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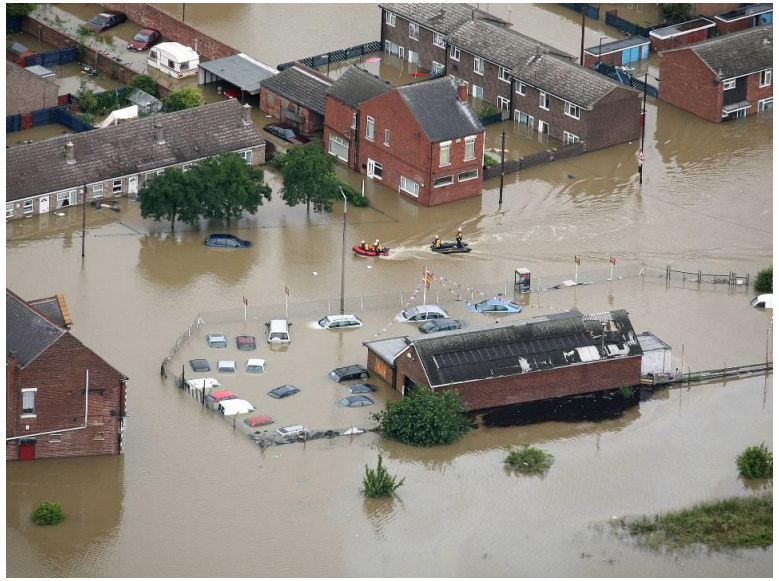
Capacity based continuum for resilience development in safeguarding critical infrastructure in cities



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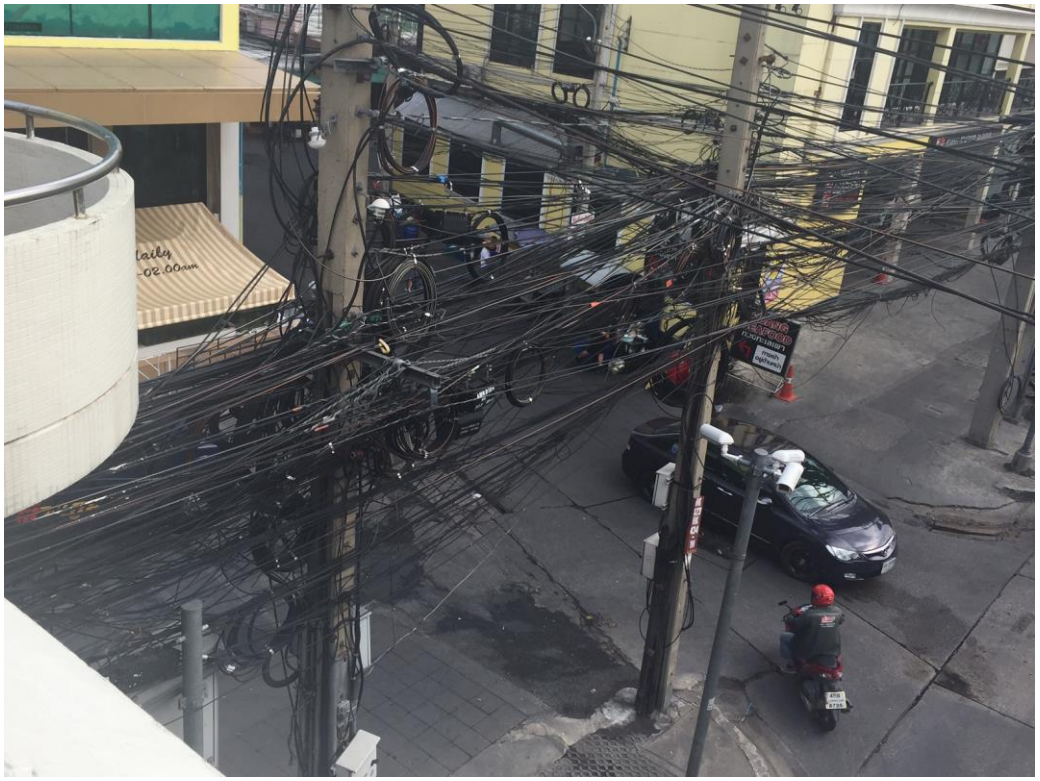
Intersections between resilience and risk, December 2017

Disaster Resilience of a Place (DROP)

(cutters, 2008)

- Vulnerability and resilience is context or place dependent
- Cities are dependent on complex systems of infrastructure for smooth running of day-to-day operations
- Social acceptance or tolerance of risk
- Capacity building to improve resilience is a gradual development via a continuum



Progressing through the capacity ladder: Developing resilience of critical infrastructure (CI) in practice

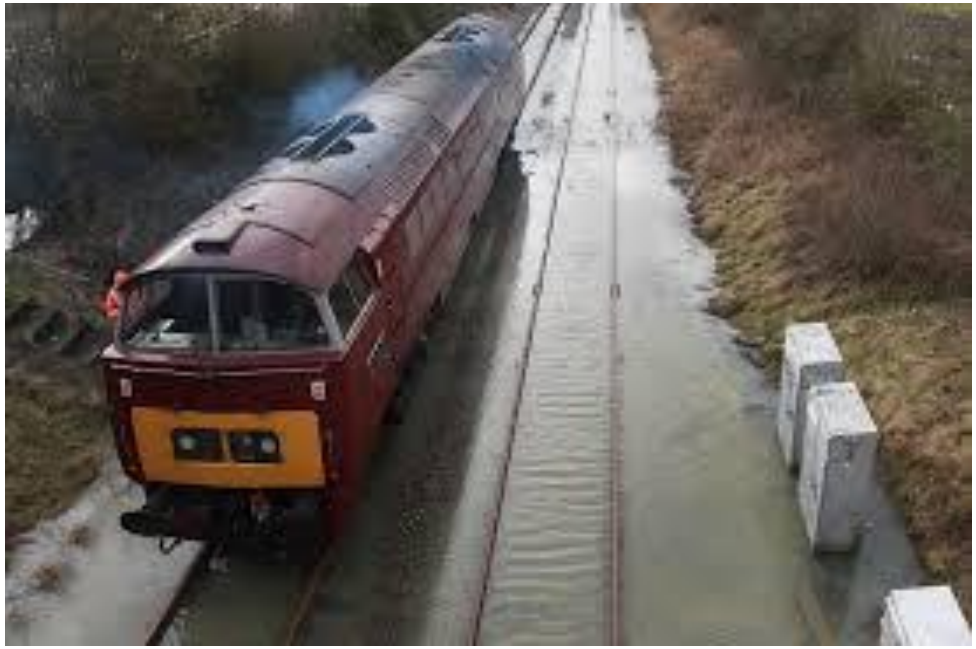
A capacity driven definition

- **Coping** – The ability of the CI to face and manage current adverse conditions with the available skills and resources
- **Anticipative** – Ability of the CI to take proactive action to anticipate and reduce the impact by avoiding or reducing exposure or by minimising vulnerability to specific hazards with the available resources.
- **Adaptive** - **:** One of the distinguishing features of meeting the challenge is the longer term orientation by considering impact of climate change on CI. It is considering complete reorganisation and change of standard operating procedures in meeting the challenges of future anticipated changes to the current and future status quo of CI Resilience.

Source: EU Horizon 2020 funded EU-CIRCLE project definitions of capacity based resilience

Building Resilience in critical infrastructure: what is the current capacity and where do you want to go from here?

The ability of CI system to face and manage adverse conditions using available skills and resources



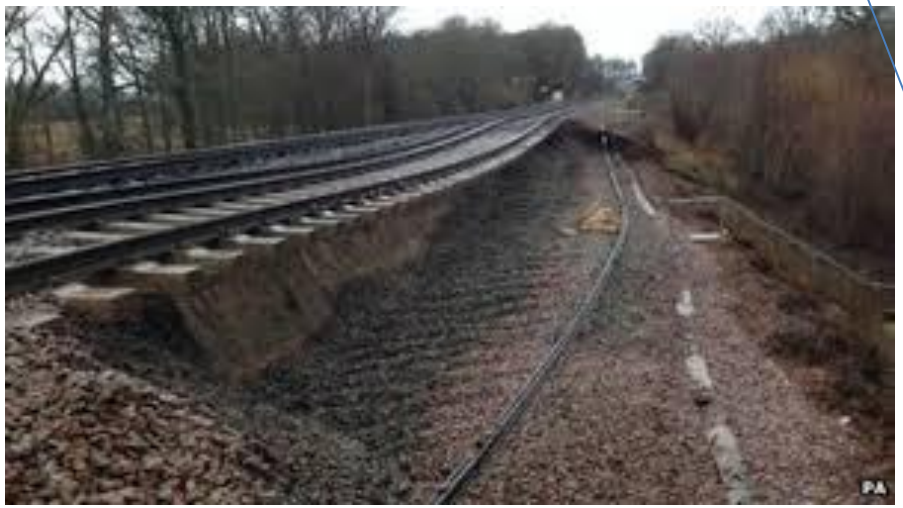
Coping

Anticipative

Adaptive

Building Resilience in critical infrastructure: what is the current capacity and where do you want to go from here?

The ability of the CI system to anticipate and reduce the impact



Coping

Anticipative

Adaptive

Building Resilience in critical infrastructure: what is the current capacity and where do you want to go from here?

The ability of a CI system to adjust and to take advantage of opportunities against potential impacts

Coping

Anticipative

Adaptive

Workshop: Intersections Between Resilience and Risk

Loughborough University

Critical Infrastructures
(Delete as appropriate)

What does Resilience mean to you?:

- Resilience is a means and not an end
- When mitigating threats / stresses against critical infrastructure it is about improving the capacity to meet challenges of systemic risks.
- Capacity building framework moves from coping, to anticipative and finally to adaptive
- Resilience also means having the ability to predict risks and characterisation of impacts ahead of any impending events to improve preparedness
- Hence end to end mapping and modelling

Key Resilience Research Challenges:

- Closely coupled systems in cities
- Resilience is a moving target
- Hence we need to plan not just for the present but contextually dependent future challenges

Your Current Research Focus:

(Identify your areas of research that could be applied to building resilience into risk management)

- Impact of climate change on critical infrastructure and an ICT based platform to improve resilience (EU-CIRCLE)
- Urban resilience and flood adaptation measures in cities

In all of the above the starting point is that risk management is generic, hence resilience need to be built into the risk management process.

What would good look like?

(Your view required here – with some context)

- Community is fully prepared to meet challenges of recurrent / sudden and systemic stresses and are able to cope at the appropriate level of capacity
- The end to end modelling reveals the magnitude of the stress on critical infrastructure systems

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Workshop: Intersections Between Resilience and Risk

Loughborough University

Critical Infrastructures
(Delete as appropriate)

Perceived Barriers?:
(Where do you perceive the barriers?)

- Investment on capacity development is difficult as the benefits are much longer term orientated
- Risk mitigation is probability based hence not definitive, difficult to perceive value
- Transcending several disciplines, professions and knowledge domains.

What are the consequences - Risks?:
(What happens if no progress is made - ie status quo?)

- Infrastructure failures
- Long lead times to understand the causes of failiure
- Inability to track benefits and opportunities

Envisaged Breakthroughs Required:
(Where do you envisage big/significant breakthroughs?

- A modelling technique that can bring in values and expertise of all knowledge domains
- End to end mapping and modeling of critical infrastructure (from the

Who needs to do what?:
(Think here - what would you need and what would you do?)

- Perhaps a way of collaborating with experts and communities
- A collaborative platform
- A better way to characterise propagation of risks and associated stresses on infrastructure systems

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