UIC Railway Asset Management
Global Conference 2019

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UIC Headquarters, Paris

Optimisation of Funding for Bridge Assets

Experiences of Asset Management Strategies

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VÄYLÄ

Topics

- Finnish Transport Infrastructure Agency
- Motivation
- Railways and Railway Bridges
- Strategic Level Bridge Management
- Lessons Learnt

MINISTRY OF TRANSPORT AND COMMUNICATIONS

AGENCIES

Transport Infrastructure Agency
Management of state transport infrastructure

Transport and Communications Agency, Traficom
Official functions in the transport and communications sectors

Meteorological Institute
Weather, sea and climate services

COMPANIES

Traffic Management Finland Ltd
Traffic control and management services

- Finrail Oy
- Air Navigation Services Finland Oy
- Vessel Traffic Services Finland Ltd
- Intelligent Traffic Management Finland Ltd

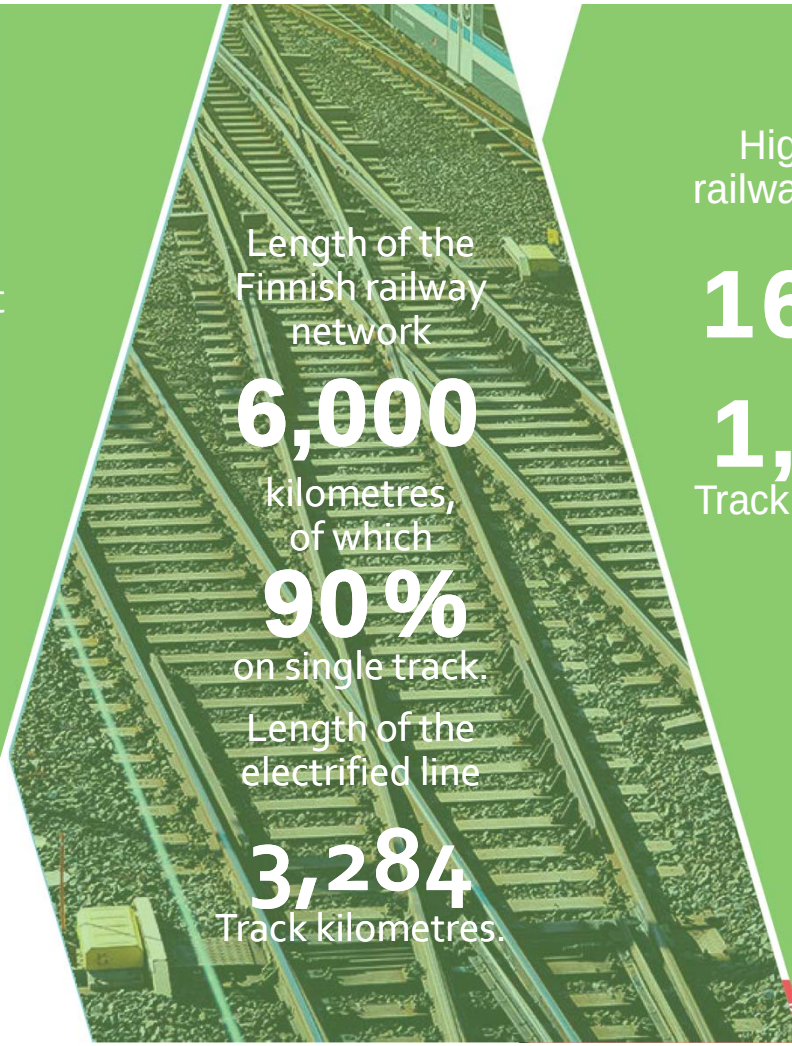
Finnish Broadcasting Company, YLE
Public service media company

Cinia Ltd
Network, cloud and software services

Railways in Finland

2,500
level crossings (main and secondary tracks) and
45
tunnels on the main lines
350
traffic operating points for passenger and freight transport.

85,7
million journeys made in railway passenger transport
and
38,4
million tonnes carrried in freight transport.



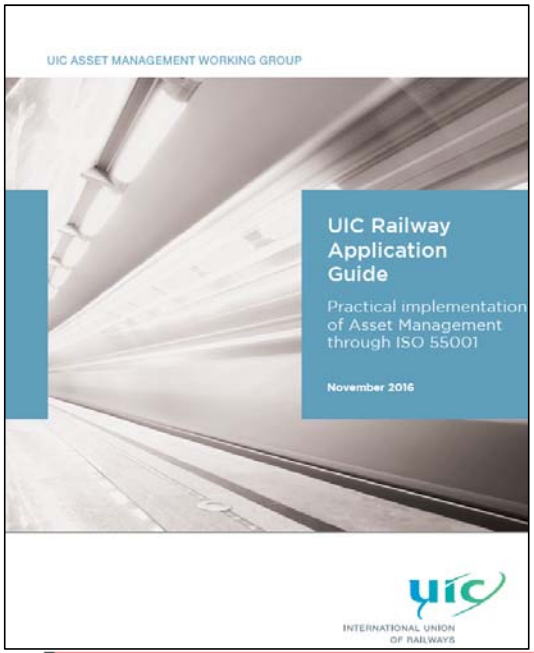
Length of the Finnish railway network
6,000
kilometres, of which
90%
on single track.

Length of the electrified line
3,284
Track kilometres.

High-speed railway network, over
160 km/h
on
1,059
Track kilometres.

Motivation

1. Inadequate funding
2. Ageing infrastructure
3. Application of ISO55000-series
4. Requirement of the MOF
5. Road bridge management more mature
6. Decision making to be transparent and systematic



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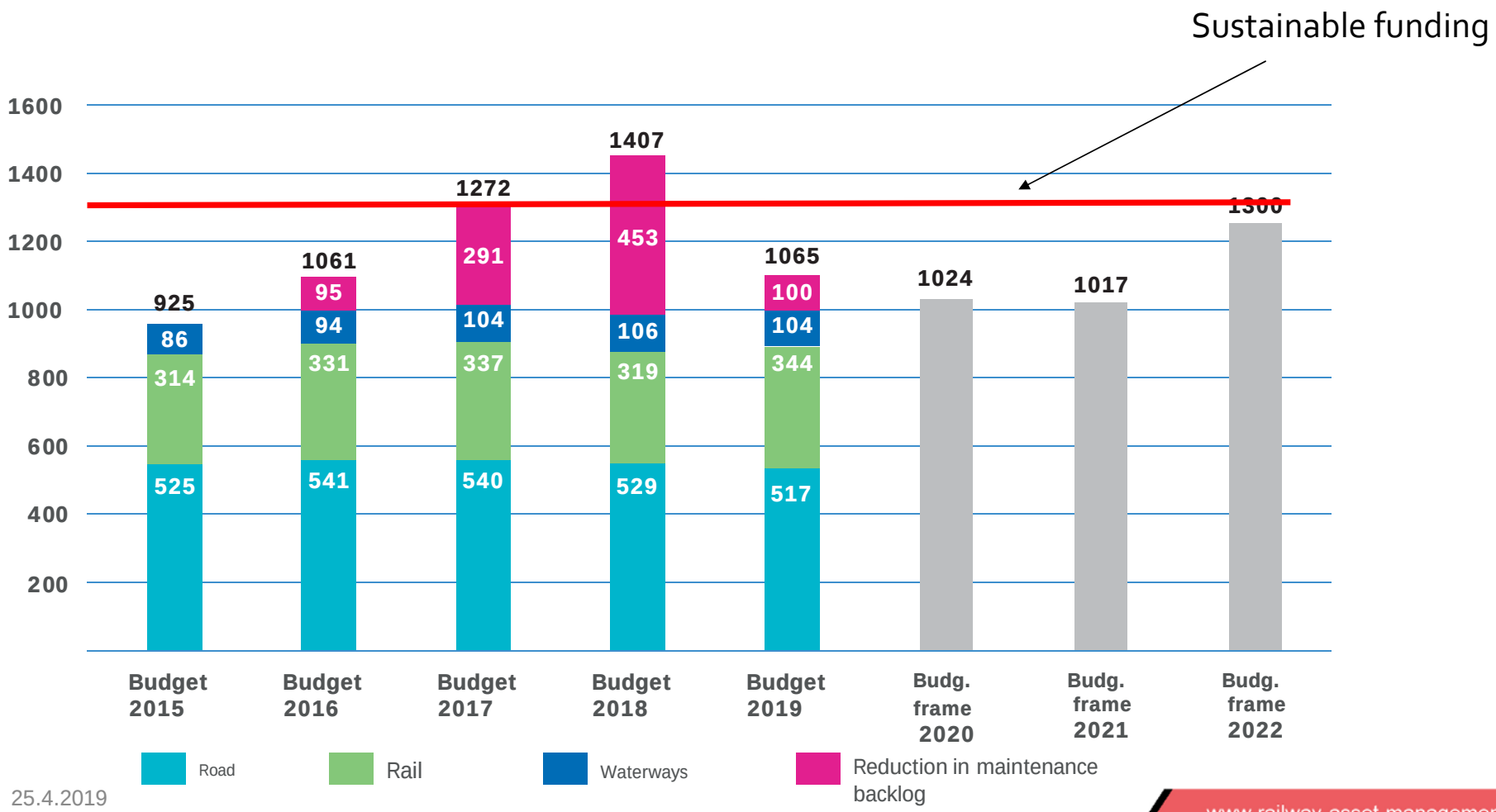
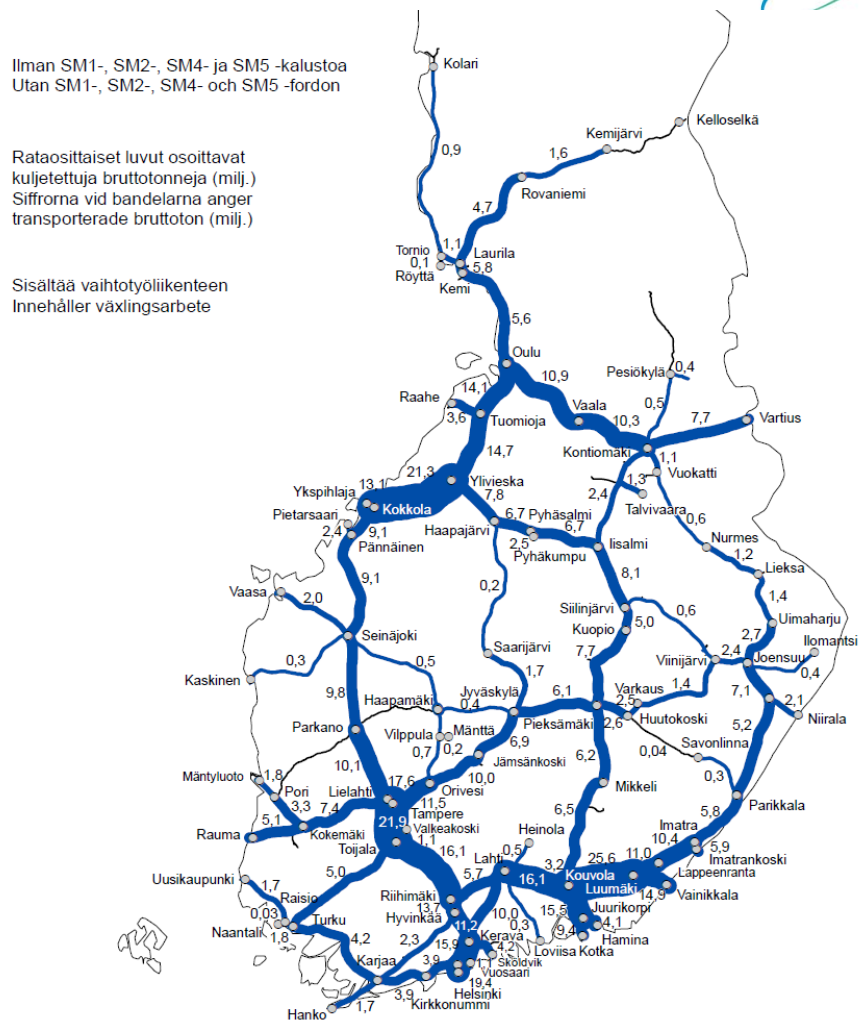
Motivation #1: Inadequate funding



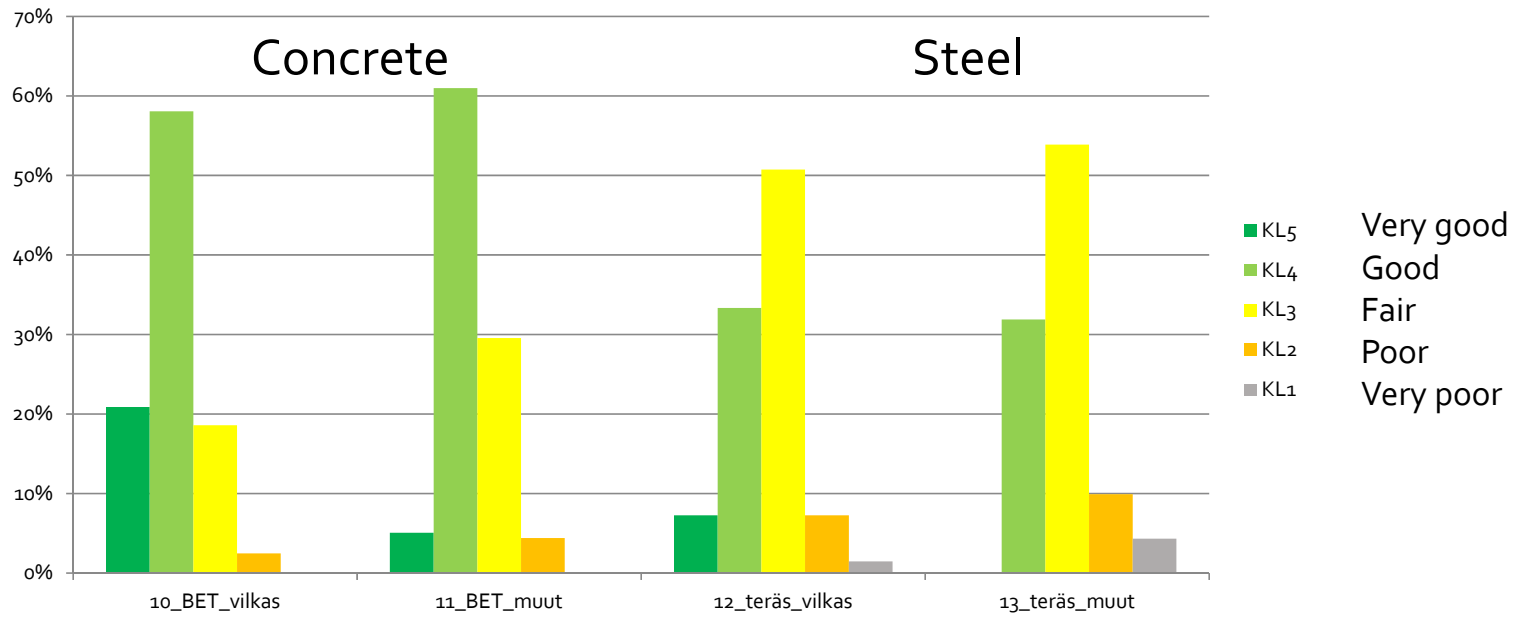
Railway Bridges

Bridge type	#	%
Concrete, high traffic	1143	48 %
Concrete, low traffic	752	32 %
Steel, high traffic	69	3 %
Steel, low traffic	233	10 %
Other bridges (stone)	168	7 %
TOTAL	2365	100 %

High traffic: > 5 Mbrt/yr



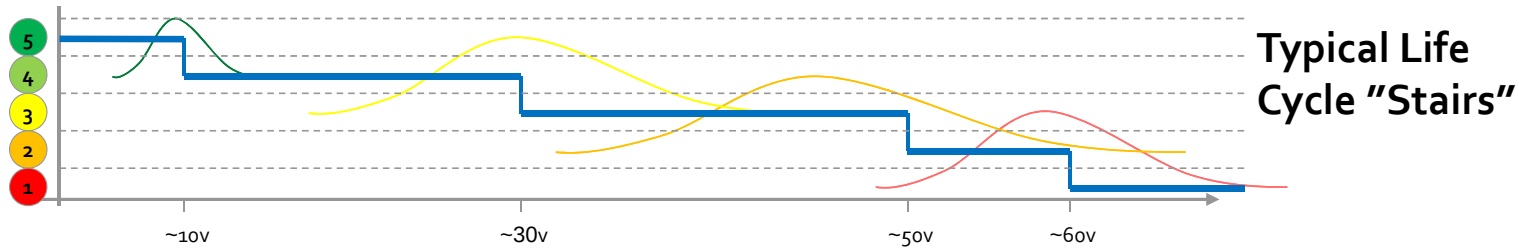
Bridge Condition Distributions



- General five-class condition classification
- Concrete bridges are in better condition – usually younger than steel bridges
  - Over 50 % of concrete bridges in "satisfactory" condition – soon in need of repair

Model Structure

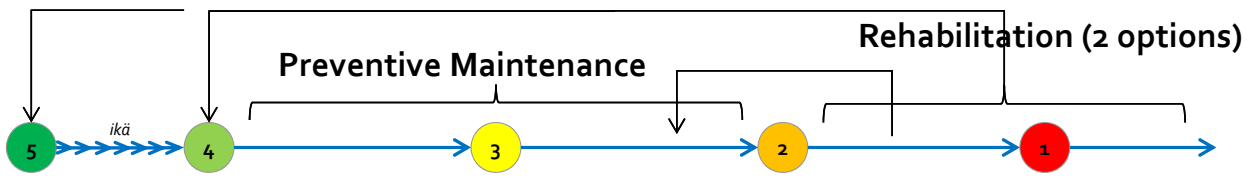
- Modeling based on KL's and median time spent in each KL(n) (+ distribution)
- By time deterioration moves bridges to lower condition classes



Time in class by bridge type	KL5	KL4	KL3	KL2
Concrete, high traffic	4	25	25	5
Concrete, low traffic	4	25	35	10
Steel, high traffic	4	25	25	5
Steel, low traffic	4	25	35	10

Model Structure (2)

- Preventive maintenance and rehabilitation are executed at certain condition classes

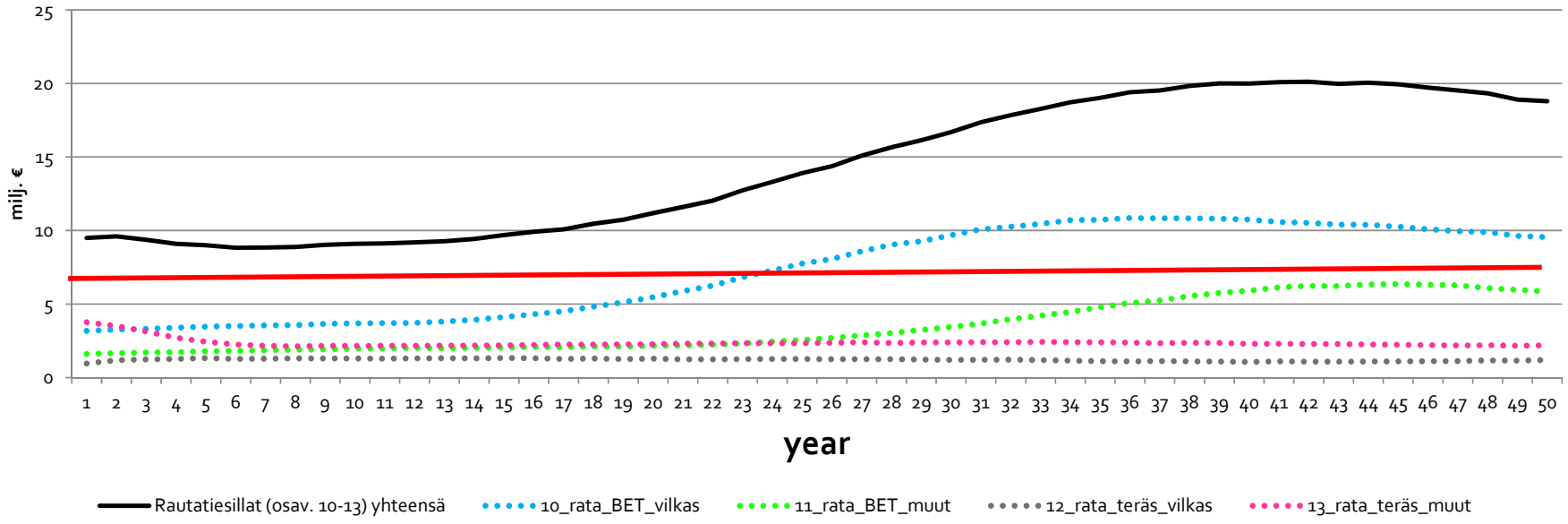


Optimisation:

Object function: sustain percentage(KL1+KL2) by bridge type => rehabilitation needs/year

Simulation of individual bridges over a long period (30-100 years)

Funding Needs by Bridge Type



- First 20 years are bearable, then expenses will increase
- Why: concrete bridges currently in KL4 (good) will be in rehabilitation stage

Lessons Learnt

1. Inadequate funding – the model tells we are 20-30 % below the needed funding level
2. Ageing infrastructure – problems will come later than expected
3. Application of ISO55000-series – one more asset strategy prepared
4. Requirement of the MOF – better understanding of funding needs
5. The chosen approach is simple, but robust enough for strategic level decision making
6. Decision making now more transparent - and compatible with road bridge management

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