optimisation model for the whole-life management of bridges, taking consideration of needs such as maintenance, repair, rehabilitation and strengthening as well as rate of deterioration. The model will be developed in conjunction with the NRA's EIRSPAN bridge management system, taking account of developments in this field elsewhere, but will be specific to the EIRSPAN database in terms of bridge population (age, type, condition, etc).
Benefits	Whilst acknowledging the need for continuing maintenance of specific bridge elements, there is an emerging need to introduce whole-life costing on a bridge network level to further improve value for money by ensuring bridge-specific structural interventions are undertaken at precisely the time which will offer optimal value against expenditure on a network level. This will enable bridge managers to target bridge maintenance and rehabilitation on a more cost effective-basis and extend the service life of these important infrastructure assets. The development of an optimisation model will improve the operation of the EIRSPAN Bridge Management system and allow the bridge managers to manage the bridge stock in a more consistent and cost-effective way.
Outputs	Optimisation model for bridges Data requirements Implementation plan for EIRSPAN Guidelines for bridge managers