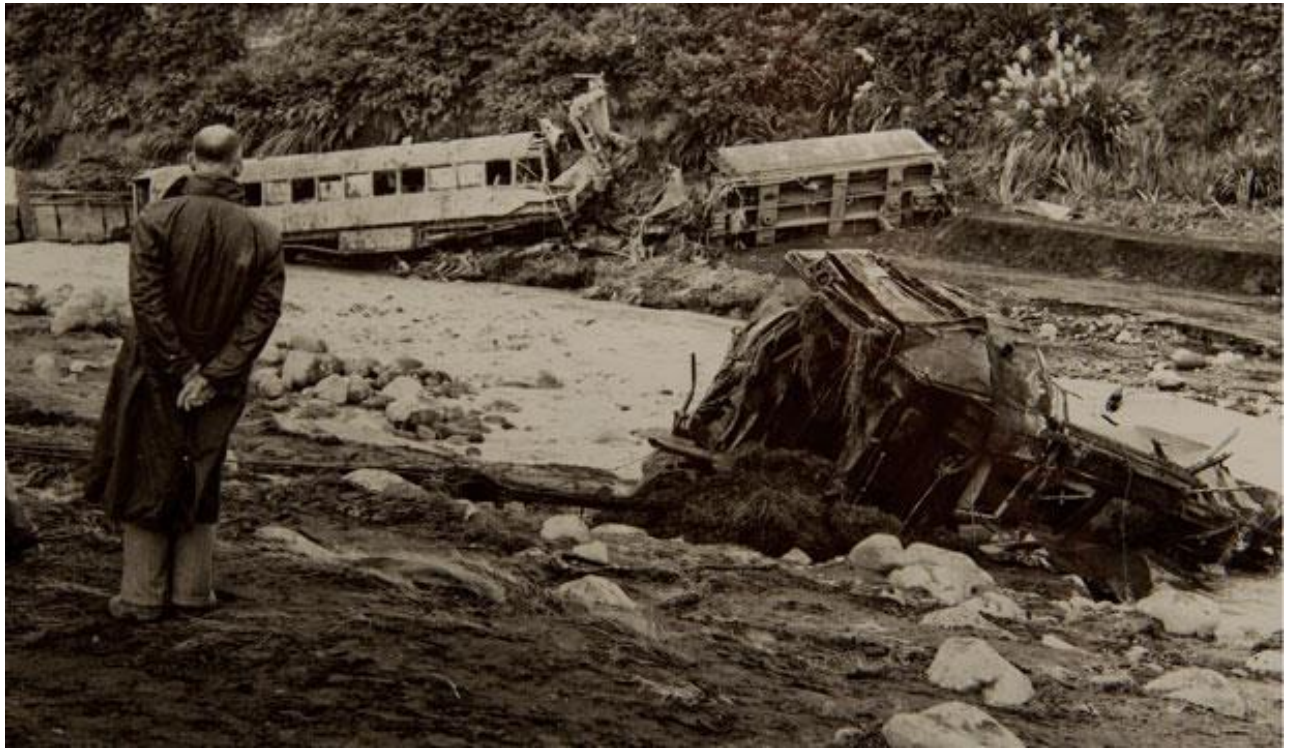
Catastrophe!

Why we should care about the possibility of rare but catastrophic transport incidents



Summary

1. The rail industry and the research project
2. Our tolerance to risk
3. The SPACE Model
4. Wrap-up

If you think safety is expensive, try an accident

Dr Trevor Kletz


FORGOTTEN
WORLD
ADVENTURES


KiwiRail
4628


CITY
LOOP
178


Fairmont
Tamper
BALLAST
EQUALIZER
KiwiRail


MAERSK
463


MAERSK


KiwiRail
5114
DXB5114

Background – The Rail Safety Regulator

- The Rail Safety Regulator is part of the Transport Agency
- We **oversee** the safety of all rail operators in NZ
  - Rail operators remain **accountable** for safety & managing risk
- Licensing, auditing, education, investigation & compliance
- Moving from a process-based regulator to a risk-based regulator.

Background – Why the focus on risk?

- Risk management is a key activity in the rail sector
  - Trains are big and hard. People aren't.
  - Potential for multi-fatality accidents & significant service disruption
- Rail companies must manage their own risks
  - "*Those creating the hazard are responsible for managing it*"
- Risk management is evolving in New Zealand
  - Increasingly complicated activities
  - Reliability is a customer focus
  - "*Everyone comes home healthy and safe*"

NZ TRANSPORT AGENCY WAKA KOTAHI

NAVIGATUS CONSULTING

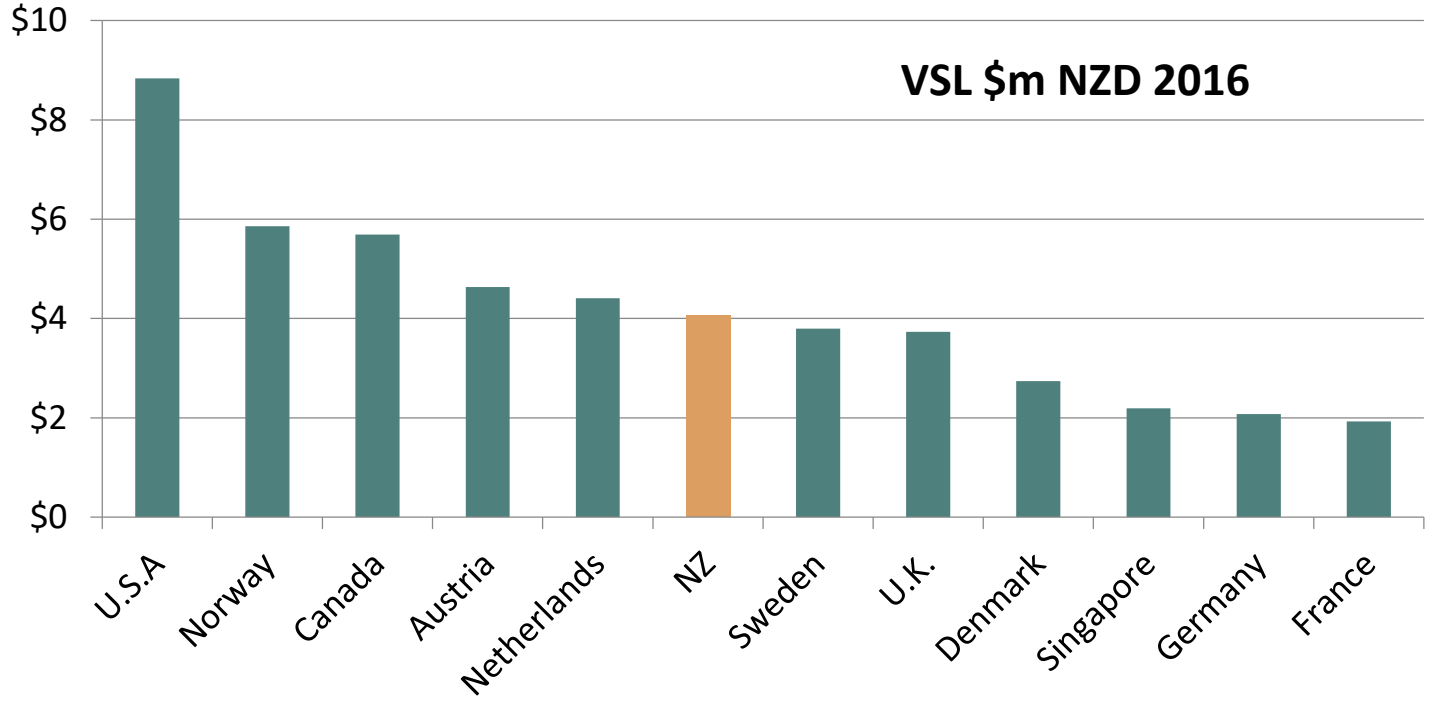
What is our risk tolerance?

- Risk management is not risk elimination
- You can't be absolutely "safe" – risk is a consequence of activity

- We need to describe a level where a risk is intolerable to our objectives

How safe – Value of Life Saved

- The current VSL is derived from a 1991 study
  - Asked 600 people
  - Willingness to pay for road safety improvements
  - This implicitly includes a degree of risk aversion

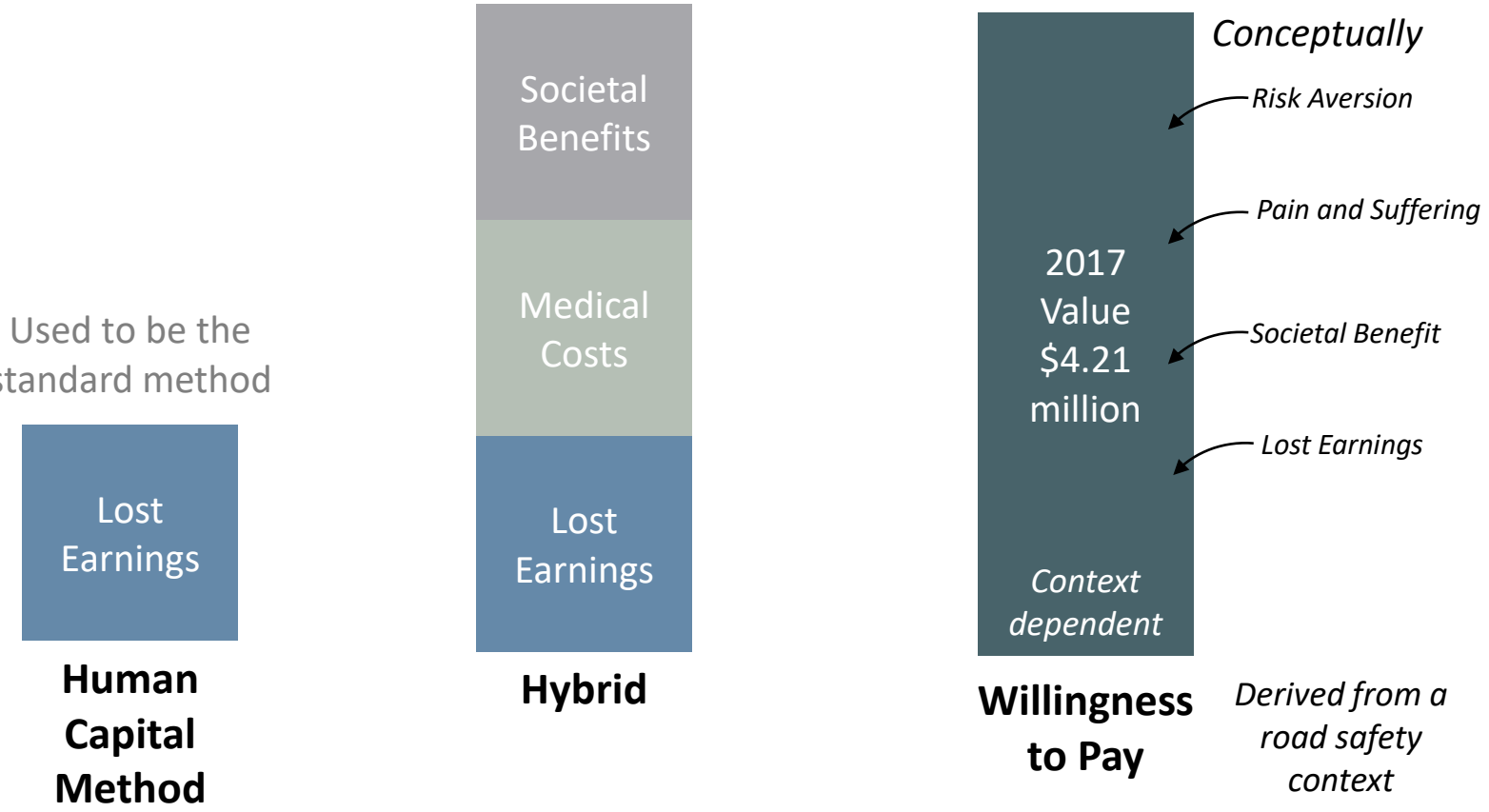


How safe – Valuation Methods for Life

Used to be the standard method

Australian method

NZ method



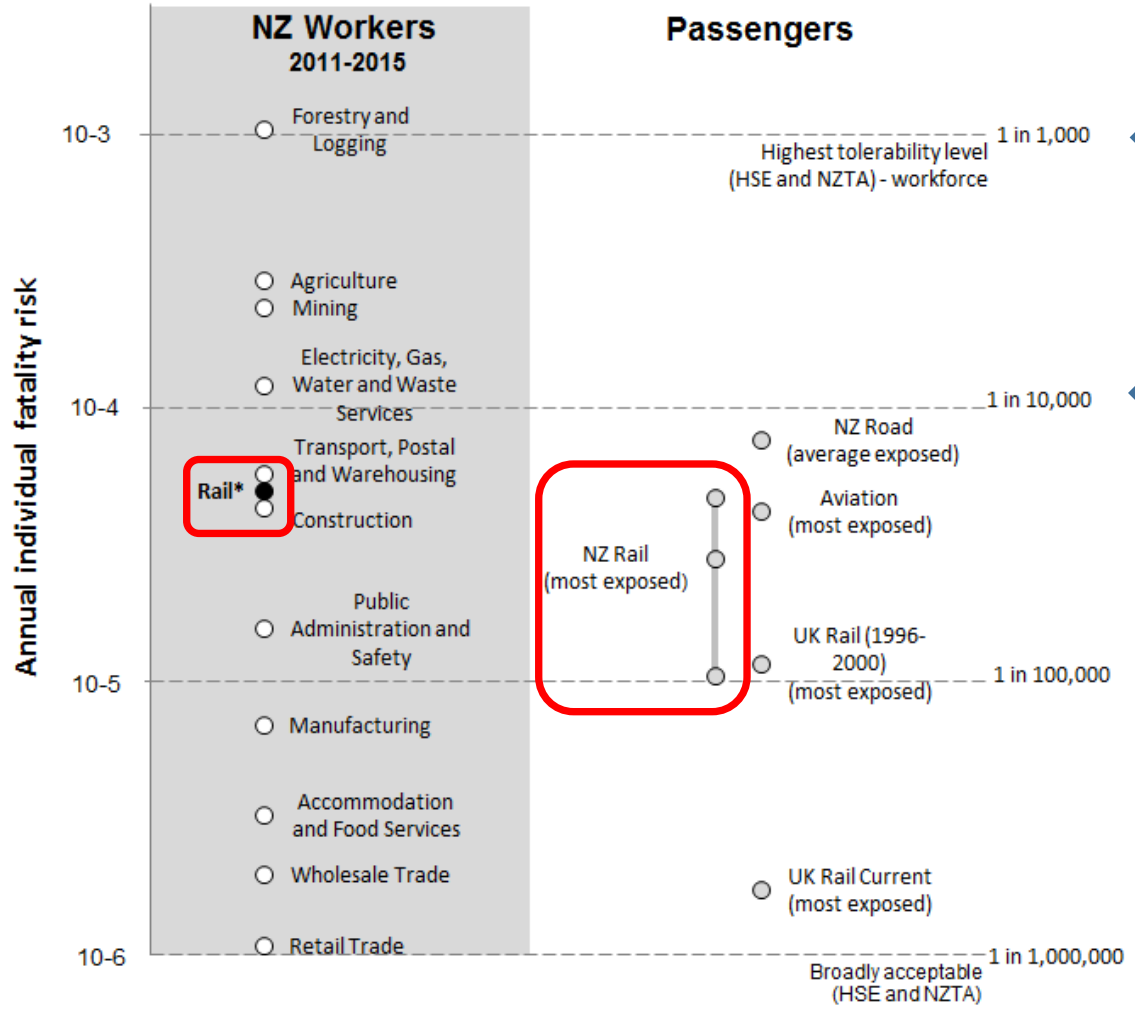
Human Capital Method

Hybrid

Willingness to Pay

Derived from a road safety context

How safe – What is the current standard?



<u>Workers: 1 in 1000</u>

Too high

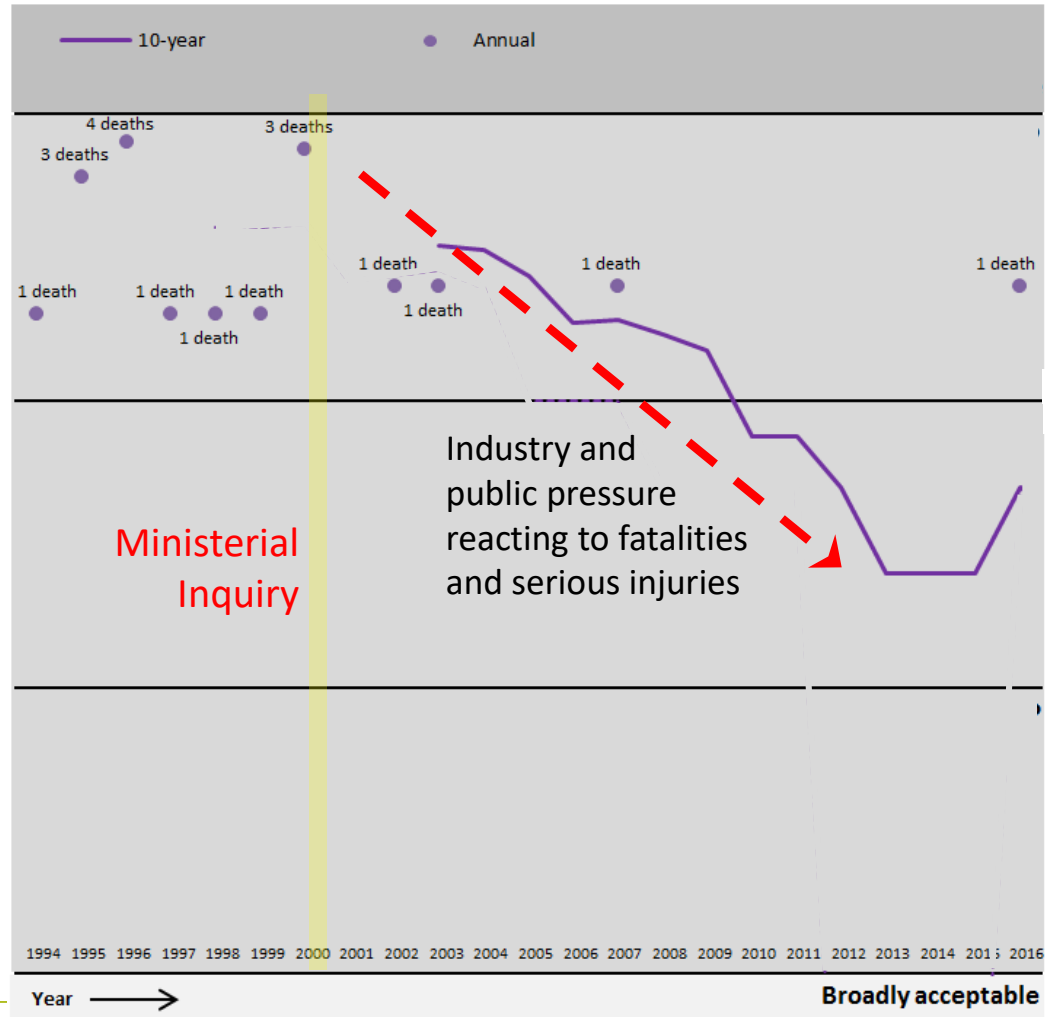
- Industries in this range must reduce

<u>Public: 1 in 10,000</u>

Higher than in practice

- Less public pressure to reduce?

How safe – What should it be?



1 in 1,000

1 in 10,000

1 in 100,000

1 in 1,000,000

Research recommendation:

1 in 10,000 for workers

What impact does this have for other transport modes?

Space Model

Estimating fatality risks in New Zealand rail

- Recent incidents
- The challenge
- Model overview
- Method
- Discussion

Freight Accidents

The Challenge

- The problem of frequency:
  - small rail industry
  - relatively low incident counts
  - very few higher consequence events.

- Record keeping historically patchy.
  - 5 years of recent improved record

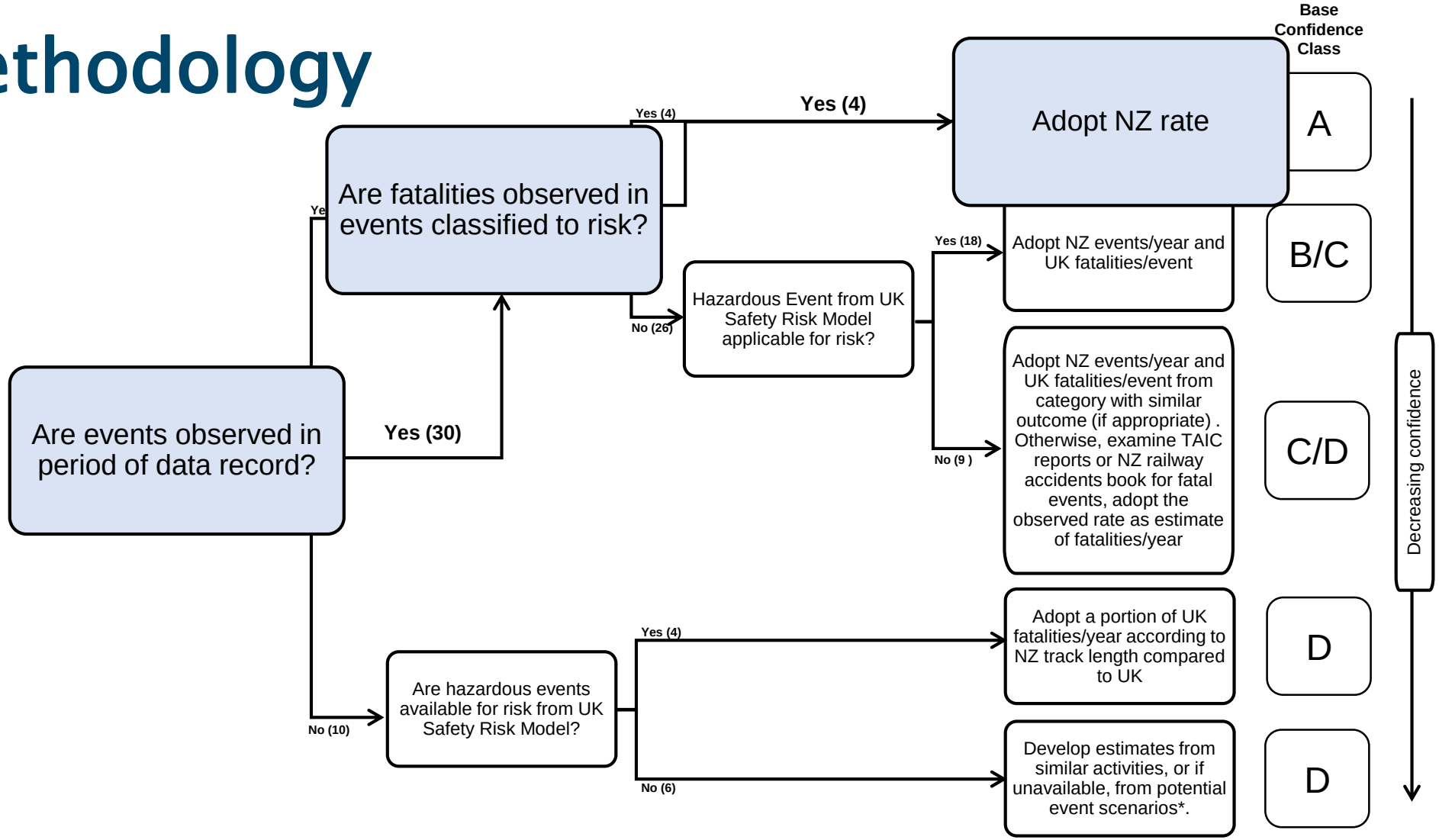
The Challenge

- Under these circumstances how can we develop a best estimate of the safety risks across both common and rare event types?

SPACE Risk Model

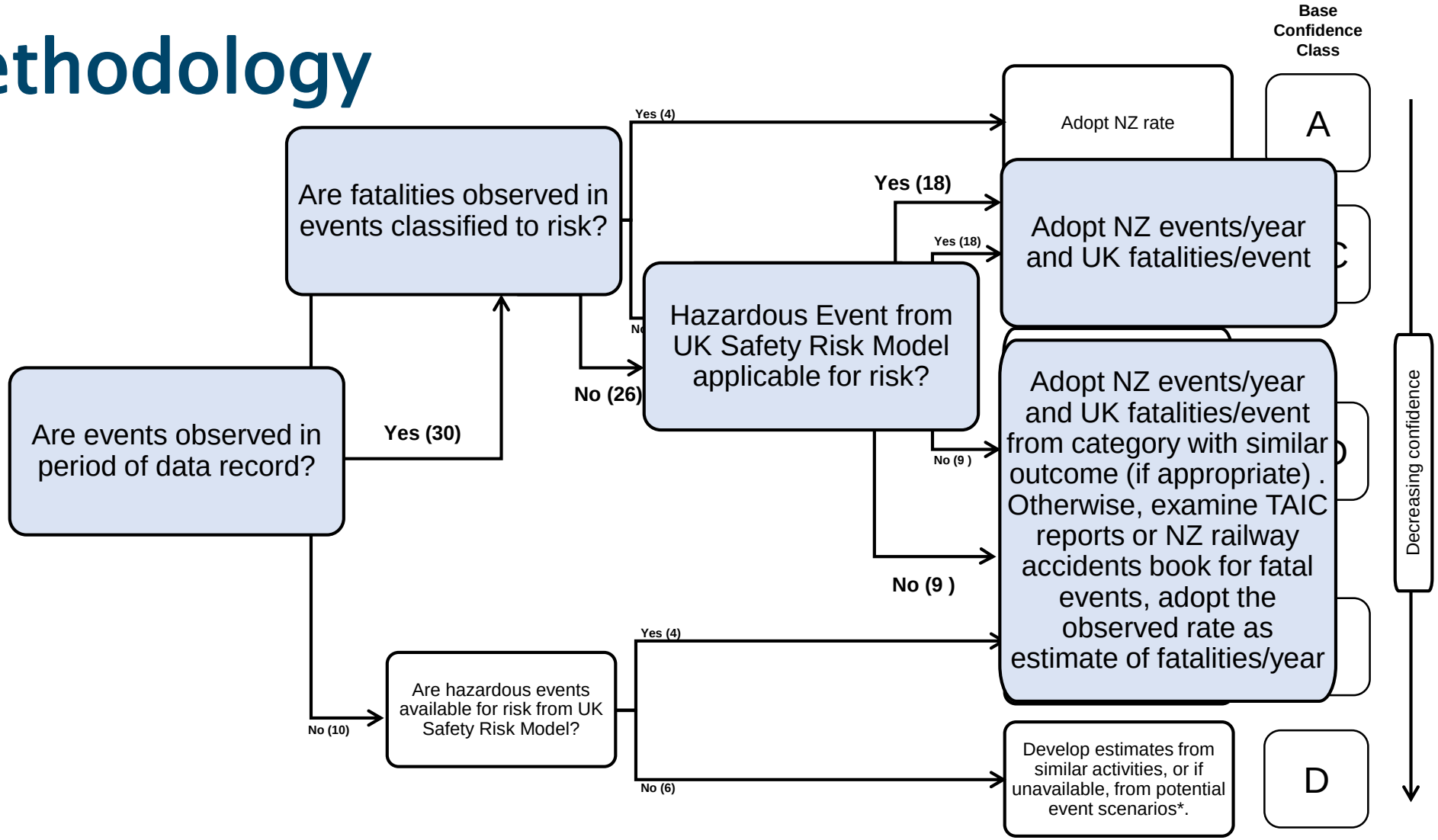
- This required a hybrid approach, drawing on New Zealand and international data, resulting in the SPACE model.
  - **S**afety
  - **P**erformance
  - **A**nd
  - **C**asualty
  - **E**stimates

SPACE Methodology



* Average expected fatalities not estimated for passenger tunnel fire risk. This is a priority risk due to the maximum credible number of fatalities

SPACE Methodology



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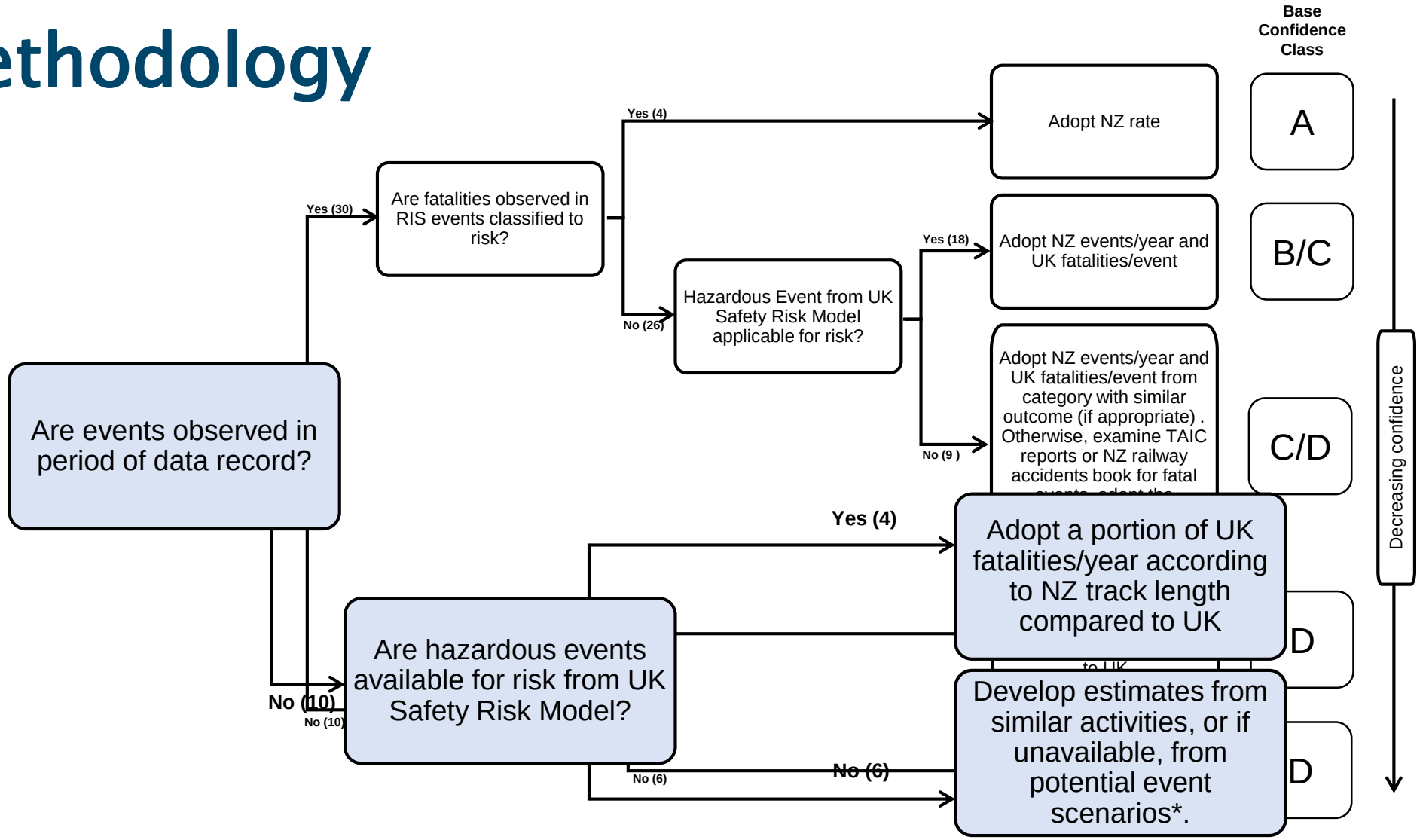
Short Stacking

SPACE Methodology



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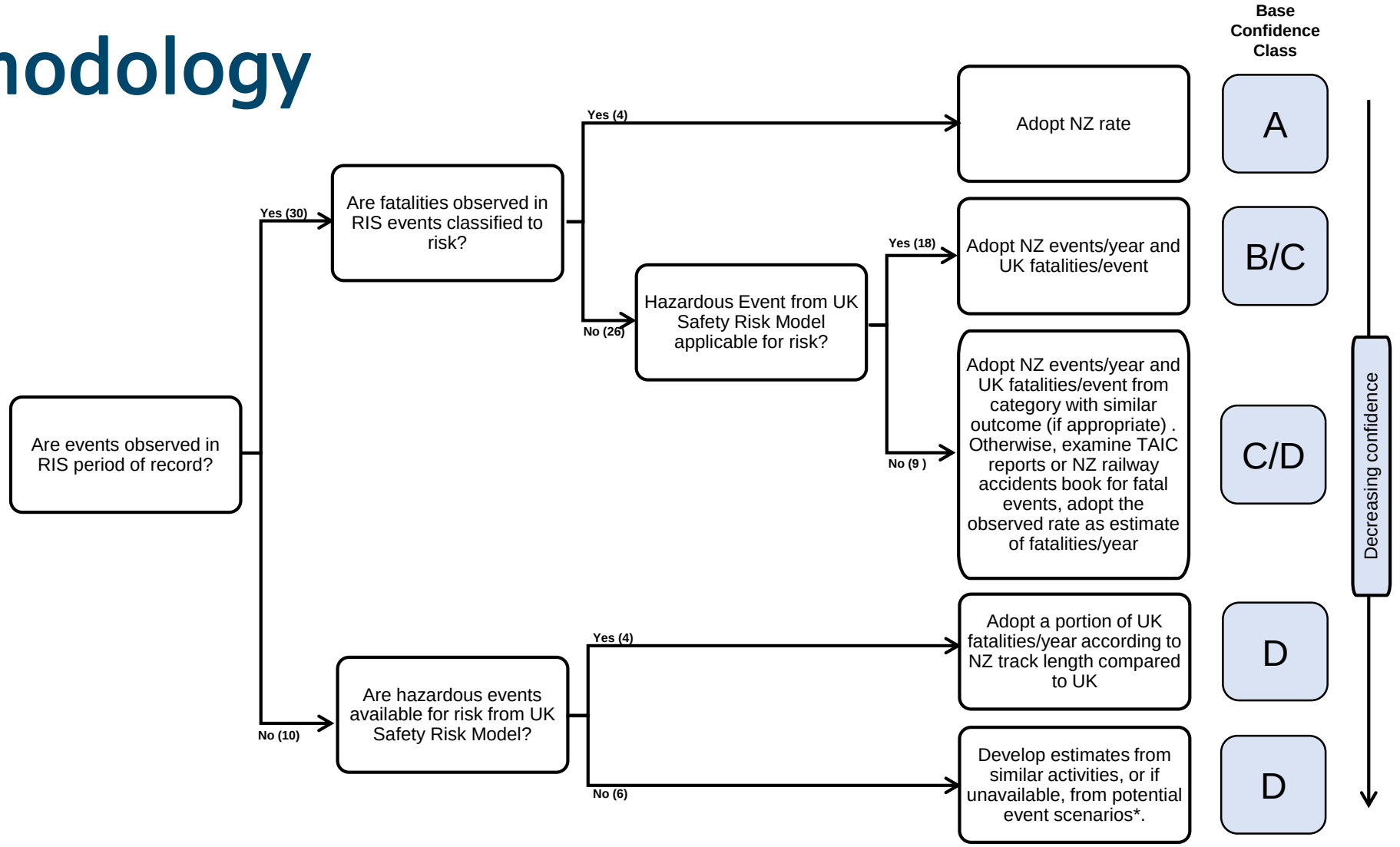
SPACE Methodology



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Relevance to freight resilience

- Similar approach can be taken to modelling delays (both delays from safety risks and from other areas)
- Safety risks can lead to delay risks

Discussion

- Intent of modelling is to draw on best available data and apply most appropriate risk assessment approach.
- Builds a transparent and rational overview.
- Peer review and industry working group oversight.
- Tool for building consensus on main issues.
- Informing rational decision making.

Wrap-up – Questions and Comments?