



ROADDEX
Network

For better rural roads



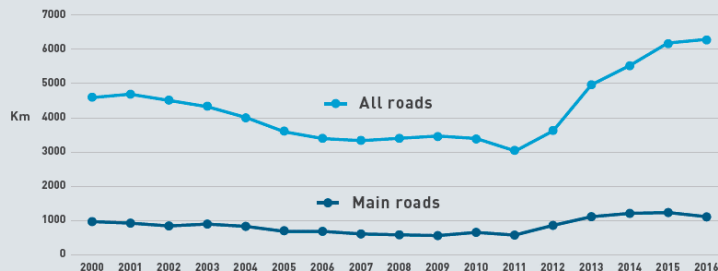
PEHKO project, Implementing ROADDEX Results in Finland

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Challenges with Public Paved Road Network Asset Management in Finland

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

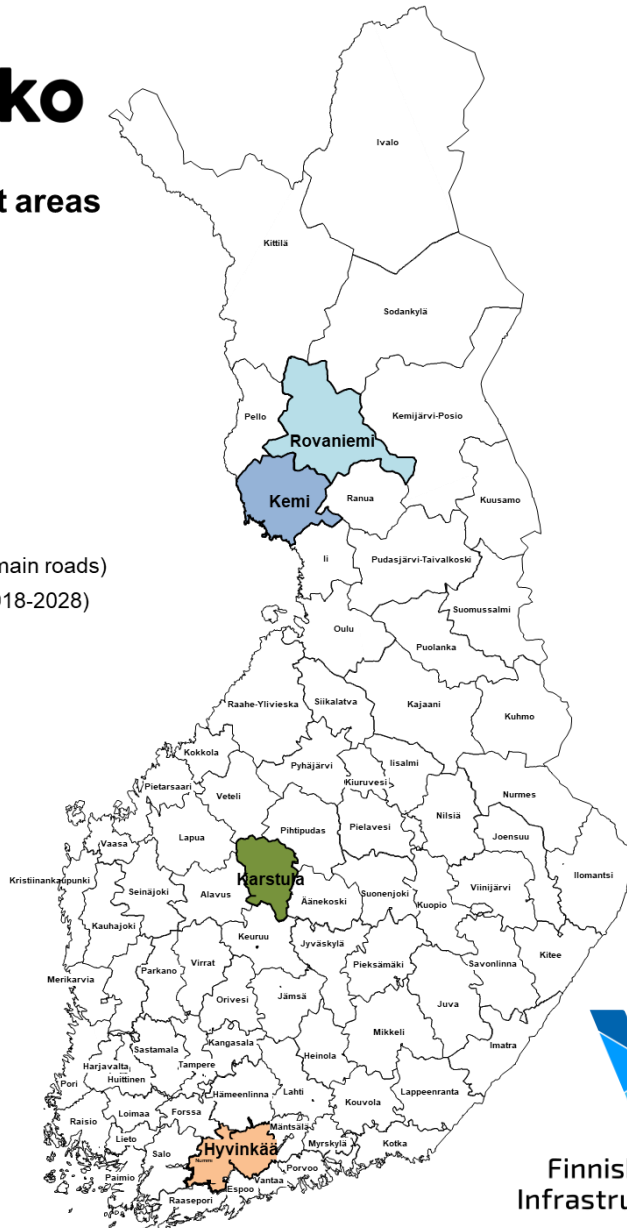


PEHKO Pilot Project to Tackle the Challenges



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



Finnish Transport
Infrastructure Agency



Calculations were based on ROADex
recommendations
www.roadex.org

www.roadex.org

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 – every year:

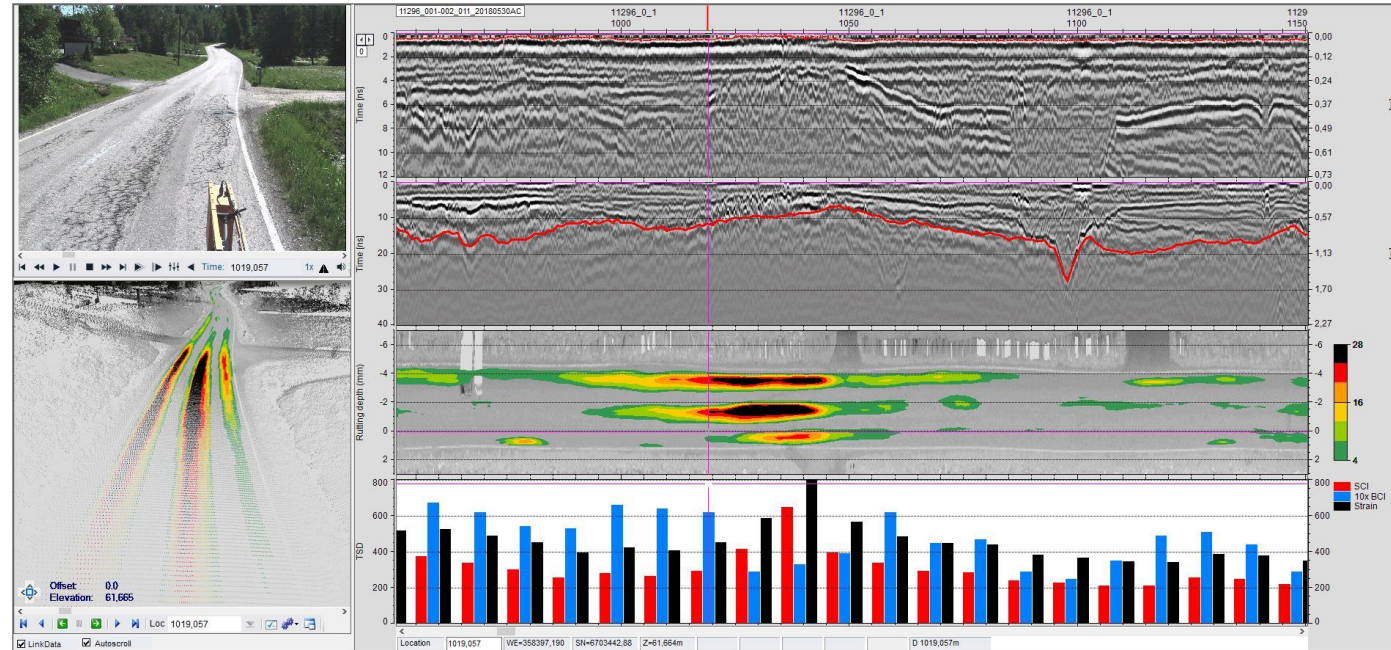


- Ground Penetrating Radar
 - Structures, moisture, etc
- Laser Scanner
 - Point cloud model, rutting, ditch depths
- 3D Accelerometer
 - Roughness, crossfall
- Digital videos

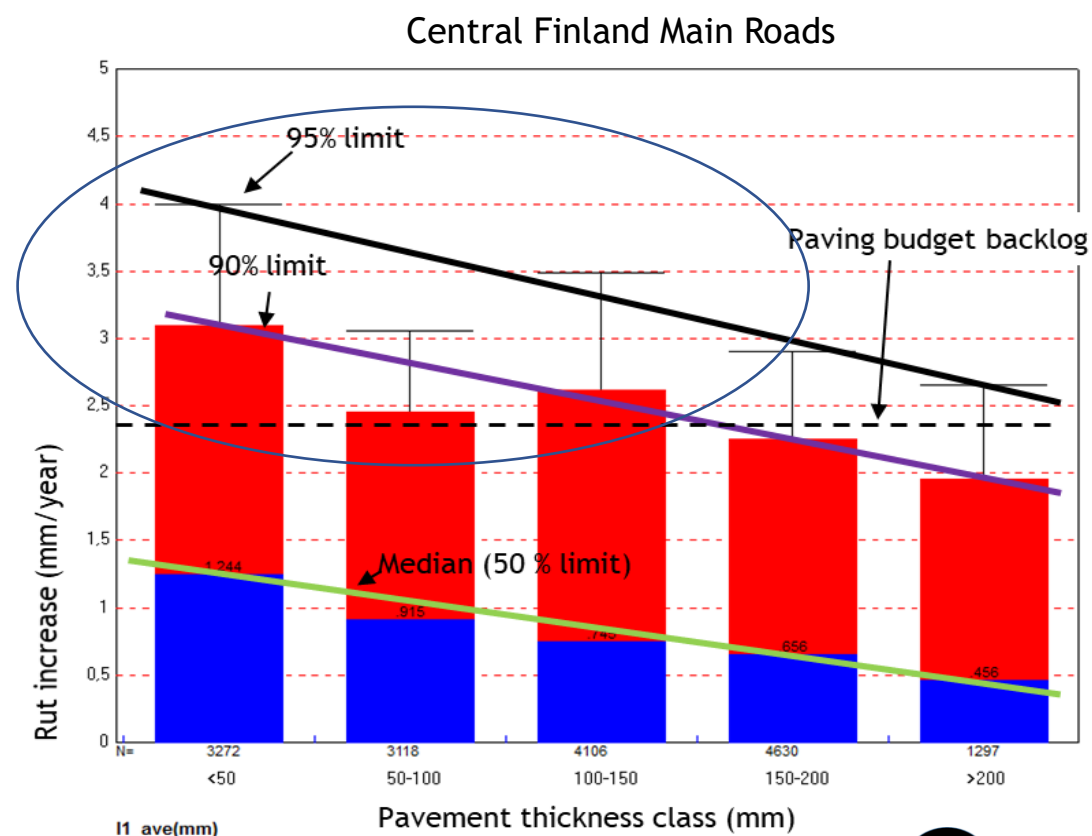
Traffic Speed Deflectometer – every 5th year:



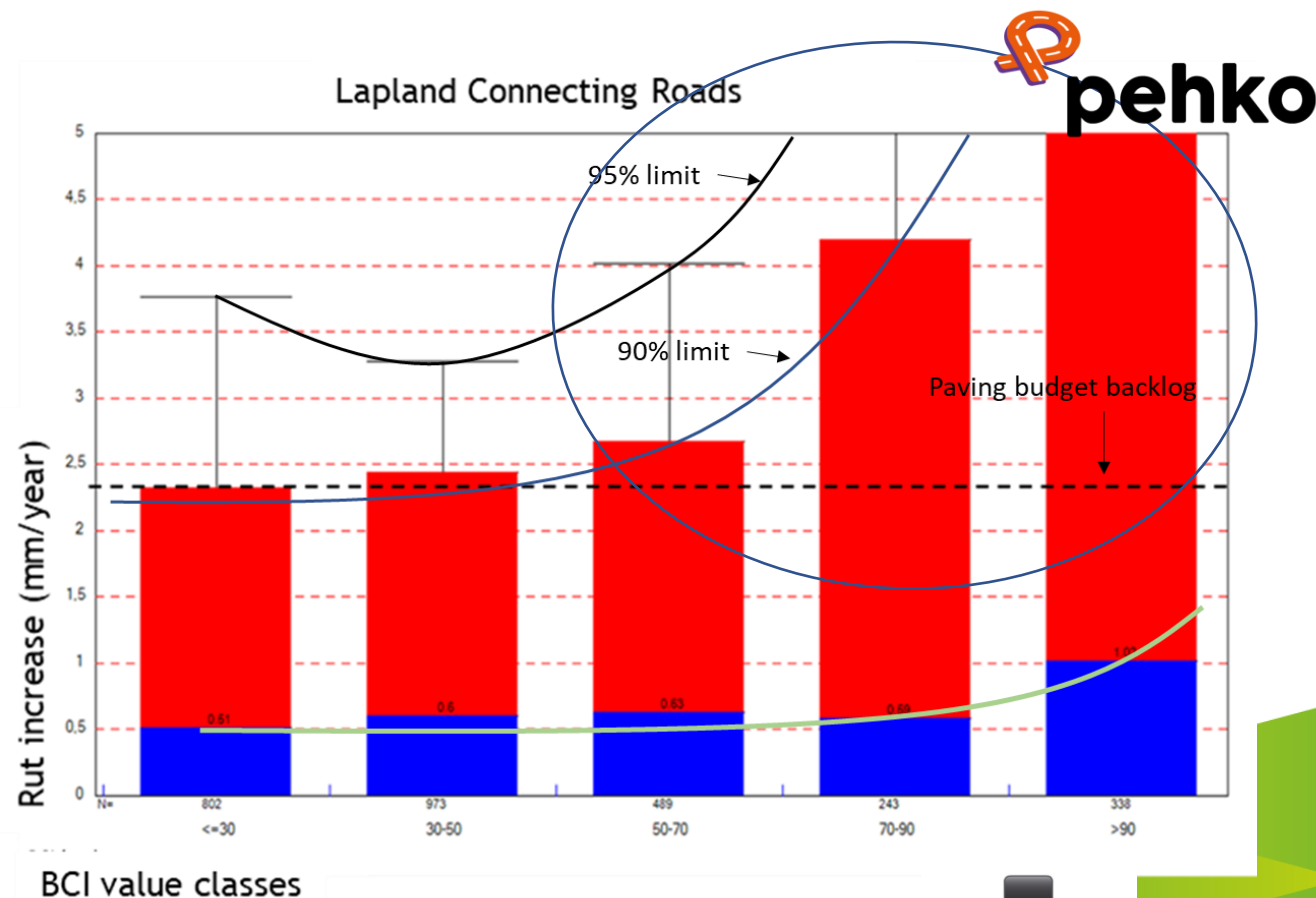
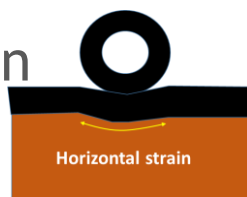
- Deflections
 - Bearing capacity indexes
 - Strains
 - Subgrade moduli



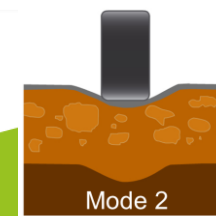
Examples of Statistical Analysis Results of the Survey Data



Problem: Fatigue due to thin pavement



Problem: deformation and pumping due to soft subgrade



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

Pavement structure

- 1. Heavy trucks and weak subgrade**
 - Big problem. Sections mainly where subgrade is peat.
- 2. Heavy trucks and thin pavements (<150 mm)**
 - Fast increasing problem with heavier trucks and new tyre types
- 3. Pavement quality in some areas**
 - Also with thicker pavement, reason: aggregate quality, paving type, patching, etc.

Daily maintenance

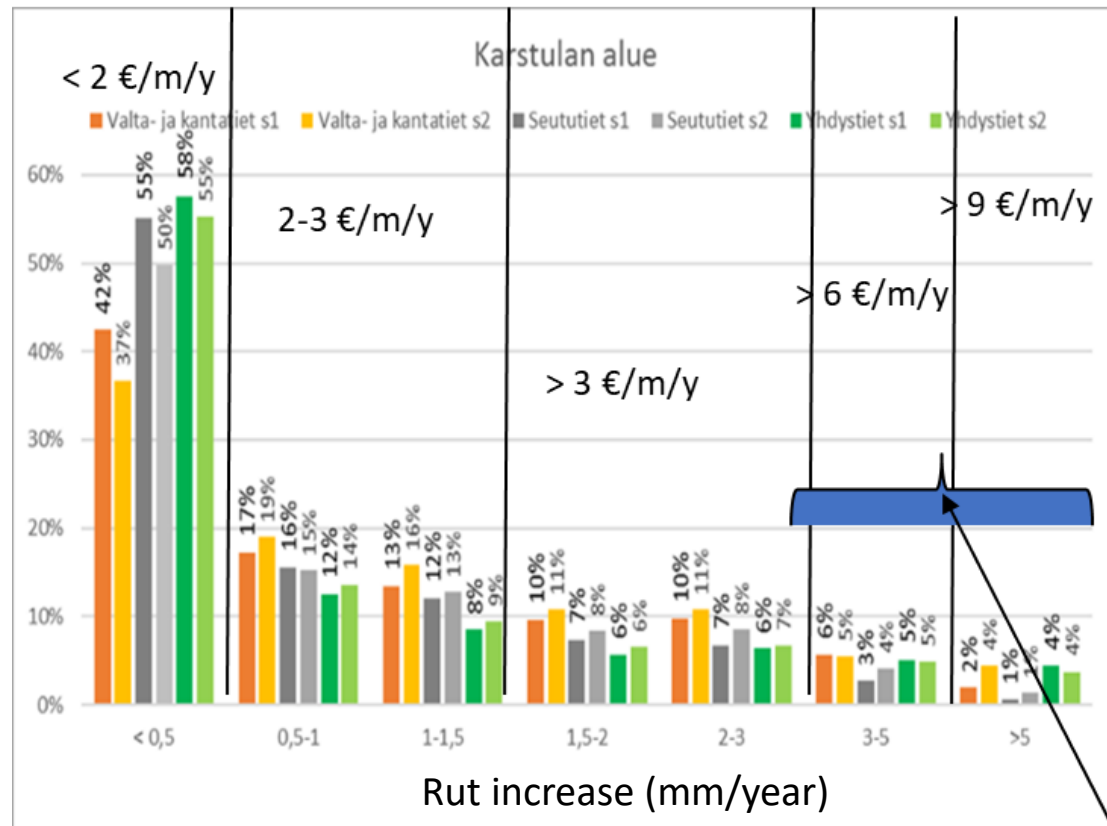
- 4. Drainage problems: private access road junctions**
 - Really big problem but cheap to fix. Rut increase can be > 7 mm/yr.
- 5. Drainage problems: side ditches**
 - Clogged and shallow ditches – impact 4-5 %
- 6. Winter drainage problems – delayed removal of snow walls**
 - Great impact on shoulder deformation and roughness, traffic safety

Both

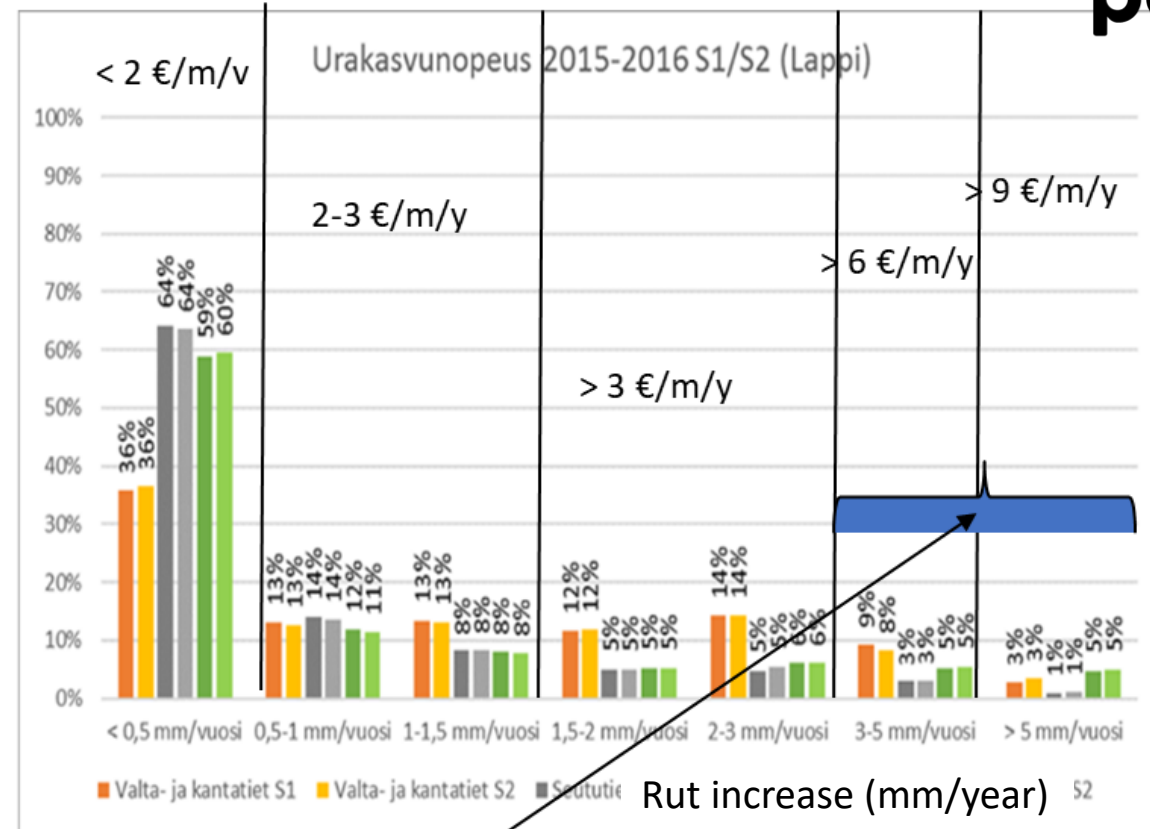
- 7. Extensive use of deicing salt and thin pavements**
 - New and very interesting finding

PEHKO RESULTS: ANNUAL RUT INCREASE IN KARSTULA AND LAPLAND PEHKO AREAS / ANNUAL PAVING COSTS

KARSTULA - CENTRAL FINLAND



LAPLAND



These ~ 10% are taking 30-40 % share of the annual paving costs (most of the backlog)

PEHKO Results:

Development of Calculated Pavement Cost (€/m/year) from 2015 to 2019 (Lapland and Central-Finland) and 2018-2019 (Uusimaa) Pilot Areas

Lapland						
	€/m				Improvement	
	2018-2019	2017-2018	2016-2017	2015-2016	2016 -2019	previous
Main roads	2,33	2,17	2,4	2,72	14 %	-7 %
Areal roads	1,72	1,64	1,73	1,92	11 %	-5 %
Connctiong roads	1,68	1,91	1,94	2,35	29 %	12 %
All roads	1,99	2,00	2,13	2,47	19 %	0 %

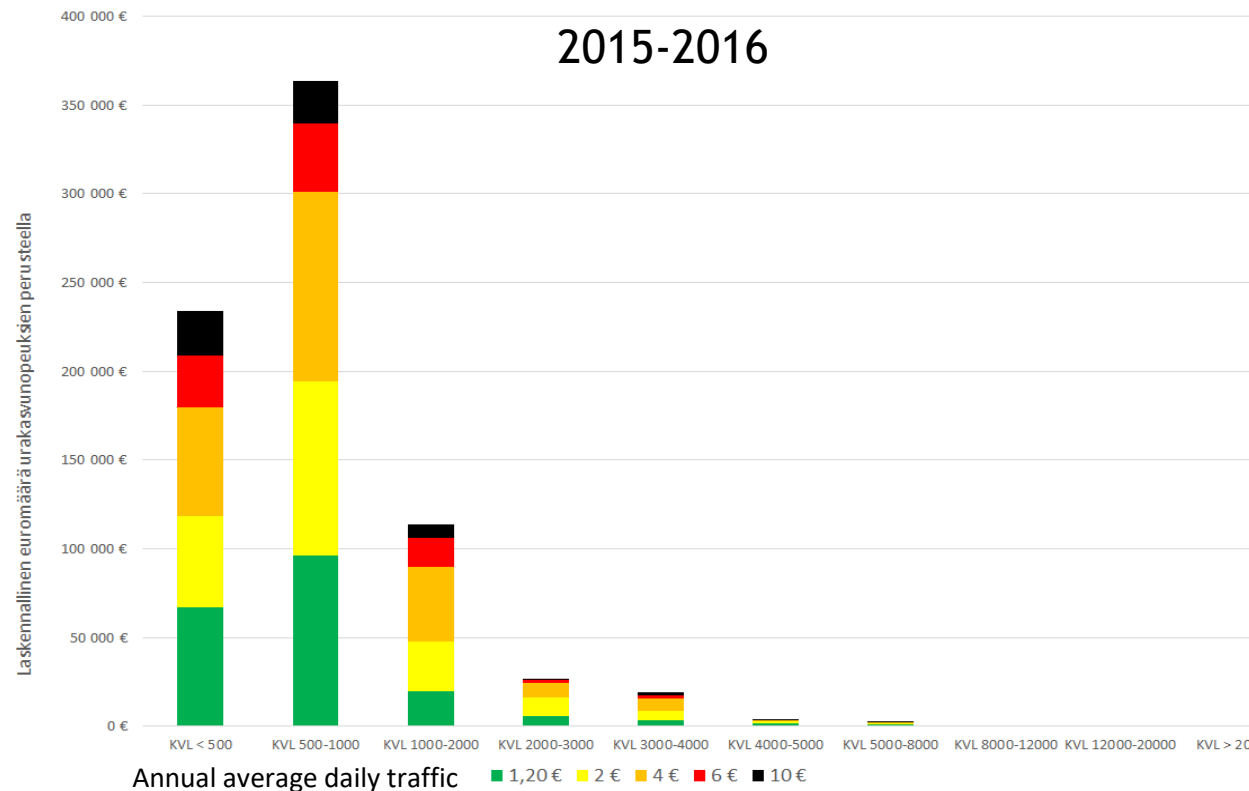
Central-Finland						
	€/m				Improvement	
	2018-2019	2017-2018	2016-2017	2015-2016	2016 -2019	previous
Main roads	1,6	1,72	1,66	2,59	38 %	7 %
Areal roads	1,39	1,73	1,45	2,10	34 %	19 %
Connctiong roads	1,55	1,89	2,03	2,32	33 %	18 %
All roads	1,52	1,75	1,66	2,38	36 %	13 %

Uusimaa		
	€/m	
	2018-2019	
Main roads	4,36	
Areal roads	3,41	
Connctiong roads	2,26	
All roads	2,79	

THE IMPACT OF PEHKO POLICIES AND PRACTISES IN THE CALCULATED ANNUAL PAVING COSTS IN CENTRAL-FINLAND PILOT AREA AT DIFFERENT TRAFFIC VOLUMES FROM 2015-2016 TO 2018-2019

Laskennallisten vuosikustannusten jakautuminen eri KVL-luokissa
(KESKI-SUOMI 2015-2016)

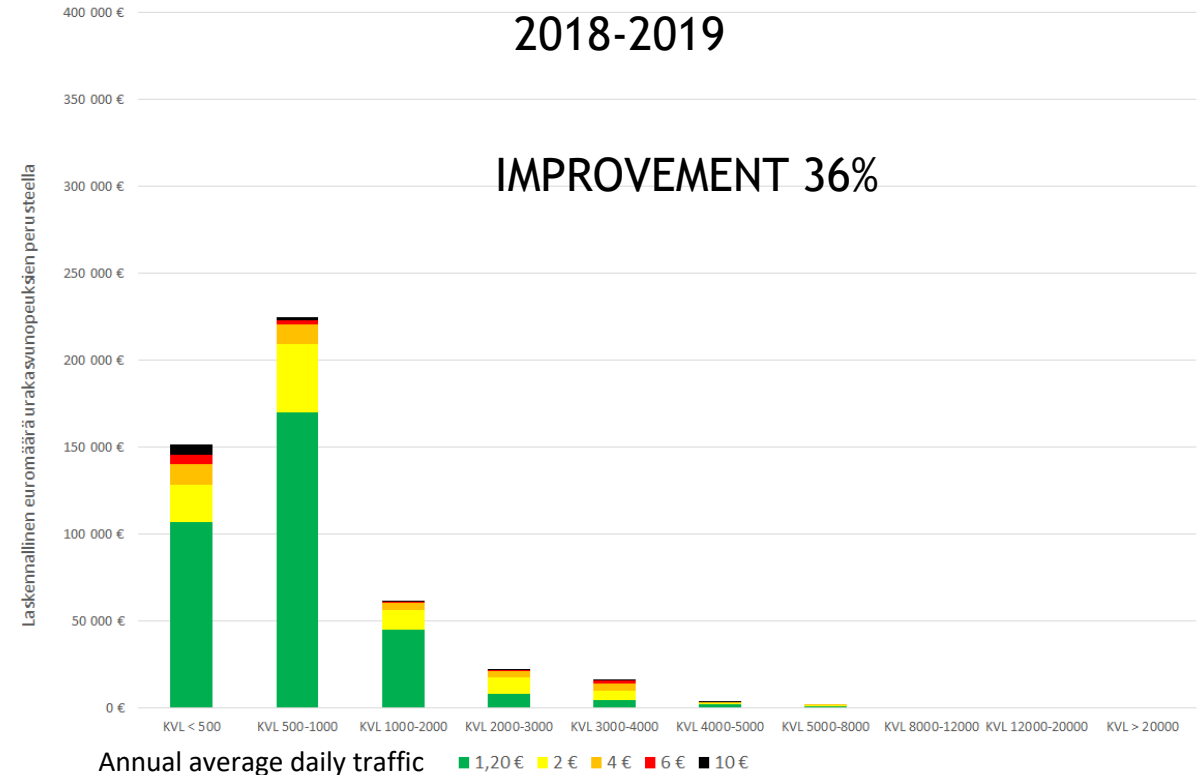
2015-2016



Laskennallisten vuosikustannusten jakautuminen eri KVL-luokissa
(KESKI-SUOMI 2018-2019)

2018-2019

IMPROVEMENT 36%



PEHKO Findings: Winter Maintenance has Surprisingly Large Impact on 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
 - Proactive pavement maintenance policies
 - Repaving before pavement loses its strength
 - Better pavement design practices:
 - Heavier and optimised measures focused on exact problem locations
 - New structural solutions for roads over weak subgrades
 - Enabling monitoring performance of new structures (learning process)
 - Better road drainage maintenance management
- > Longer pavement lifetimes, better roads and savings

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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