PROJECT PROFILE

Title	**Probabilistic analysis of concrete bridges**	
Contractor	IRCSET/TCD	
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Start date	Dec-08	
End date	Nov-11	
Status	On-going	
Type of project	IRCSET EPS project: 3-year PhD (Paraic Ryan)	
Cost	€24.0k: total budget € 72.0k	
Project reference	NR/250/04 PO 6928	

Description	On a global scale, the question of how to best maintain ageing infrastructure is central to economic prosperity. In order to optimise this maintenance process, advanced methods for assessment are required which move away from conservative deterministic models. Over the last decade research has been conducted into the use of probabilistic models to assess the capacity of structures. However, a number of questions arise: (i) how can material specific stochastic Ferrycarrig bridge, Wexford deterioration models be best incorporated into the process? (ii) How can the process of repair be best incorporated into modelling the deterioration process? (iii) How does spatial variability modelling affect the process? and (iv) How can the non-stationary process of traffic load evolution with time be incorporated into the models? The project focusses on information obtained from the monitoring of Ferrycarrig bridge, Wexford. The bridge was repaired using a number of different techniques such as ggbs, corrosion inhibitors, etc. Various sensors were installed during the repair to monitor the performance of the different repair systems. In this project, the on-going monitoring will be used to address the above issues.
Objectives	The specific objectives of the project are: 1. To investigate the appropriateness of different concrete repair techniques applied to a real bridge in a marine environment; 2. To assess the effectiveness of the techniques and study the effects of change of scale on predicted results through accelerated corrosion tests preformed at the TCD laboratory; 3. To incorporate spatial variability modelling into the probabilistic analysis of a bridge structure to determine its influence on the results; 4. To use the results of the experiments to develop best practice guidelines for probability based assessment of Irish bridges.
Benefits	The research will be used to evaluate the performance of different repair system for concrete bridge and to produce guidelines for the selection of appropriate repairs. The guidelines would assist infrastructure owners/managers such as the NRA to plan maintenance in a more effective way, thus achieving best value for money.
Outputs	Annual reports on the monitoring system installed on Ferrycarrig bridge; Guidelines on the selection of approporiate repair techniques for concrete bridges; Probabilistic response model to assess the effectiveness of different repair systems; Final report containing methodology for probabilistic assessment.