



ROADEX
Network
For better rural roads

13.5.2019



PEHKO project, Implementing ROADEX results

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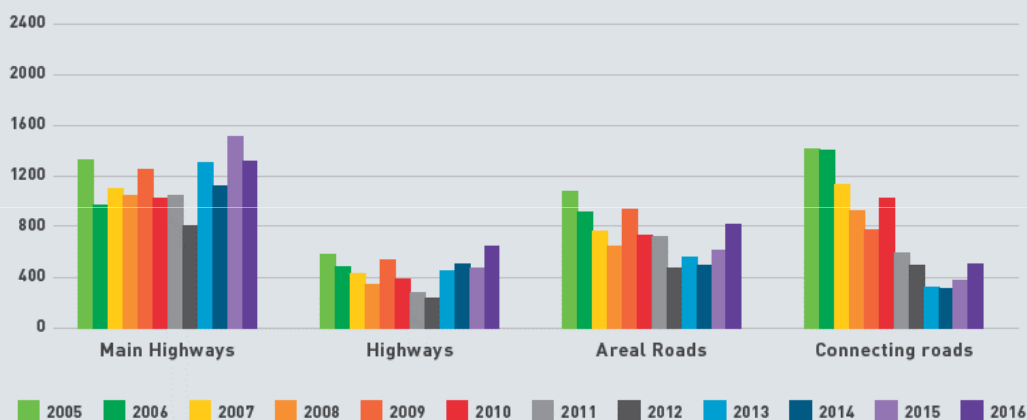
(Centre for Economic Development, Transport and the
Environment for Lapland)

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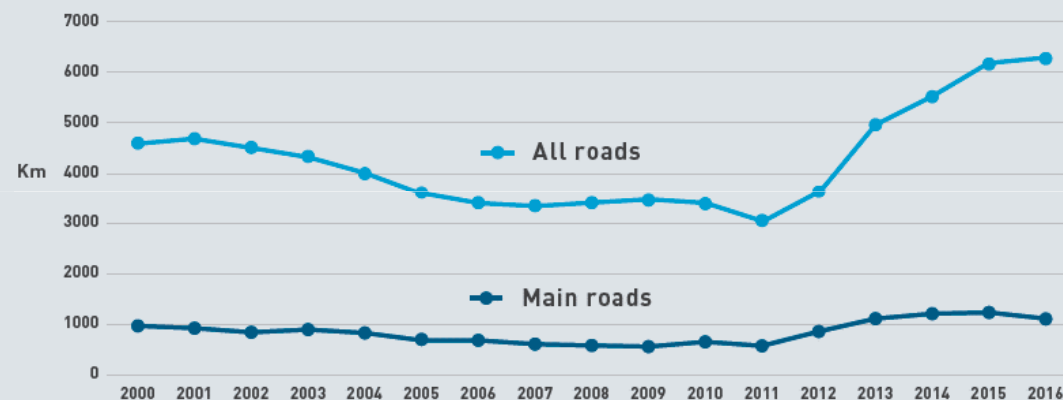
Challenges with Public Paved Road Network Asset Management in Finland



Public Road Paving Programme in Finland 2005–2016 (km)

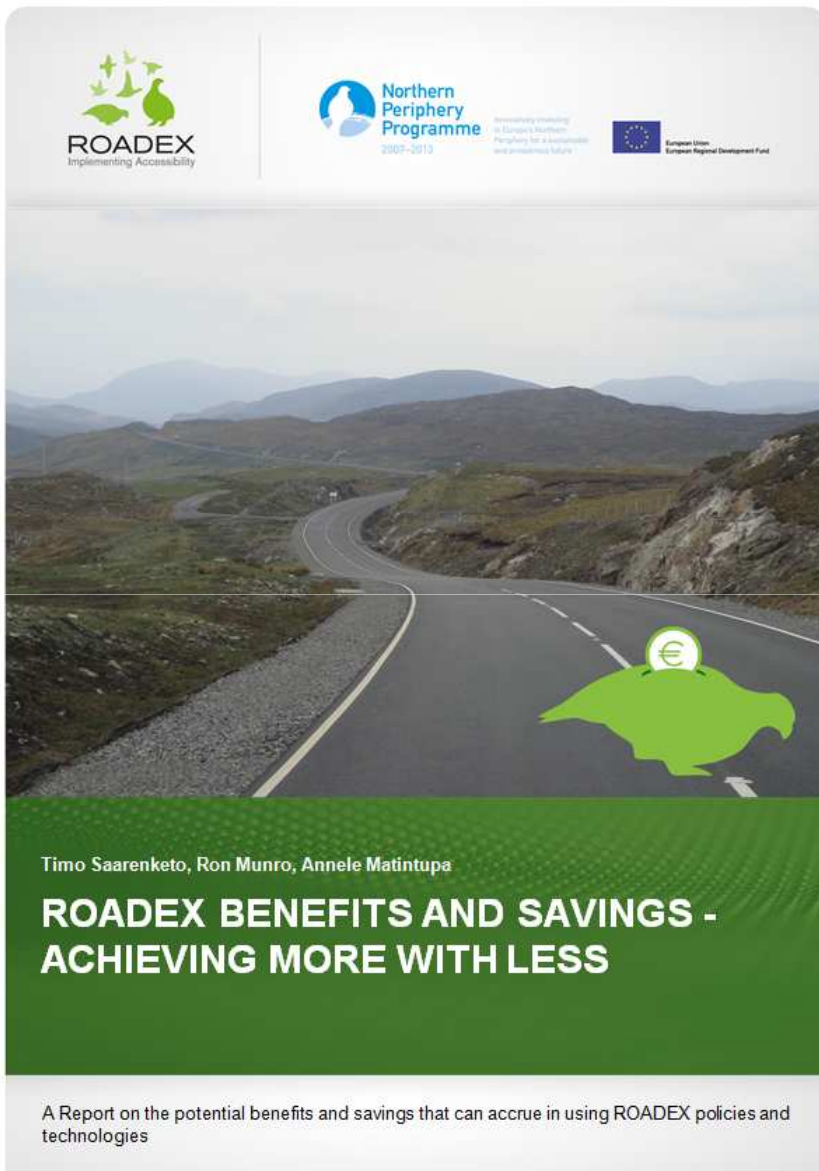


Total Length of Poor Quality Paved Roads in Finland 2000–2016 (km)



ANNUAL FUNDING FOR PAVEMENTS

Finland has ~60.000 km of public paved roads (calculated as 2-lanes)
 Annual funding has been around 130–140 mill. €/year → Annual funding: 2.25 €/m/year



Tools for Savings

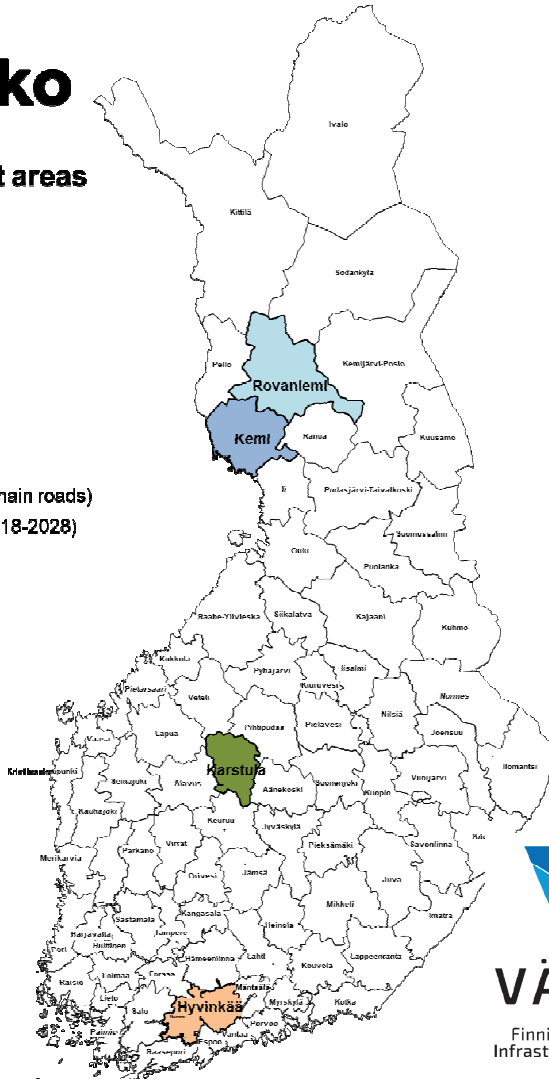
- Better daily maintenance practices
- Focused rehabilitation design
- Monitoring of road condition and seasonal change

PEHKO Pilot Project to Tackle the Challenges



PEHKO pilot areas
2015-2025

- Karstula
- Kemi-Tornio
- Rovaniemi (main roads)
- Hyvinkää (2018-2028)



- Finnish Transport Agency and ELY Centres of Lapland and Central Finland initiated the PEHKO pilot project for paved roads in 2015 together with Roadscanners
 - 2015-2025 in Kemi, Rovaniemi and Karstula areas
 - 2018-2028 in Hyvinkää Area
- Final goal in 2025:
 - Paved road network will be in better shape and annual paving costs 50 % lower than current levels



VÄYLÄ
Finnish Transport
Infrastructure Agency



Calculations were based on ROADEx
recommendations
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PEHKO Pilot 2015 – 2025: How we planned to do it?



1. The **road maintenance standards** will be improved, especially drainage maintenance. This increases pavement lifetime and cuts down annual paving costs. Savings 10-30%.
2. **New technology** will be implemented in pavement management allowing maintenance operations to focus on the weakest sections – paved road lifetime will be increased and annual paving costs decreased. Savings 10-40%.
3. **Proactive maintenance** policies will be used and maintenance crews will react to problems as they arise before they cause damages in the pavement. Savings 20-60%.

PEHKO Survey Techniques



Road Doctor Survey Van:



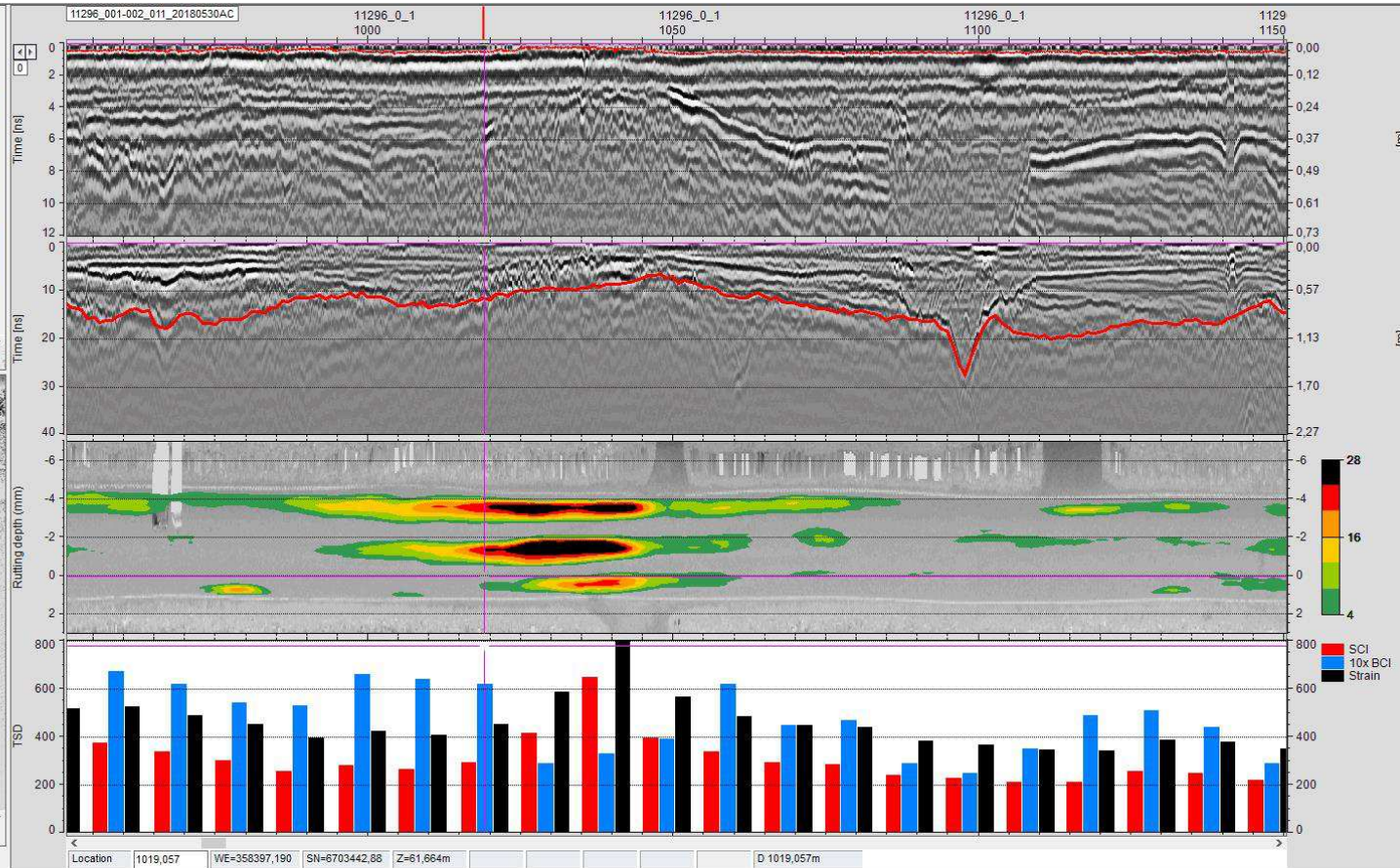
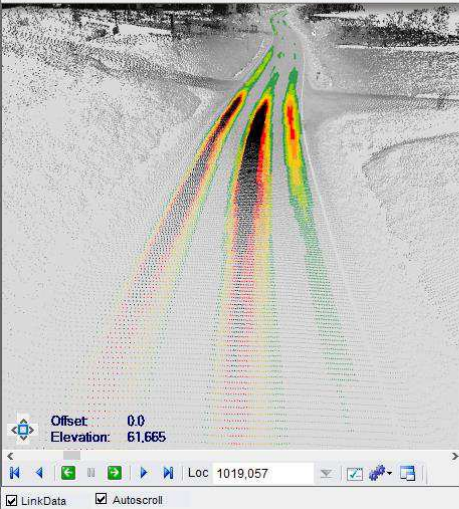
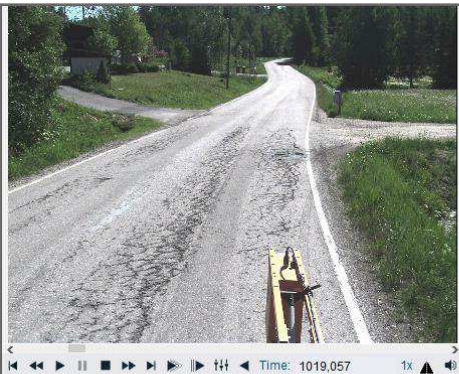
- Ground Penetrating Radar
 - Structures, moisture, etc
- Laser Scanner
 - Point cloud model, rutting, ditch depths
- 3D Accelerometer
 - Roughness, crossfall
- Digital videos

Traffic Speed Deflectometer:



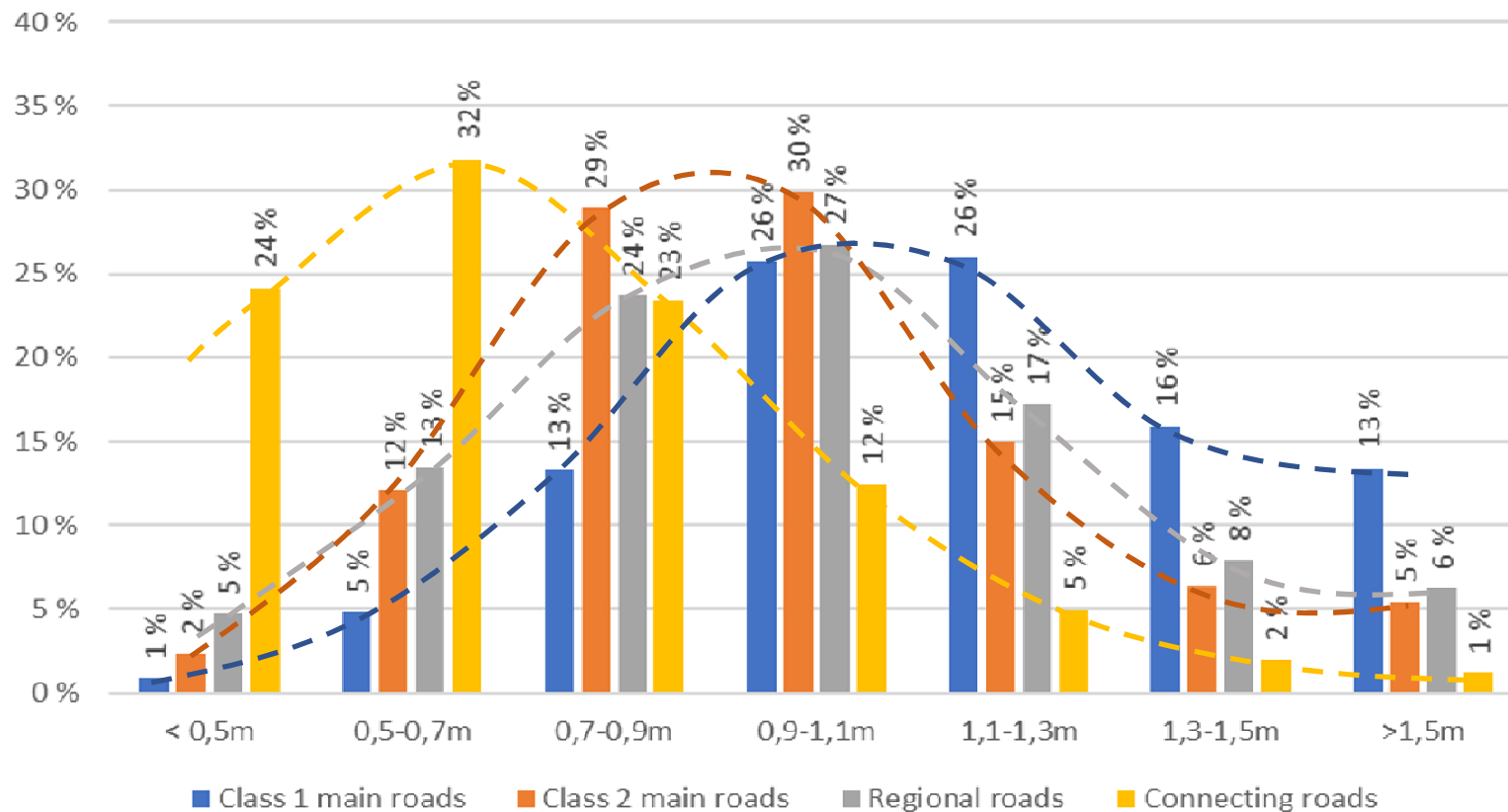
- Deflections
 - Bearing capacity indexes
 - Strains
 - Subgrade moduli

PEHKO Problem Diagnostics



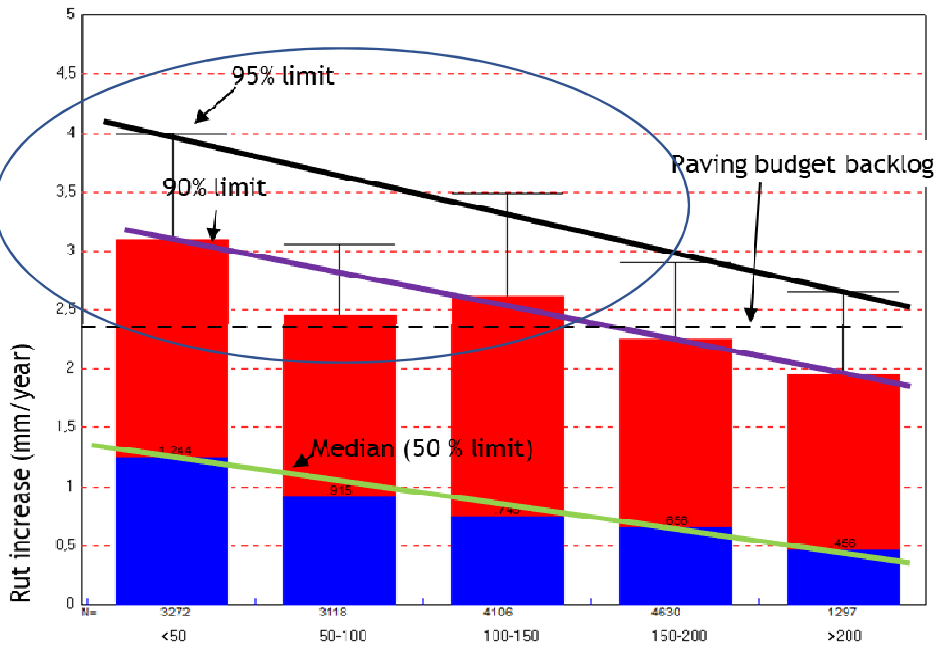
Statistical Analysis of the PEHKO Data

Pavement Structure Total Thickness in Lapland



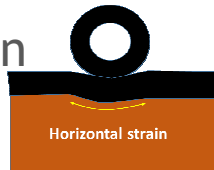
Statistical Analysis Results of the Survey Data

Central Finland Main Roads

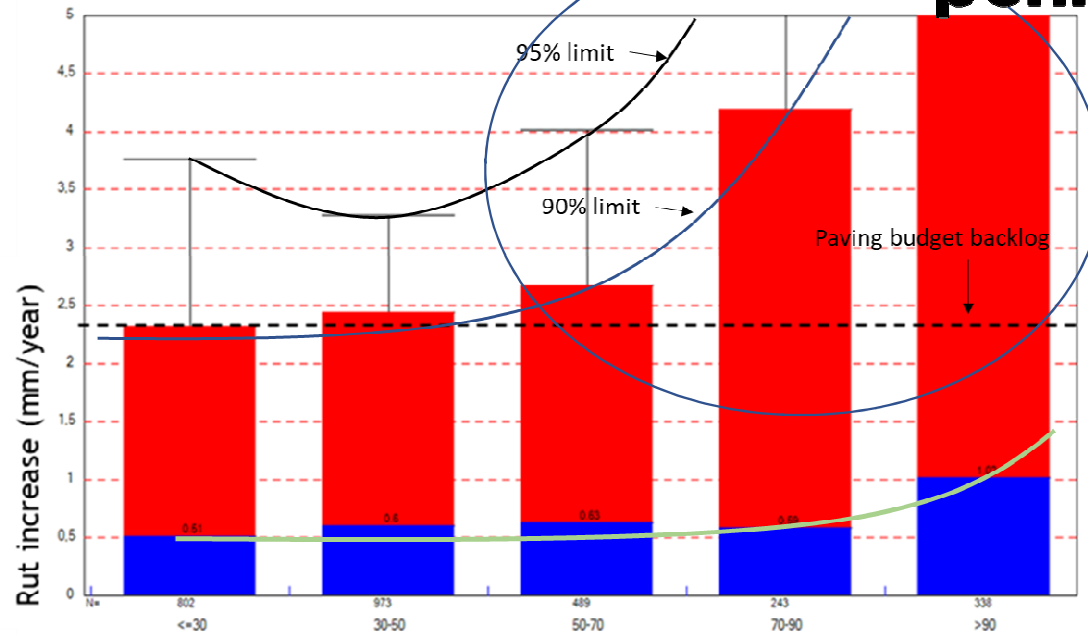


H_{ave}(mm)

Problem: Fatigue due to thin pavement

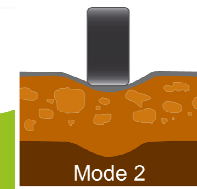


Lapland Connecting Roads

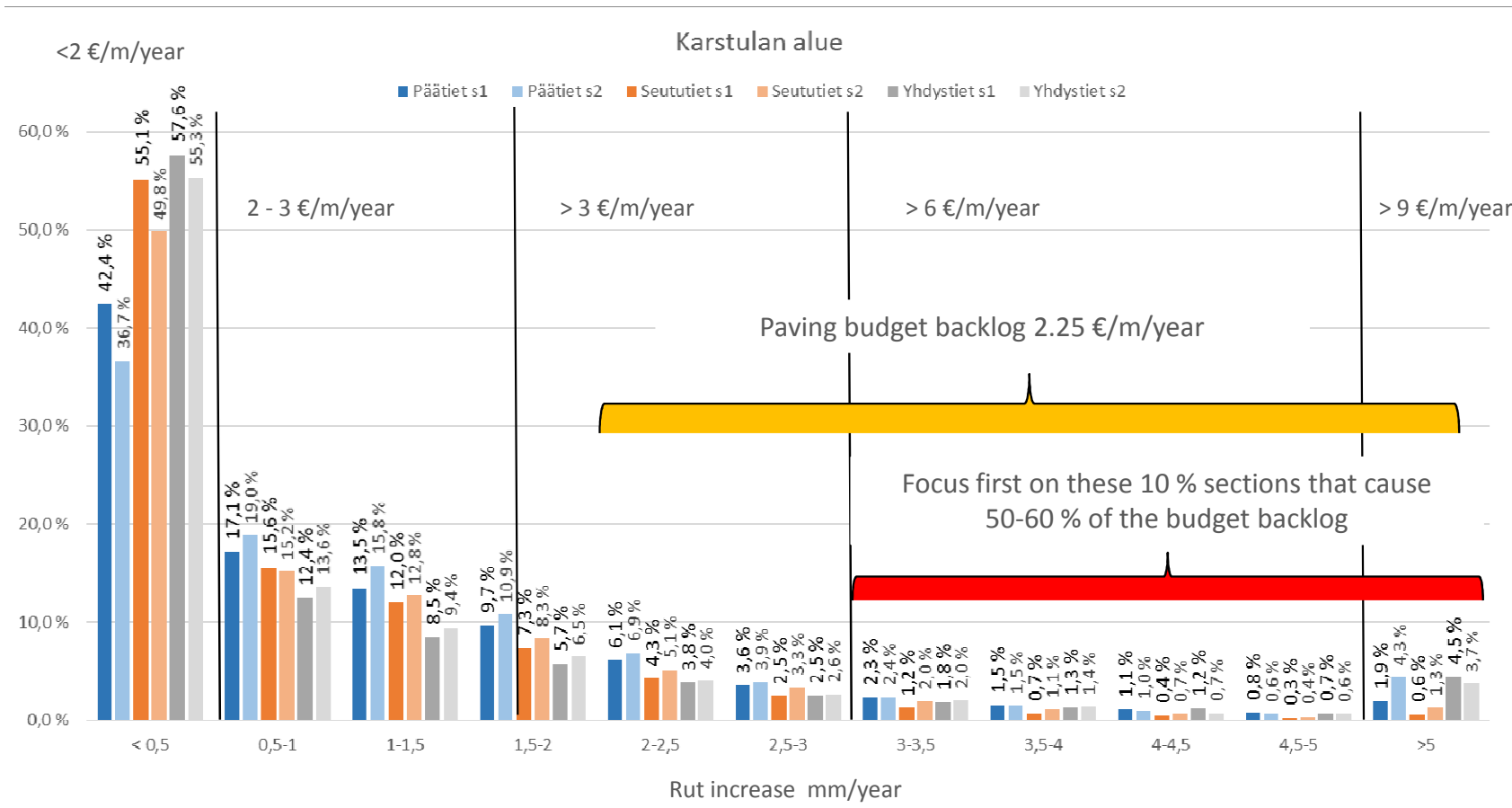


BCI value classes

Problem: deformation and pumping due to soft subgrade



PEHKO Findings: Annual Rut Increase in Karstula Area and Annual Paving Costs



PEHKO Findings: 7 Key Reasons Behind the Paving Backlog in Finland



- | | |
|---------------------------|---|
| Pavement structure | <ol style="list-style-type: none">1. Heavy trucks and weak subgrade<ul style="list-style-type: none">• Big problem. Sections mainly where subgrade is peat.2. Heavy trucks and thin pavements (<150 mm)<ul style="list-style-type: none">• Fast increasing problem with heavier trucks and new tyre types3. Pavement quality in some areas<ul style="list-style-type: none">• Also with thicker pavement, reason: aggregate quality, creep, paving type, patching, etc. |
| Daily maintenance | <ol style="list-style-type: none">4. Drainage problems: private access road junctions<ul style="list-style-type: none">• Really big problem but cheap to fix. Rut increase can be > 7 mm/yr.5. Drainage problems: side ditches<ul style="list-style-type: none">• Clogged and shallow ditches – impact 4-5 %6. Winter drainage problems – delayed removal of snow walls<ul style="list-style-type: none">• Great impact on shoulder deformation and roughness |
| Both | <ol style="list-style-type: none">7. Extensive use of deicing salt and thin pavements<ul style="list-style-type: none">• New and very interesting finding |

Economic Benefits of PEHKO Policies 2015-2018



	LAPLAND €/m			Improvement (%)		CENTRAL-FINLAND €/m			Improvement (%)	
	2015-2016	2016-2017	2017-2018	Whole period	Compared to previous year	2015-2016	2016-2017	2017-2018	Whole period	Compared to previous year
Highways and main roads	2,72	2,4	2,17	23 %	9 %	2,59	1,66	1,72	34 %	-4 %
Regional roads	1,92	1,73	1,64	16 %	5 %	2,1	1,45	1,73	18 %	-19 %
Connecting roads	2,35	1,94	1,91	22 %	1 %	2,32	2,03	1,89	18 %	7 %
All roads	2,47	2,13	2	22 %	6 %	2,38	1,66	1,75	26 %	-6 %

PEHKO Findings: Winter Maintenance Problems Leading to Increased Annual Paving Costs



Frozen or clogged private access road culverts leading to deformations.

Annual cost effect: ~10 %

Delayed snow removal from road shoulders leading to water infiltration under the pavement and permanent deformations.

Annual cost effect: 13 – 17 %

With better daily maintenance it is possible to cut approximately 50% of the annual paving backlog in Finland (50-60 mill€)

The New PEHKO Maintenance Practices have also Improved Traffic Safety



March 31st, 2018. Road outside PEHKO areas



March 31st, 2018. PEHKO Road

Benefits of the Intelligent Asset Management Technologies

- Better understanding of the root causes of road damages
- Better road drainage maintenance management (new techniques)
- Better pavement design practices:
 - Heavier measures focused on exact problem locations
 - Optimised pavement thickness
 - New structural solutions for road over weak subgrades
 - Enabling monitoring performance of new structures (learning process)
- Proactive pavement maintenance policies
 - Repaving before pavement loses its strength
- Longer pavement lifetimes

**-> Better roads and major savings with
asset management costs**



In 2018 the IRF awarded the PEHKO 2015-2025 Project the Global Road Achievement Award RAA in the “Asset Preservation and Maintenance Management” category



Thank You

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