

Break-Out Session 1.3

Status Quo:
Physical modelling of sewer failures.

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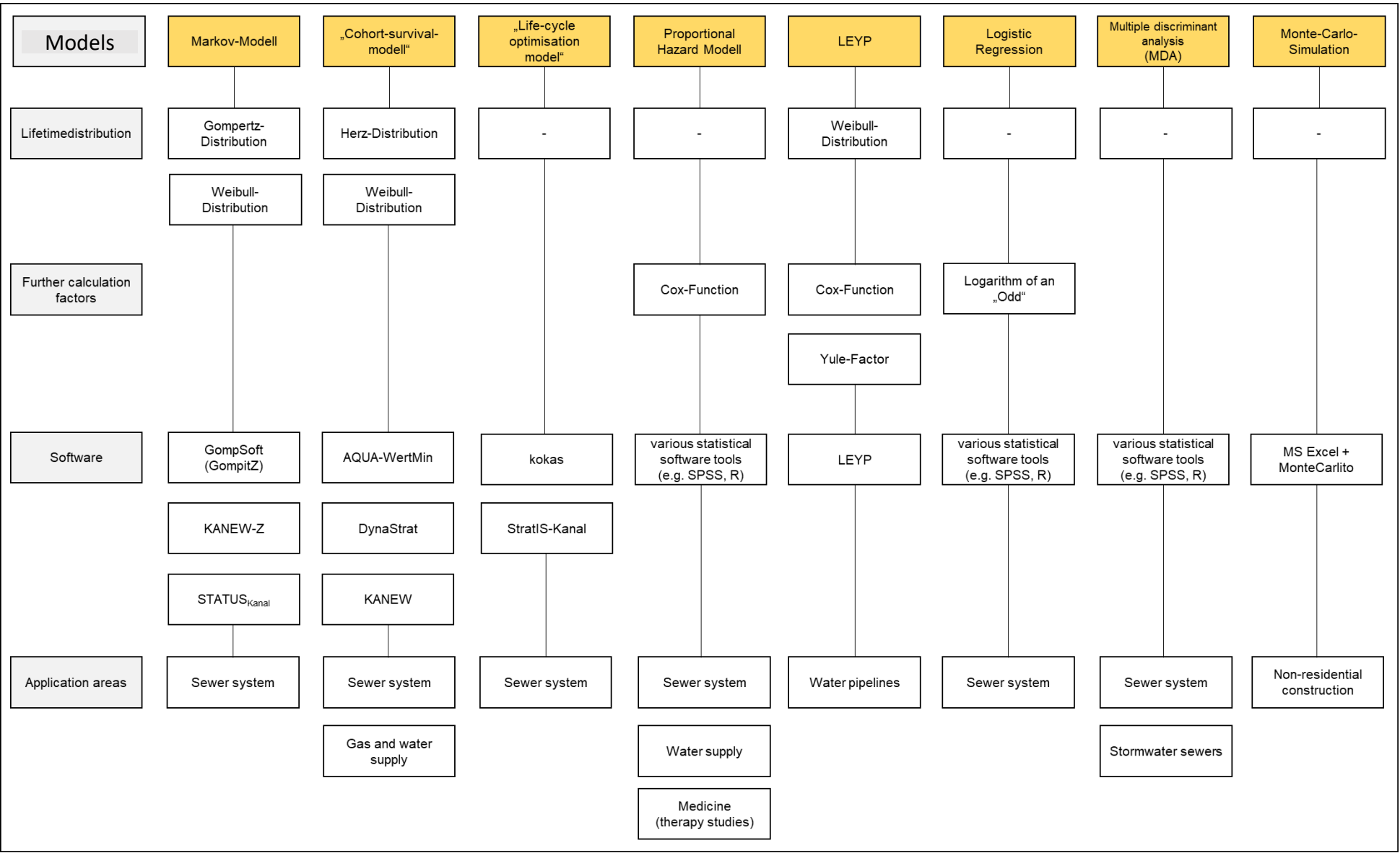
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IKT - Institute for Underground Infrastructure, Gelsenkirchen (Germany)

25th February 2021

1. Status quo: Overview of modelling of sewer failures
2. How do sewer failures occur?
3. Examples of damage development over time
4. Open Q&A dialogue
5. Planned research project

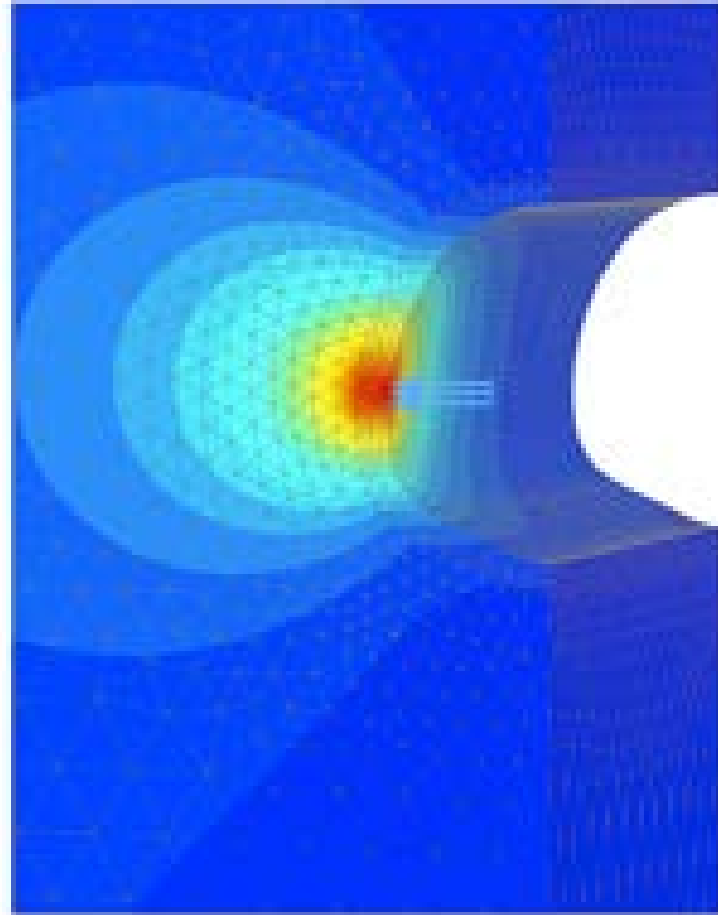
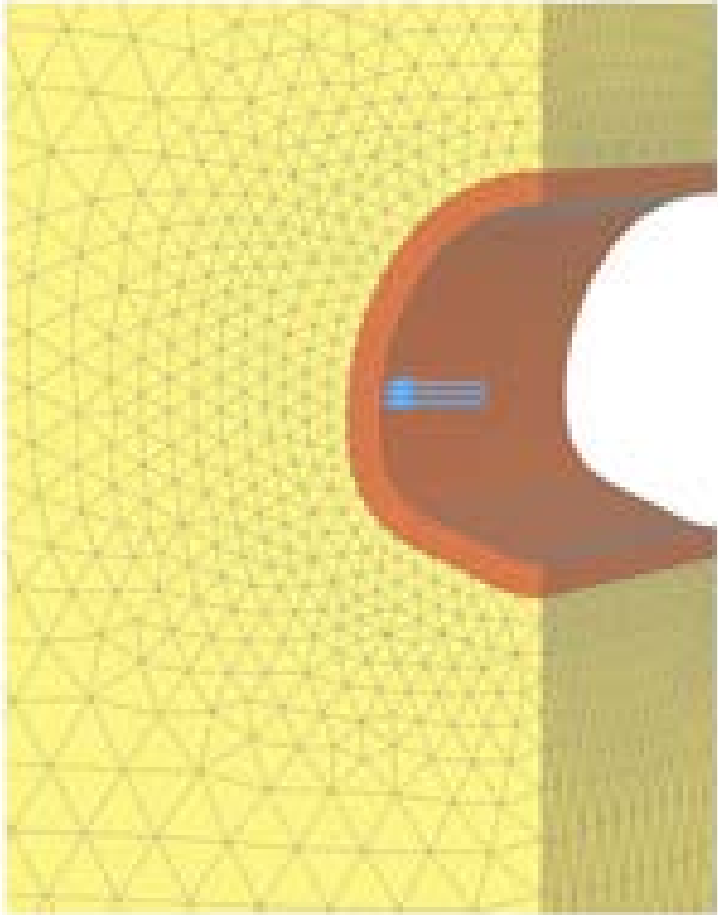
Status quo: Overview of modelling of sewer failures



There are many different **empirical** models and softwares used in practice.

Source: Master-thesis Luisa Brandl: “Beschreibung, Modellierung und Prognose der Zustandsänderungen von Bauteilen der Abwasserkanalisation“. 2017.

Translated into English.



The **physical modelling** is essentially based on FEM calculations, supported by measurements where possible. “Snapshots” of the damage development!

Damage development over time?

Different damages are the result of different mechanisms.

Potentiell mechanisms are:

1. Installation faults (e.g. inadequate bedding, missing seals)
2. Improper handling (e.g. false connections, excavation damage)
3. External process influences (e.g. subsidence, root ingrowth)
4. Wear (e.g. corrosion, abrasion, cyclic loads)
5. Unforeseen external loads (e.g. change of load, earthquakes)
6. Material ageing (change in chemical and physical properties)

Major issues are:

Which damage development scenarios are most relevant? **POLL**

Which scenarios have already been the subject of extensive research?

Example 1: Crack in clay pipe over time



1999
(65a)

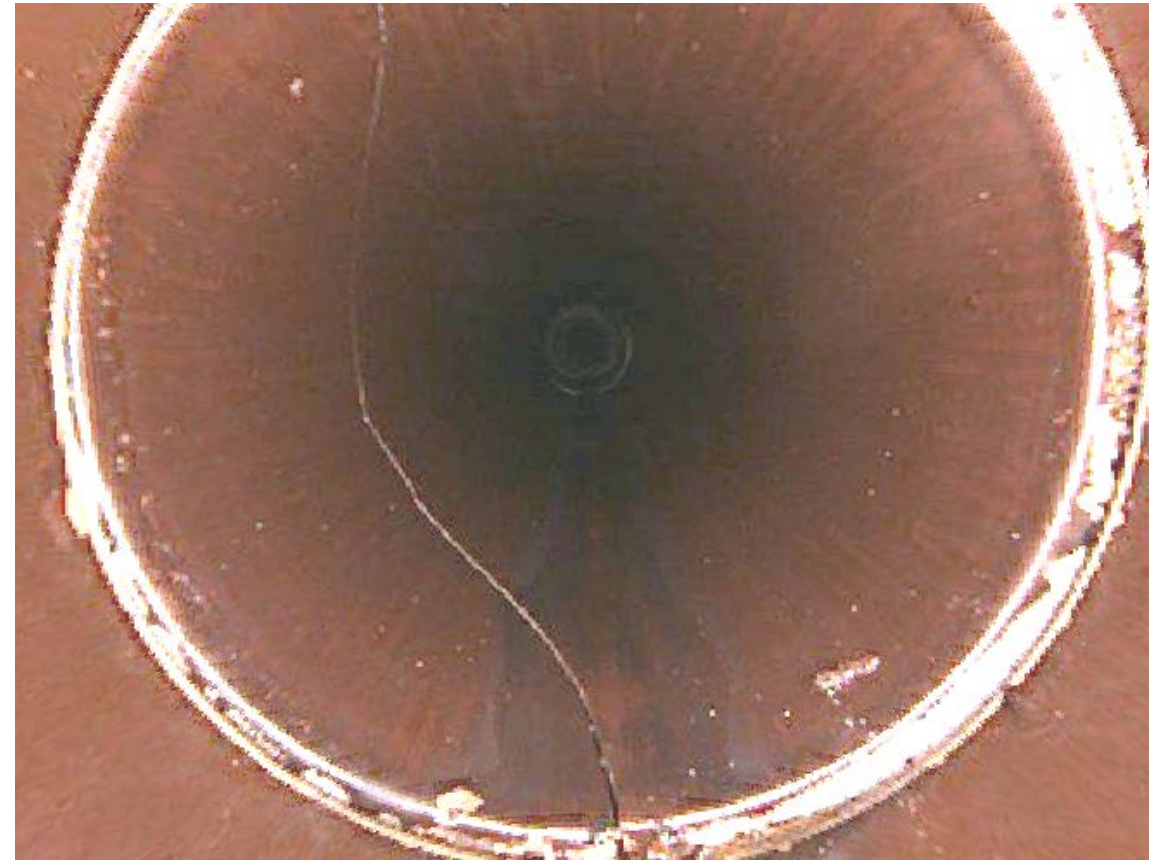


2015

Example 2: Crack in clay pipe over time



2006
(36a)



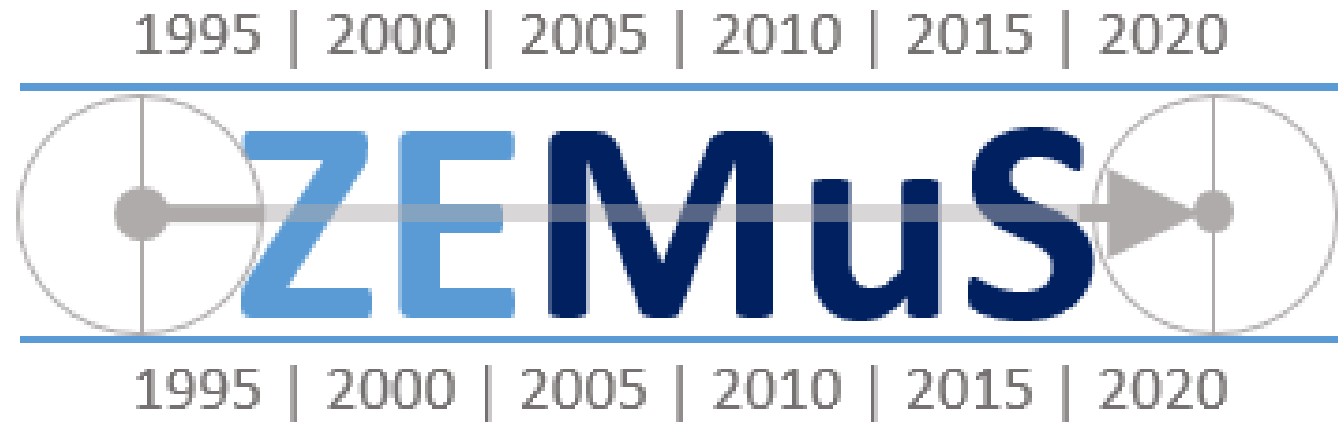
2015

- Why are some damage scenarios more relevant, cp. poll result?
- Which scenarios have already been the subject of extensive research?
- Experiences on the durability of rehabilitation measures?
- Future overarching processes (e.g. climate change or demographic change) with impact on sewer condition?
- Whatever else is interesting ...

Project proposal

Changes in condition of sewers over time

- data-based forecasts, models and risk-oriented strategies –
(acronym: **ZEMuS**)



Project open for knowledge-exchange. Interested? Please contact salomon@ikt.institute

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