



RYERSON INSTITUTE FOR INFRASTRUCTURE INNOVATION

Research Seminar

Development of Risk-Reducing Intervention Programs for Inland Waterway Networks Using Genetic Algorithms

Thursday, May 24, 2018, 13:00-14:00
MON 316 (341 Church Street at Gerrard Street)

Speaker: Prof. Dr. Bryan T. Adey
Institute of Construction and Infrastructure Management, ETH Zürich

*** THIS SEMINAR IS OPEN TO THE PUBLIC ***
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Abstract

Inland waterways often consist of large numbers of man-made objects to ensure navigability. These objects are of many different types, ages and sizes, and deteriorate in uncountable of different ways. In order to ensure that the deterioration of the objects does not result in a loss of navigability, interventions must be executed. This, however, produces costs, in terms of both labour and material costs and costs of loss of service if the waterway is rendered non-navigable during intervention. In this seminar, a methodology will be presented to determine optimal multiple time period intervention programmes for inland waterways. The optimal intervention programme is the one that has highest net benefit, i.e. overall benefits minus overall costs, where benefits are the reduction in risk of failure. A genetic algorithm is used to overcome the problem of combinatorial explosion when many objects, in many states, over many time periods are to be considered. The exact formulation of the genome, as well as the genetic fitness function, will be presented. They will be used to determine an optimal intervention programme for a fictive inland waterway network. The results will be presented and discussed, and an outlook provided on further steps to improve this methodology.

About the Speaker

Bryan T. Adey is the professor of infrastructure management at the Institute of Construction and Infrastructure Management (IBI) at the Swiss Federal Institute of Technology in Zürich, Switzerland (ETHZ). His research is focused on the development of methodologies to assess the risk related to infrastructure networks and the development of algorithms to determine optimal risk reducing intervention programs.