

# Circle

## The clockwork that makes modern society tick

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Integrated Water Management



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Economic Cooperation Program Cities - Beijing, December 4-6th, 2018*



Are you safe?

**This presentation / links for Circle Videos:**

**Introduction to Circle**

<https://www.youtube.com/watch?v=R204VdO216U>

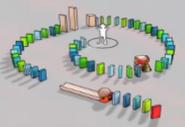
**Case of Waterland**

[https://www.youtube.com/watch?v=O5dz7LwvO\\_c&t=53s](https://www.youtube.com/watch?v=O5dz7LwvO_c&t=53s)

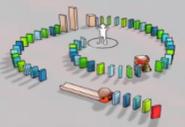
**Case of Cork**

<https://www.youtube.com/watch?v=9tISZo8cmMY>

**Summary**



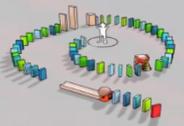
**'Critical Infrastructure'** means an asset, system or part thereof [...] which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions.



## Circle - Cascading domino effects of floods on critical infrastructures

Over the past decades, the increasing frequency and intensity of extreme climatic events have impacted the society in unimaginable ways. Particularly the interruptions of critical infrastructures such as electricity, communication, drinking water or transport systems lead to enormous, often long-lasting societal impacts including fatalities and economic losses.

Circle helps stakeholders to understand the complex and interdependent relations between critical infrastructure systems. These relations, or causal links, can be investigated and visualized even within the context of a relatively data poor environment.



# Blackout in Italy

National Blackout in 2003



# 2010 Queensland Floods

Australia



Source: 2010 Queensland Floods on Boston Big Picture

Thailand floods 2011



# Blackout in Manhattan

Hurricane Sandy (October 2012)



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Source: [Wikipedia Commons](#) – User Hybirdd

# What do all events have in common?

- small impact, large consequences
- urban centres are heavily affected
- in all cases, the failure of CI had major impacts
- there are events with a single cause, but most failure is a combination of causes



# Deltares

Enabling Delta Life



# Amsterdam-Waterland

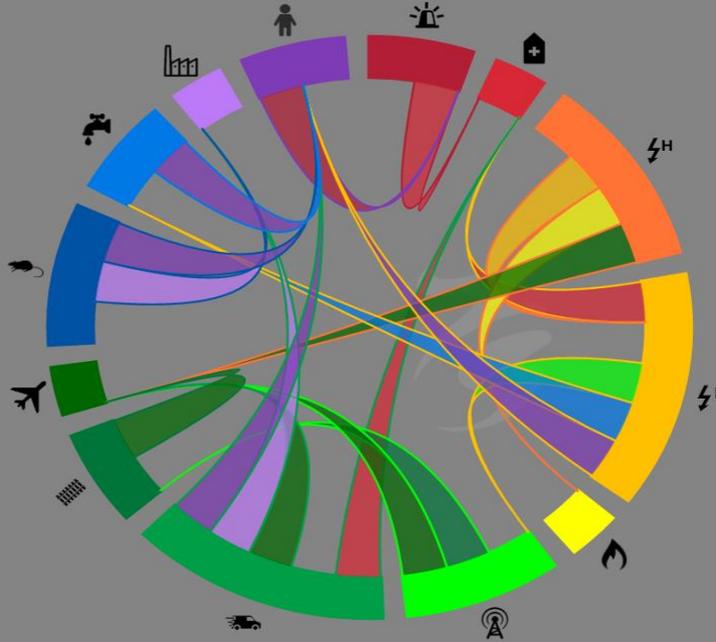
Revisited the 1916 flooding





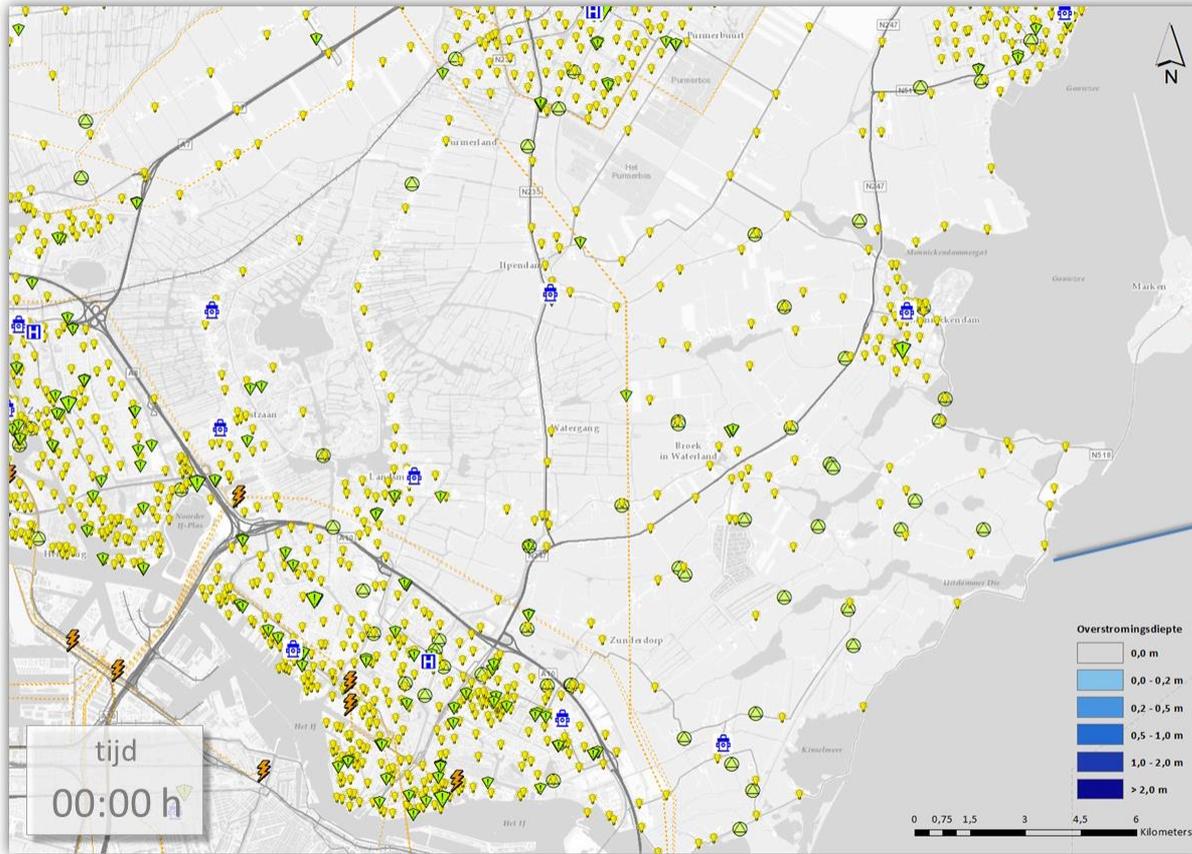
# Circle - Critical Infrastructure: Relations and Consequences for Life and Environment

- Emerg. Coord. Centres
- Hospital
- Electricity High
- Electricity Low
- Gas network
- Telecommunication network
- Main roads and tunnels
- Railways
- Airport
- Wastewater
- Drinking water
- Industry
- Citizens





## Circle case study - Cascading-effects in Waterland 1916 – 2016



Two dike breaches cause Waterland to flood entirely within 36 hours.

# Large Power Outage Amsterdam 2015



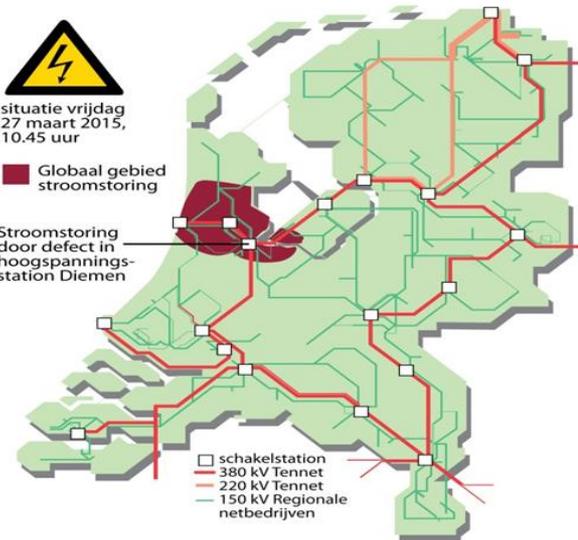
## Stroomstoring treft deel Noord-Holland



situatie vrijdag  
27 maart 2015,  
10.45 uur

■ Globaal gebied  
stroomstoring

Stroomstoring  
door defect in  
hoogspannings-  
station Diemen



bron: tennet

ANP

# Cork, Ireland – interactive flood modeling



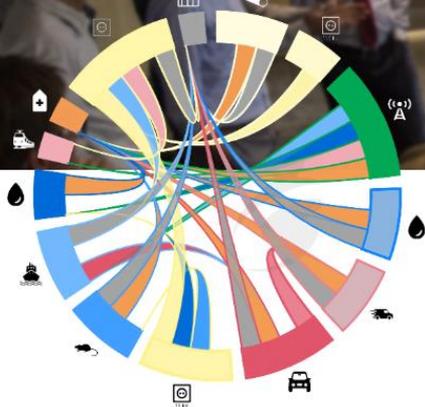
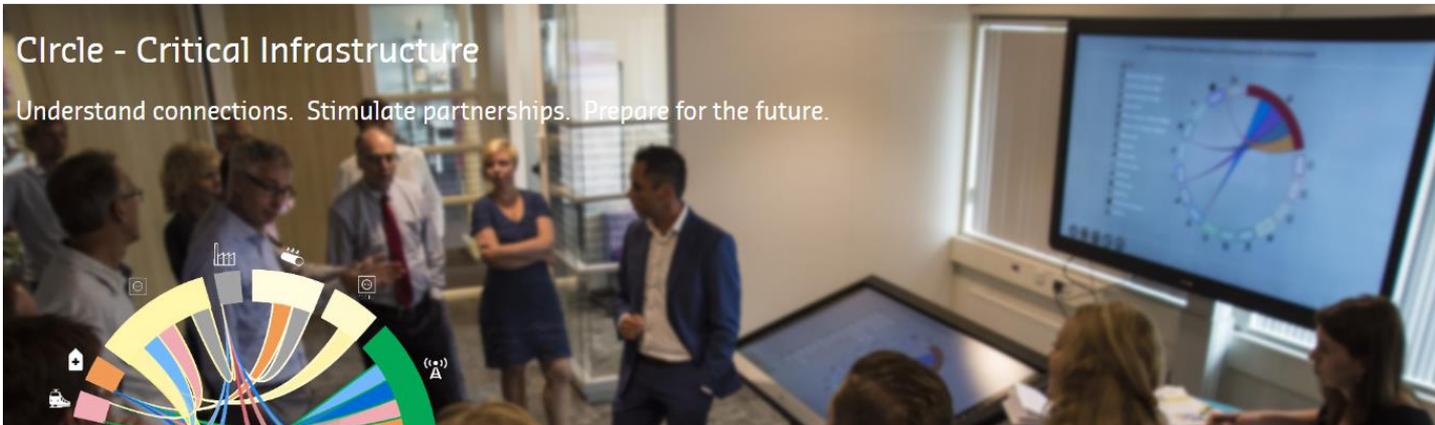
# Circle Online – Open to the Community



Circle Home Success stories My sessions Create session My account [andreas.burzel@deltares.nl]

## Circle - Critical Infrastructure

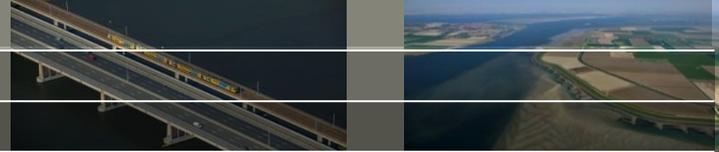
Understand connections. Stimulate partnerships. Prepare for the future.



Discover more

<http://circle.deltares.org>

# Non-digital Circle



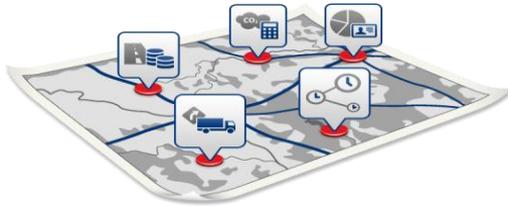
# Contributes in...



Awareness and overview



Collaboration



Planning



Decision making

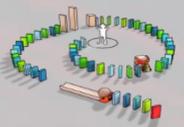


Prioritizing actions

## Summary

- CI is very relevant
  - networks enable the flux of people, goods, data and money
- We have little or no experience in CI failure
  - climate change – extreme patterns
  - likelihood to fail increases with increasing complexity
  - in the next 30 years more infrastructure will be build than since built from the beginning of industrialization
- ‘Small impacts, large consequences’ events are difficult to identify
- Awareness can lead to increased resilience

**Perfect tool for disaster management and planning**  
*(“if you fail to plan, you plan to fail”)*



**Thank you for your attention!**

