



DELTA IN TIMES OF CLIMATE CHANGE II INTERNATIONAL CONFERENCE

OPPORTUNITIES FOR PEOPLE, SCIENCE, CITIES AND BUSINESS
ROTTERDAM THE NETHERLANDS, 24-26 SEPTEMBER 2014

Deltas in Depth scientific sessions	
Deltas in Depth Theme 7. Infrastructure and ports	
DD 7.1 Systems of systems approach for climate resilient multi-infrastructure	
Chair	Prof.dr. Lori Tavasszy, TNO and Delft University of Technology, the Netherlands
Presentations	<ul style="list-style-type: none">● PhD Jonas Johansson, Lund University, Sweden● PhD Jane Mullett, Global Cities Research Institute, RMIT University, Australia● Ruben Vogel, TNO, the Netherlands● PhD Raghav Pant, University of Oxford, United Kingdom

The aim of this focused session was to compare different approaches on risk assessment for interconnected infrastructures and see what can be learnt from these approaches. The researchers presented frameworks for (1) quantitative risk assessments on interconnected infrastructure, (2) information on climate change for practitioners around port infrastructures, and (3) for joint fact finding as process to gather information for multi-stakeholder planning situations. Different perspectives existed in the presentations:

- Vulnerability versus risk assessment? Vulnerability is oriented at the functioning of the system, risks at the impacts on its environment.
- Substantive perspective (output of tools) or process perspectives (using tools)? Risk rating of impacts by using existing risk tables and rate them on consequences and priorities is a qualitative way to build group consensus, the exact risks calculations are important to know what to do and when.
- Emphasis on technical or on sociotechnical aspects? While the pressure of climate change on the physical system is high, the pressure on governance systems (unclear responsibilities) is equally high. Can you pay attention to one aspect or do they have to be treated equally?

Lessons learnt for the development of a multi infrastructure risk assessment tool for climate change included:

- A systems of systems approach is valuable, because it provides the 'complex' perspectives
- A huge amount of data needed for quantitative research
- A risk framework aims to create understanding and to inform policy makers on infrastructure safety and security
- There are methods available to do vulnerability analysis
- Most methods demonstrated on small scale rather than large scale real life infrastructures
- Attaining data is problematic; due to confidentiality issues a national framework is needed.
- Many tools are applicable to get insight in risks and vulnerability, but tools are not trusted
- Information gets powerful for stakeholders when it is grounded in their own language, tools (or either their outputs) should thus be sector specific.
- Joint fact finding is needed to get the results of risks assessment into the decision making process, because of institutional stickiness, siloed work and information usability gap.
- Risk assessment tools can help to create insights in problems, but it does not solve them.
- Iterations are needed to learn and improve insights.
- Using scenario's will provide insights for robust adaptation options





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- Often nobody feels responsible for these interconnected risks or wants to know about the vulnerability of this system of infrastructures. Might it be that the owner of a framework for interconnected risks does not exist?

An important conclusion from this session was that current frameworks are still one-sided (quantitative or qualitative, substance or process, past, present or future – often one of these at a time), that perspectives are complementary and more work is needed to arrive at a systems-of-systems approach.

