

Seminar on

Climate Adaptation Engineering for Extreme Events

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Date: November 14, 2014

Time: 13:00-14:00

Place: E-417D, Uji Campus, Kyoto University
(No registration required)

ABSTRACT

The climate change debate is often characterized by worst-case thinking, cost neglect, probability neglect, and avoidance of the notion of acceptable risk. And much of the climate change debate has focused on costly measures to reduce CO₂ emissions. Climate adaptation, such as reducing vulnerability of infrastructure to extreme weather events, is much less costly, more effective in the short-term, and in many cases a sound investment even if climate projections turn out to be inaccurate.

There is increasing research that takes into account the changing climate risks and life-cycle costs in engineering to reduce the vulnerability or increase the resiliency of infrastructure - we define this as 'climate adaptation engineering'. The paper will describe how risk-based approaches are well suited to optimising climate adaptation strategies related to the design of new infrastructure. Stochastic methods are used to model infrastructure performance, risk reduction and effectiveness of adaptation strategies, exposure, and costs. These concepts will be illustrated with state-of-the research of risk-based life-cycle assessment of climate adaptation strategies including (i) design of new houses subject to severe storms, (ii) effects of climate change on corrosion of reinforced concrete structures, and (iii) measures to reduce vulnerability of power distribution infrastructure. Uncertainties of climate projections are also discussed. This will pave the way for more efficient and resilient infrastructure, and help 'future proof' new and existing infrastructure to a changing climate.

Professor Mark Stewart is Director of the Centre for Infrastructure Performance and Reliability at The University of Newcastle in Australia. He is the co-author of *Probabilistic Risk Assessment of Engineering Systems* (Chapman & Hall, 1997) and *Terror, Security, and Money: Balancing the Risks, Benefits, and Costs of Homeland Security* (Oxford University Press, 2011), as well as more than 350 technical papers and reports. He has more than 25 years of experience in probabilistic risk and vulnerability assessment of infrastructure and security systems. Mark is currently leading a CSIRO funded \$3 million project assessing the cost-effectiveness of adaptation strategies for Australian infrastructure for extreme weather events.



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