



Conférence Européenne
des Directeurs des Routes
Conference of European
Directors of Roads

RE-GEN

Risk Assessment of Ageing Infrastructure

Research project funded under the CEDR Transnational Road Research Programme
CEDR Call 2013: Ageing Infrastructure Management - Understanding Risk Factors

CEDR Call 2013: Ageing Infrastructure Management is a Transnational Road Research Programme organised by CEDR (Conference of European Directors of Roads). The funding partners for this programme are Denmark, Germany, Ireland, Netherlands, UK and Slovenia

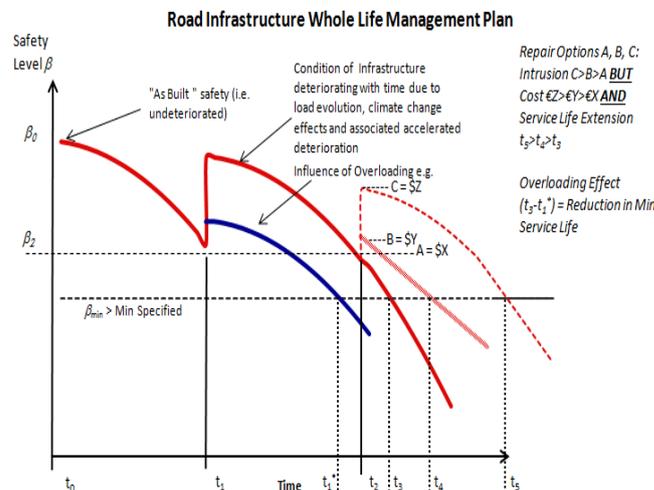
Details	
Acronym:	RE_GEN
Start:	April 2014
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Budget:	EUR428.1k
Co-ordinator:	Alan O'Connor, ROD-IS, Ireland
Contact:	alan.oconnor@rod.ie
Partners:	GDG, Ireland ZAG, Slovenia IFSTTAR, France Ramboll, Denmark TU_Delft, Netherlands
PEB Project Manager:	Tom Casey, Ireland, tcasey@nra.ie
Website:	http://www.re-gen.net/



Project Summary:

The objective of the project is to provide Road Owners/Managers with best practice tools and methodologies for risk assessment of critical infrastructure elements, such as bridges, retaining structures and steep embankments. Risk is being assessed considering not only the probability of failure, pf , of an element/network but also based upon the consequences of that failure. For example suppose two bridges, one on the Primary Motorway Network and the other on the Regional Network, have the same probability of failure at a given limit state, clearly the consequences of failure are vastly different for these two structures, e.g. closure/posting of a bridge on a motorway vs. on a regional road! As a result the prioritisation of these structures for repair should be planned based upon the associated risk, where risk is defined as the product of the $pf \times$ consequence of that failure. Note failure here is described as the probability of exceeding a limit state NOT as structural collapse. The developed tool will provide Owners/Managers with the facility to optimise budgets/resources from the perspectives of minimisation of cost, i.e. considering alternative rehabilitation strategies including the do-nothing option, for maximised service life performance, Figure 1.

Figure 1 – Life Cycle Performance Optimisation



Over the last five years, extensive research efforts have yielded new analysis and design tools that can provide more realistic predictions of infrastructure damage state, which can be used as part of a probabilistic predictive maintenance strategy as illustrated in Figure 1. To date such techniques have seen wide application in Denmark, where RE-GEN partner Rambøll were responsible for producing a Guideline for the Danish Roads Directorate on Probabilistic Assessment of Highway Bridges. Application of this Guideline to real 'problem' bridges led to savings in excess of €50 million (O'Connor and Enevoldsen, 2008) through avoidance of unnecessary repair/rehabilitation and to optimisation of maintenance where required. The coordinator of the RE-GEN project, ROD-IS, have applied these techniques to a number of structures in the Republic of Ireland whilst ZAG, using site specific Weigh-in-Motion data have saved over 100 small to medium-span under-designed bridges from requiring strengthening and/or posting, resulting in savings in excess of €10 ml for a country whose bridge infrastructure represents <0.5% of the EU total. The primary objective for the RE-GEN consortium is to demonstrate to road owners/managers across the EU how probabilistic risk based techniques may be widely applied to optimise performance for minimised cost whilst maintaining the minimum specified safety level as required by National Authorities and/or Codes of Practice. The output of the RE-GEN project will be a risk modelling tool, which will consider risk from a variety of perspectives, e.g. safety risk, financial risk, operational risk, commercial risk and reputational risk, considering both the current situation and the challenges posed by projected traffic growth, climate change and limited funding. The consortium partners are uniquely placed to achieve this aim having been at the forefront of the application of these methods Nationally and Internationally.