Towards a Classification Method for Gravity Pipeline Failures

Mark Milke, PhD, CPEng

Dept. Civil & Nat. Res. Eng., University of Canterbury

Building Innovation Partnership

Funded by industry to deliver solutions to industry identified needs.

Data, Metrics and Reporting for Wastewater Pipe Networks

Improve our ability to answer questions on

- How much data for asset management planning?

- Which parameters?

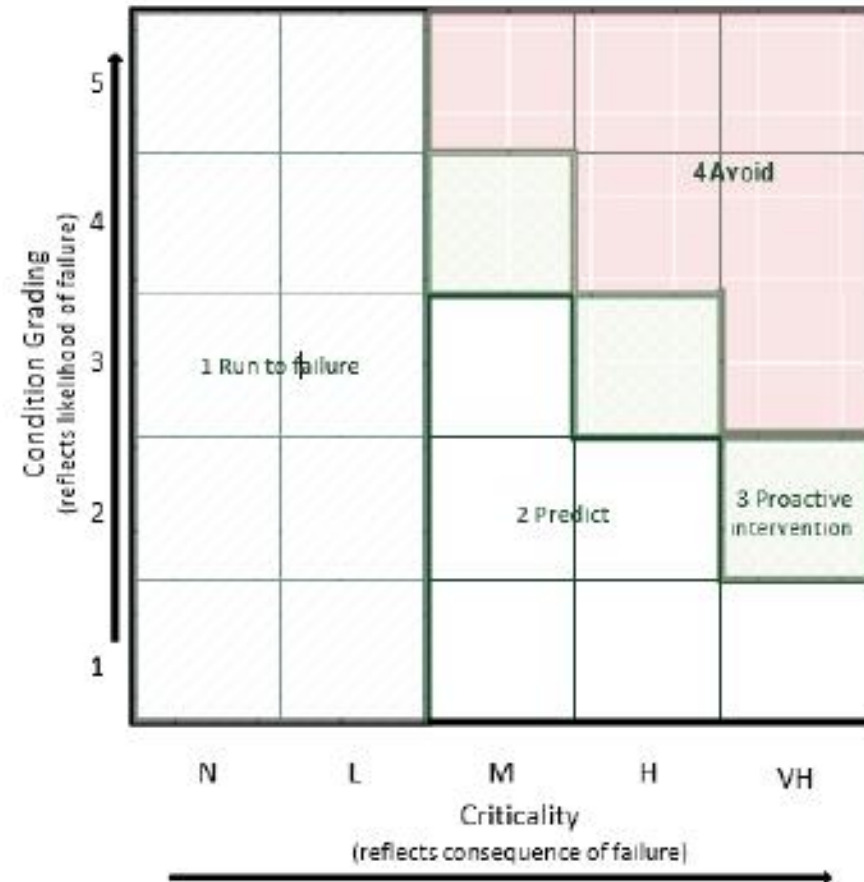- How best to match data collection with asset class of pipe?

Figure 9-2 : Auckland Council Renewals Strategy Framework

Which Pipe Data to Collect Complicated by Wide Uses and their Changing Nature

Potential Use	Used now	Possible now, but lack time	Possible in future, need more/better data	Not likely to be ever practical given cost and value
Capital Works Planning				
Risk/Insurance Planning				
Maintenance Assessments				
System Resilience Analysis				
Wellbeing Assessment				

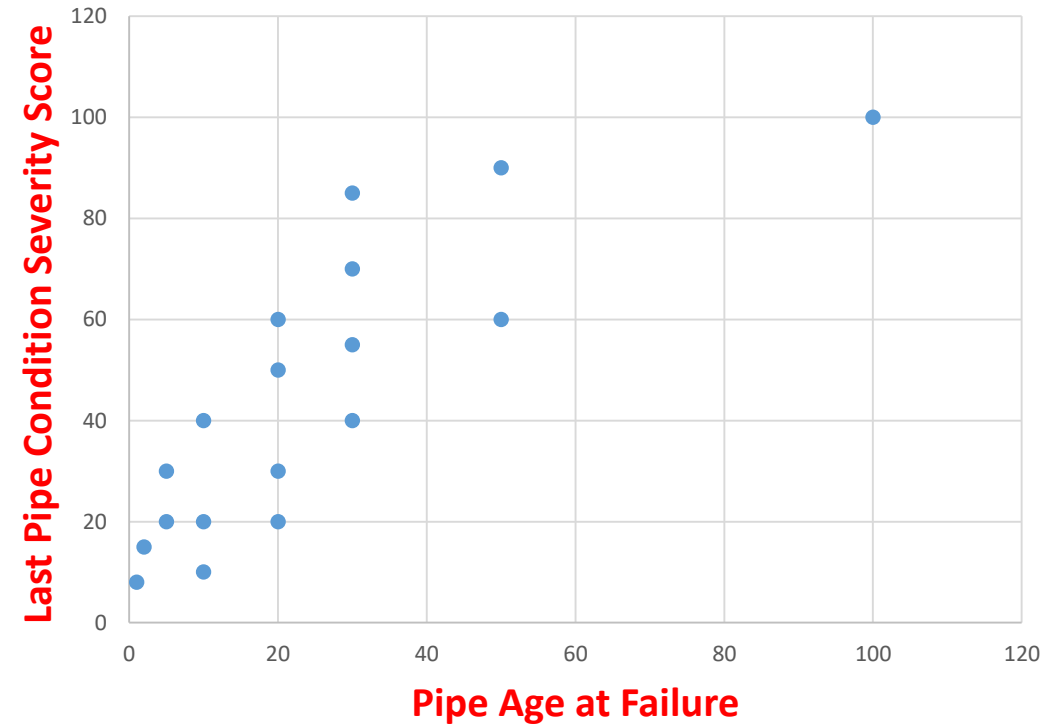# Pipe Condition Assessment Only Partly Predicts Pipe Failure

- Ground condition?

- Technology obsolescence?

- Change in land use (population density, commercial)?

- Other?

Value of Analysis Will be Limited without Failure Classification


All Failure Data

Filtered Failures Related to Pipe Condition

Benefits of Failure Tree Approach

- Allow separation of correlation/causation in data analysis
- Separate failures that can be reduced by monitoring from those that cannot
- Separate failures into those that are constant over time from those that increase as system ages

Towards a Gravity Pipe System Failure Classification
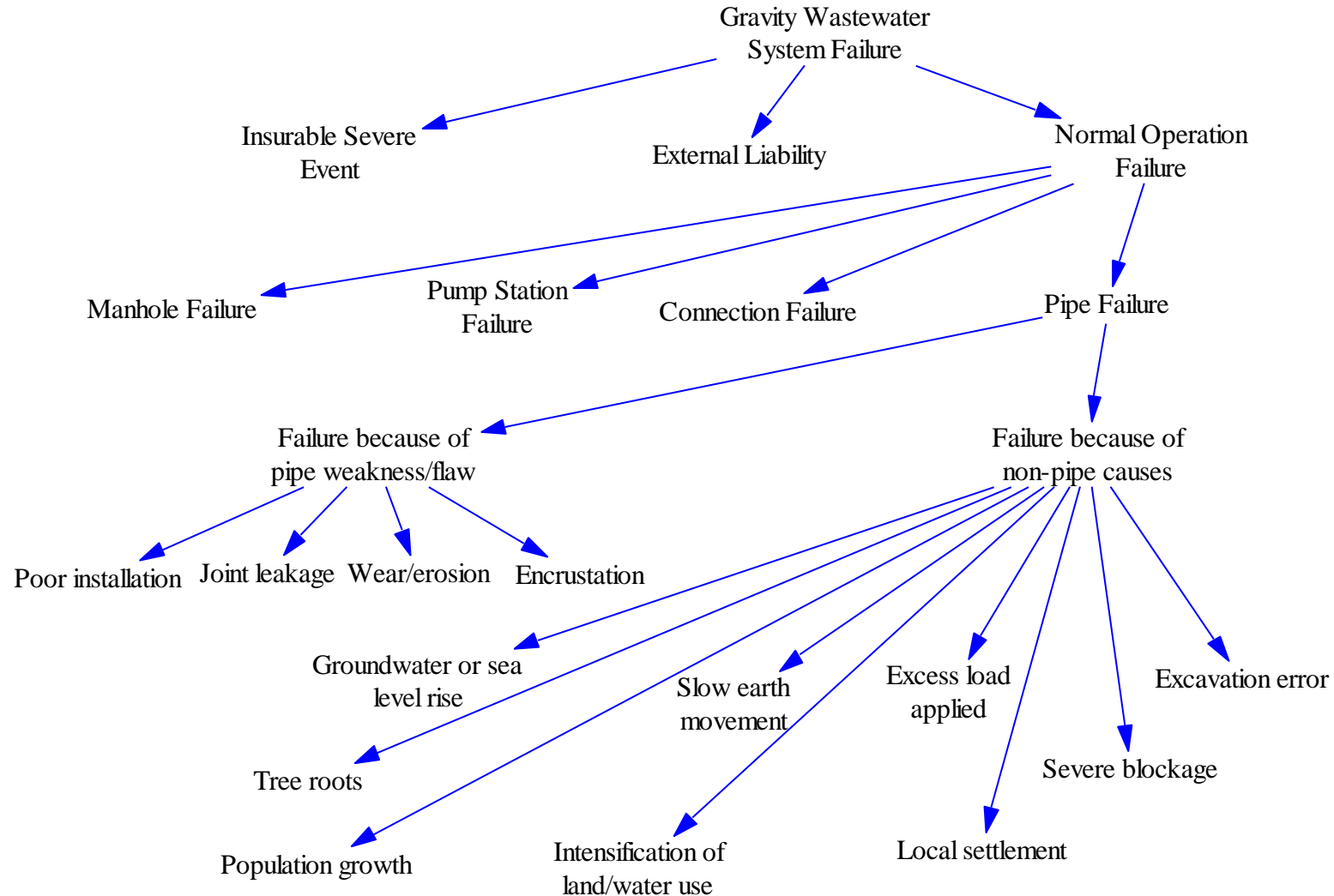
How best to analyse monitoring and data adequacy?

- Is the problem framed appropriately?
- Where is the research priority?
- How much data needed to analyse?
- Which trial data set(s) to use?
- How to balance multiple uses of data?
- Can we learn from other sectors? Petrochemical? Defence (air, ship)?
- Can we learn from other countries? Universities?