



ROADDEX
Network
For better rural roads

The ROADDEX Network

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ROADEx 1998- 2020



A trans-national collaboration of northern European road organisations set up to:

- Share best practice
- Research and develop new knowledge
- Implement and test new solutions

Running for 22 years. Initially supported by the EU Northern Periphery Programme for 4 projects, now funded by the Partners themselves.

Current Partners in the ROADEx Network



Lead Partner, The Swedish Transport Administration
Northern Region, The Swedish Forest Agency



Lapland Centre for Economic Development, Transport and the Environment, The Finnish Transport Infrastructure Agency



The Icelandic Road and Coastal Administration



The Northern Region, Norwegian Public Roads Administration



Transport Scotland, The Highland Council, Forestry Commission Scotland, Comhairle Nan Eilean Siar



Department of Transport Tourism & Sport, Road Management Office, Department of Agriculture, Food and the Marine



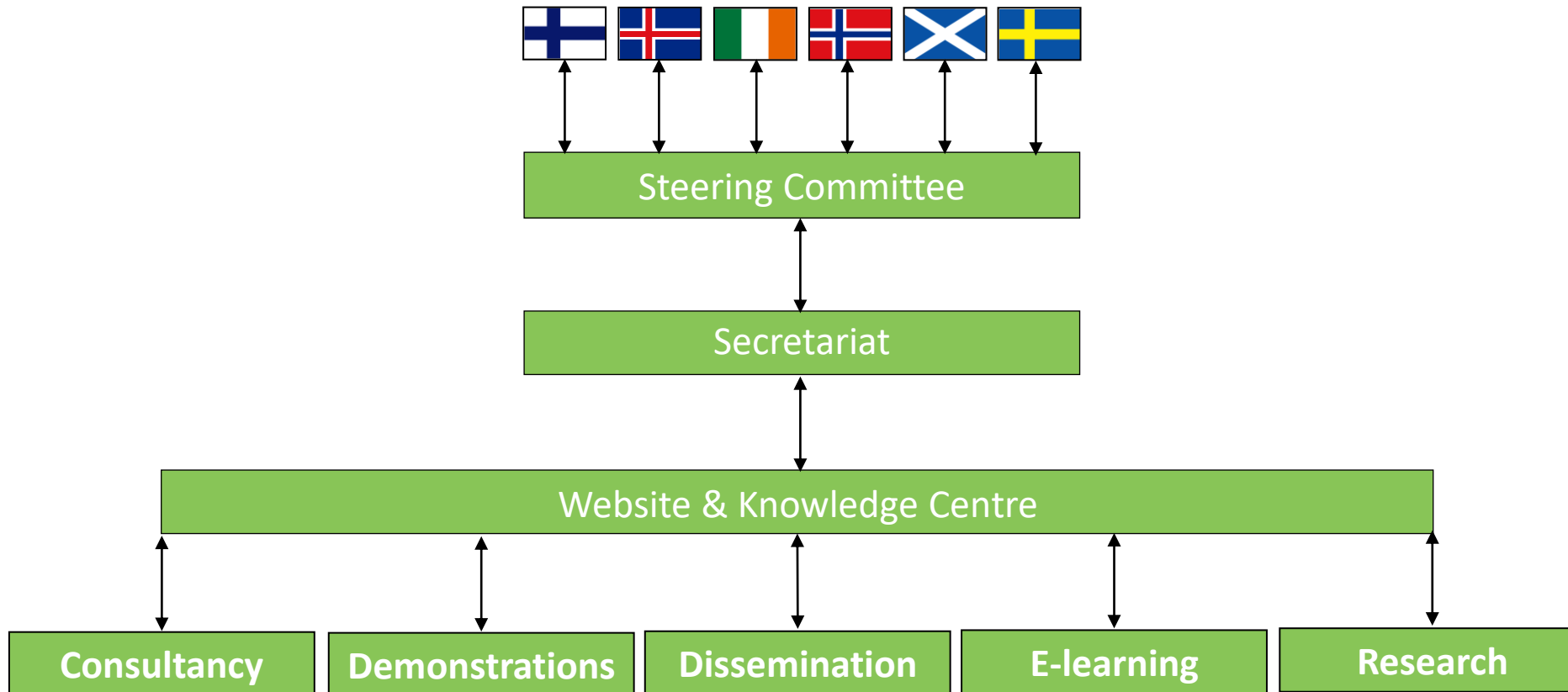
An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Project Consultant: Roadscanners Oy, Finland

ROADEX Network structure



Why collaborate?

Why ROADEx?

All Partners had the same problems:

- Reducing budgets for roads
- Increasing road user expectations
- Increasing traffic & truck sizes/weights
- Increasing environmental awareness
- Searching for "best value"

⇒ all needed MORE from LESS



Public road, Ireland



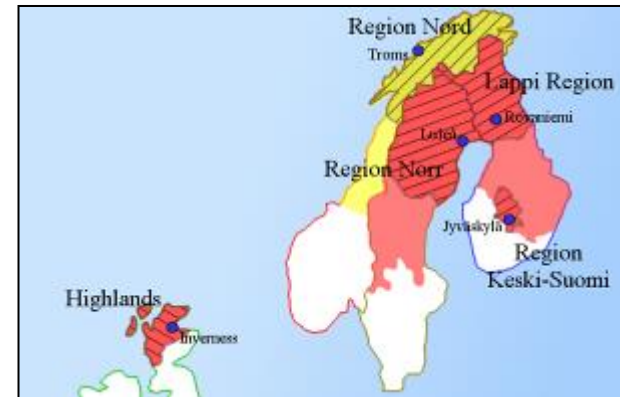
Winter conditions, Norway



Forest road, Scotland

The ROADEX pilot project (1998-2001)

- proved that collaboration could work
- created the ROADEX network
- tested collaboration in:
 - A. winter maintenance
 - B. road condition management
- convinced the Partners to do more



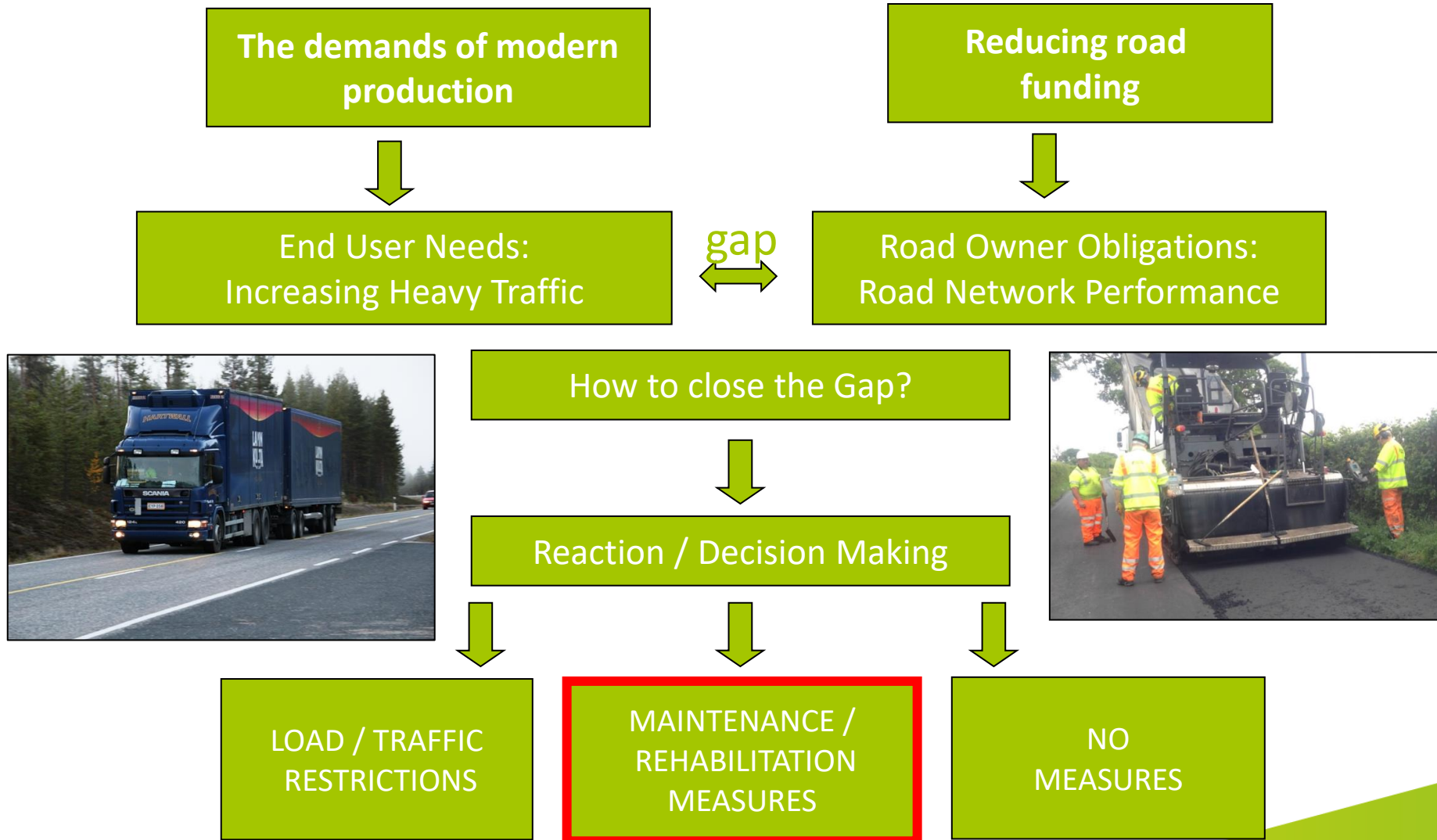
Common problems across the Northern Periphery

- Drainage
- Heavy trucks and permanent deformation
- Poor quality road materials
- Roads on peat
- Widened roads



The roads challenge:

The demands of modern production & logistics chains v. reducing road funding



Improving rural road performance

The ROADex solution:

“FOCUS, FOCUS, FOCUS”

- Precise survey to map the weak sections and focus in on them
- Understand the underlying reasons for the problems
- Design ‘fit for purpose’ structures and treatments
- Consider the timing of remedial works – and improving the drainage
- Don’t forget follow-up preventative maintenance



Survey, data collection & mapping

ROADEX technologies (all to GPS):

- Digital video
- Drainage
- Ground Penetrating Radar
- Falling Weight Deflectometer
- LIDAR - 2D / 3D scanning
- Drill cores
- High Speed Road Monitoring
- Drone survey
- 360° camera
- Thermal camera
- 3D accelerometer

Data processing and analysis:

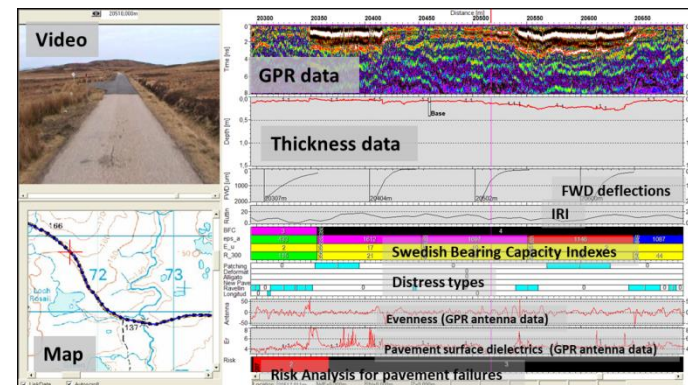
- Cloud based data handling
- Road Doctor processing
- Map presentation
- Point cloud models



FWD & GPS



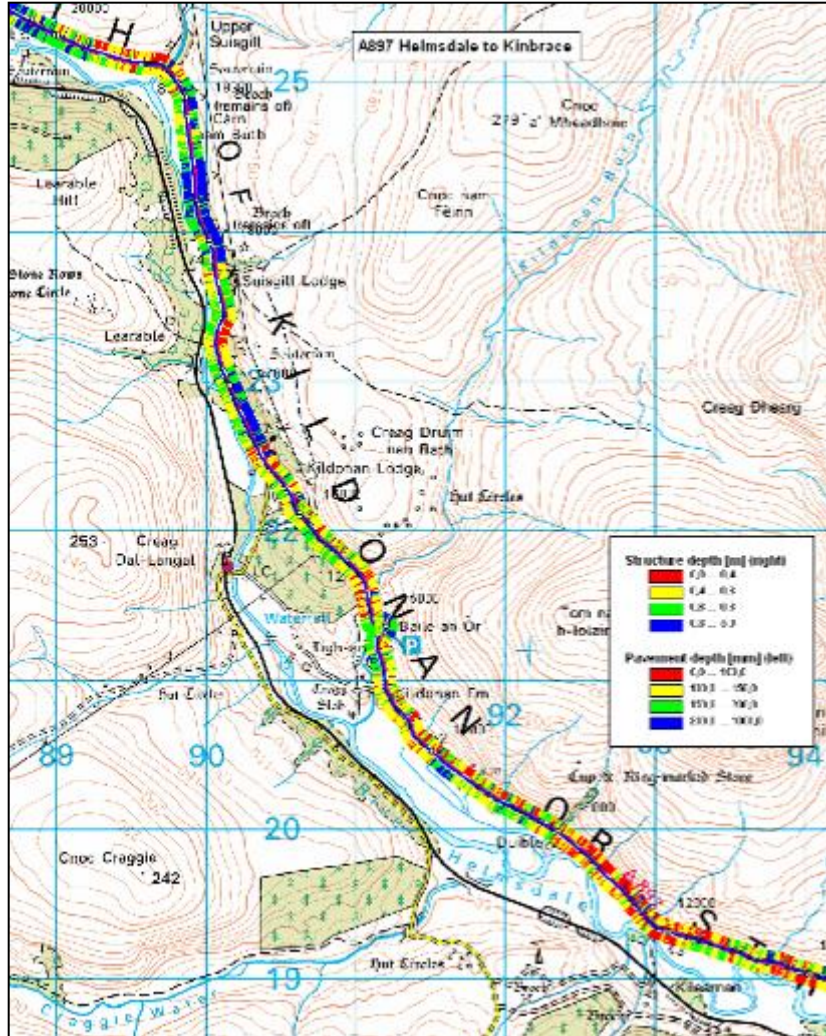
GPR, GPS & Video



Integrated analysis & mapping

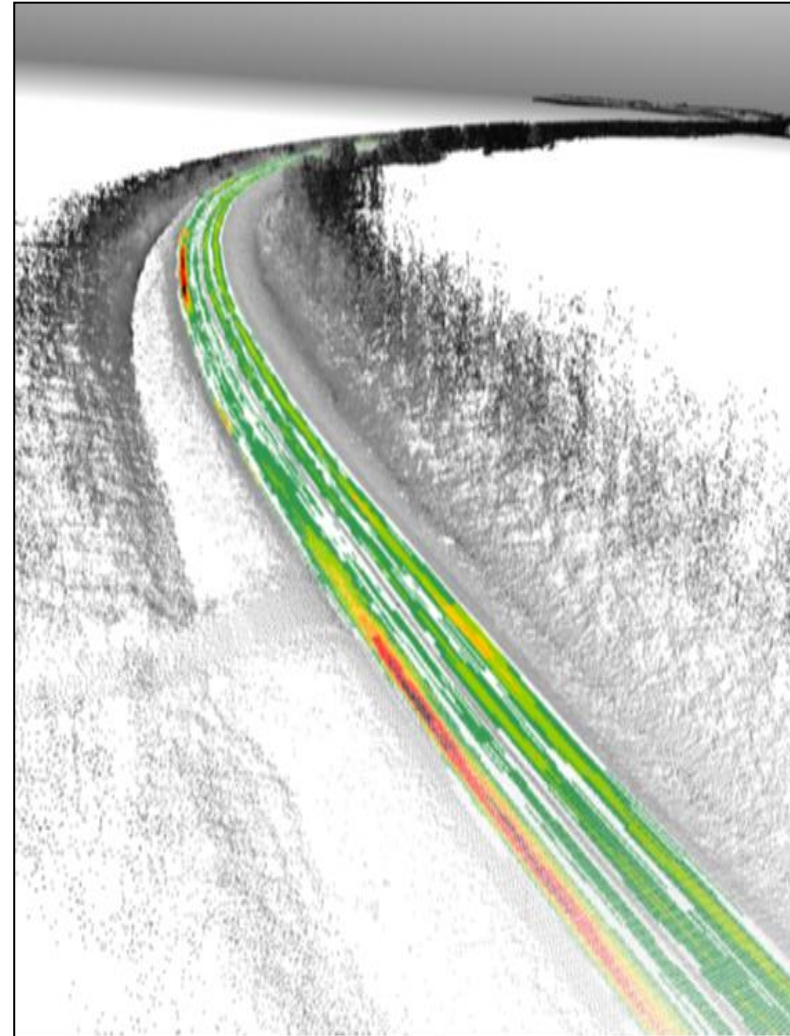
Typical outputs

Map



Pavement & structure depths from GPR data

Point cloud model

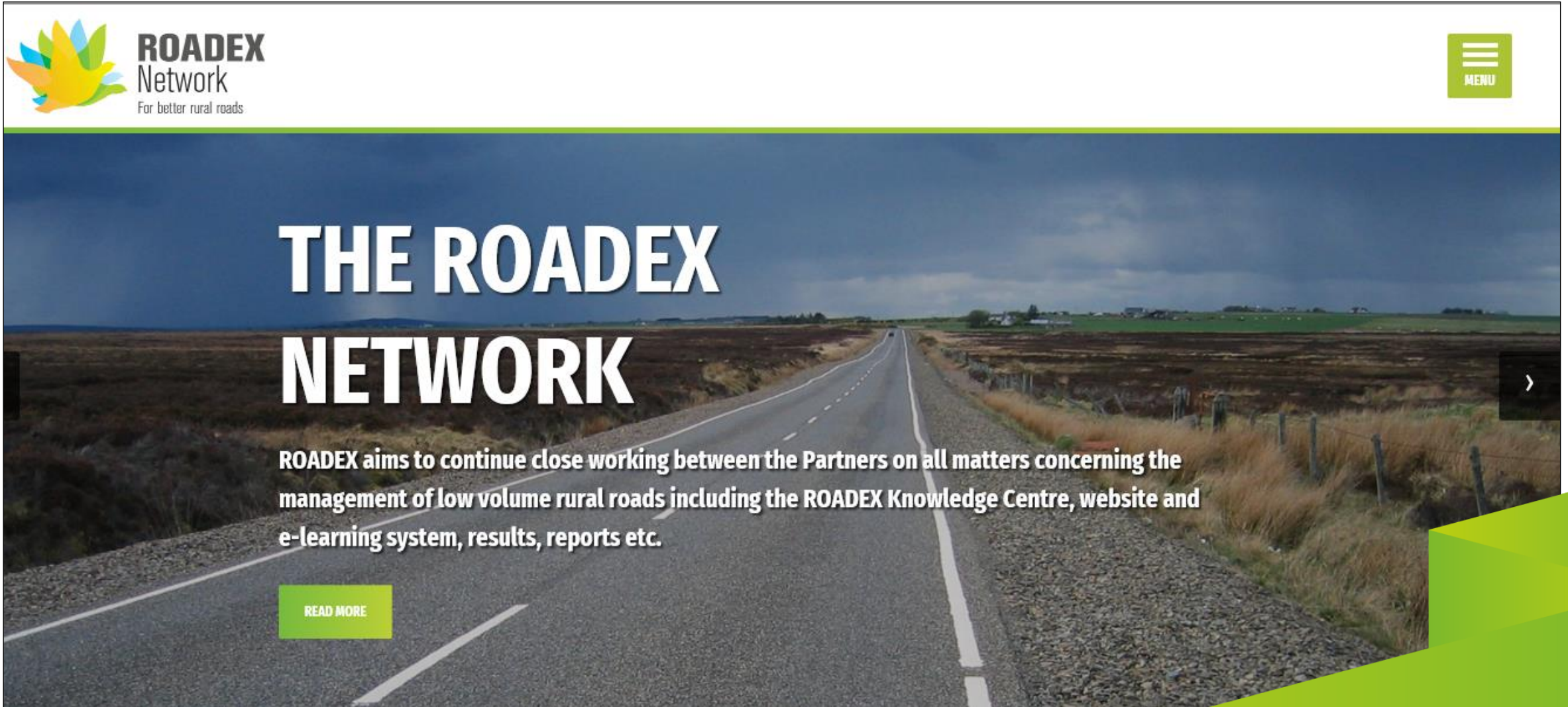


Rutting analysis from 2D laser scanner

Dissemination



The ROADDEX website: www.roadex.org



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**THE ROADDEX
NETWORK**

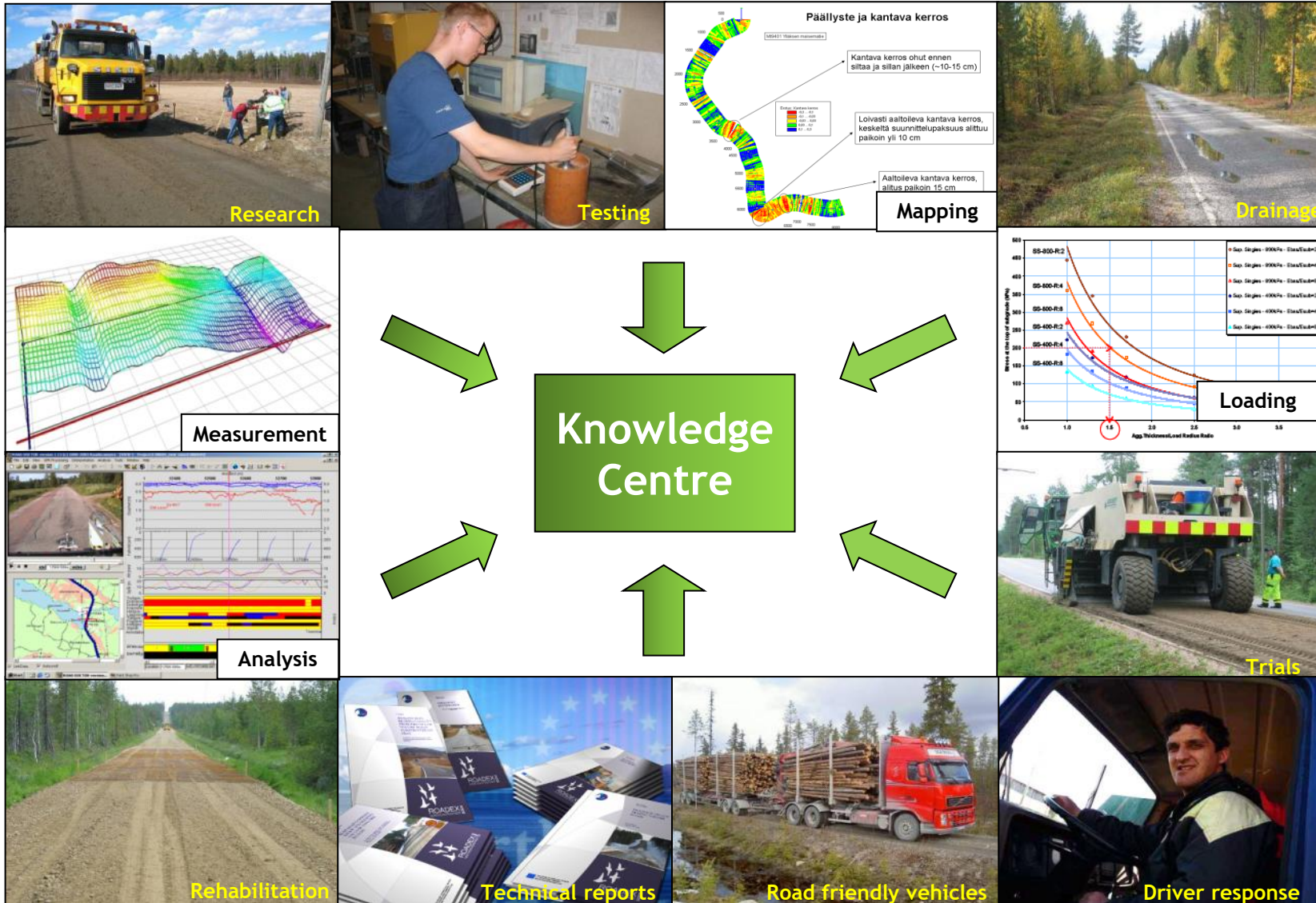
ROADDEX aims to continue close working between the Partners on all matters concerning the management of low volume rural roads including the ROADDEX Knowledge Centre, website and e-learning system, results, reports etc.

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The ROADEx Knowledge Centre



ROADEX E-Learning lessons



Lesson 1 Permanent Deformation

CONTINUE



Lesson 3 Drainage of Low Volume Roads

CONTINUE



Lesson 2 Roads on Peat

CONTINUE



Lesson 4 Environmental Considerations for Low Volume Roads

CONTINUE

Demonstration projects



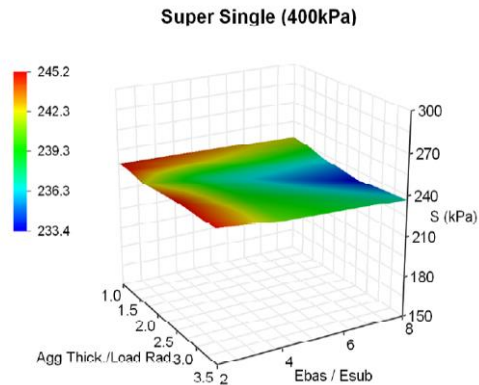
Drainage maintenance



Road friendly vehicles & CTI



Forest road policies



Road design

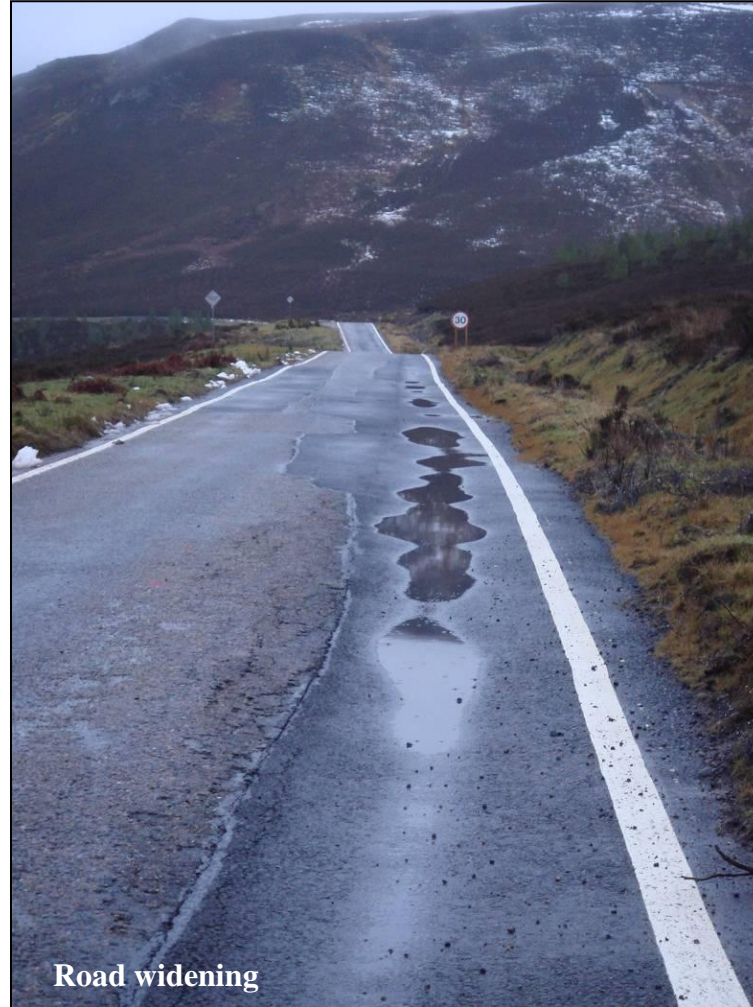


Roads on Peat



Driver health and vibration

ROADEx Research Projects



ROADEx promotes

- Survey methods and analysis techniques



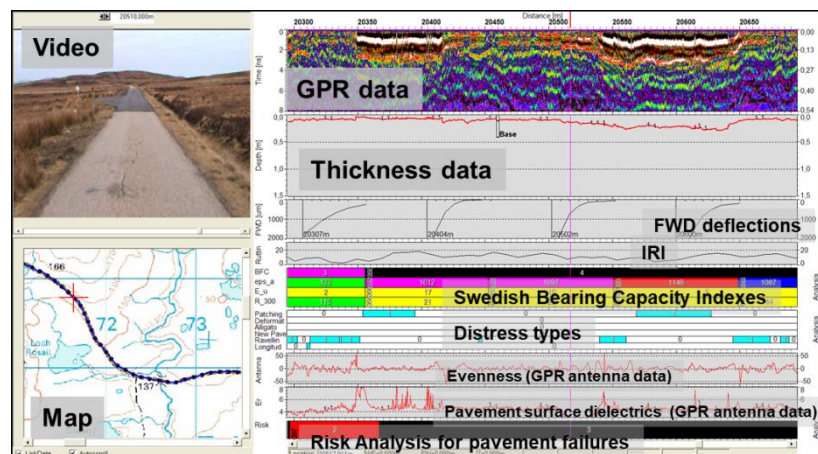
GPR survey vehicle, UK Forestry Commission



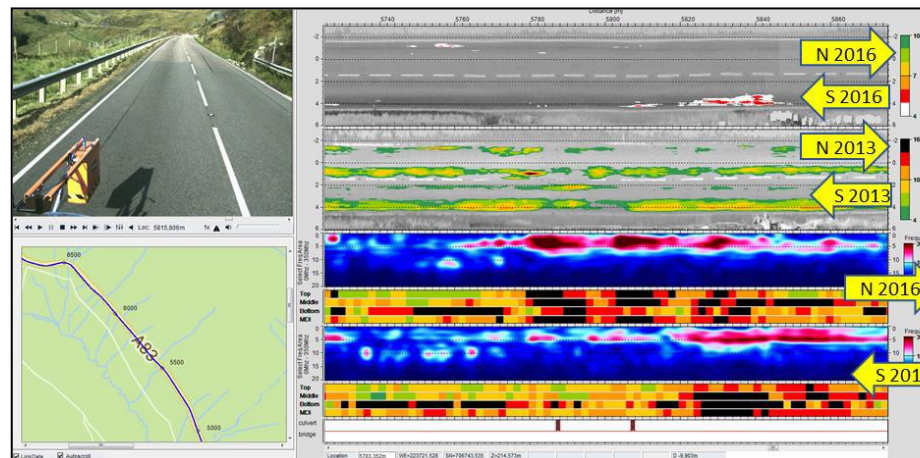
Roadscanners & GeoVap survey vehicles



Drainage survey vehicle, ICERA



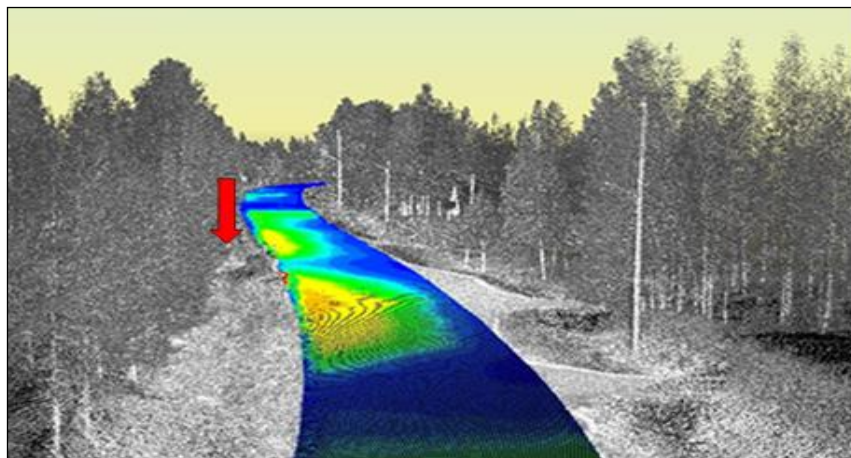
Road Doctor analysis screen displaying all data in one place



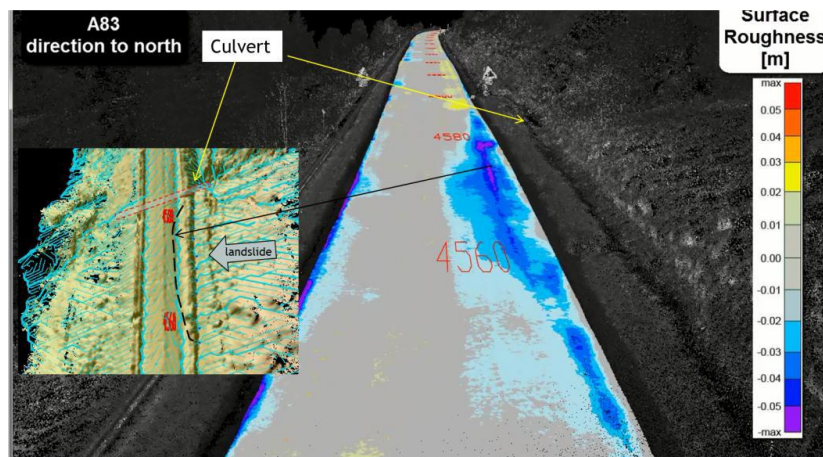
Road structure moisture v. rut depth

ROADEx successes

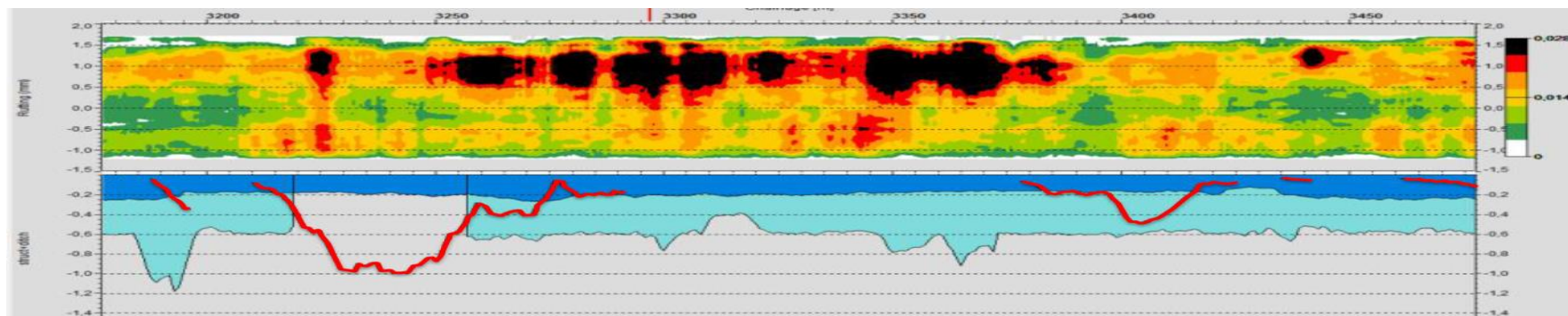
- Survey methods and analysis techniques
- **The importance of correctly functioning drainage**



Blocked access culvert causing frost heave on both sides



Landslip in ditch causing adjacent road deformation



Lane roughness v. drainage. Red line indicates the adjacent ditch. No line means no ditch.

ROADEX successes

- Survey methods and analysis techniques
- The importance of correctly functioning drainage
- **New materials and testing methods**



Stabilising treatment of base course materials



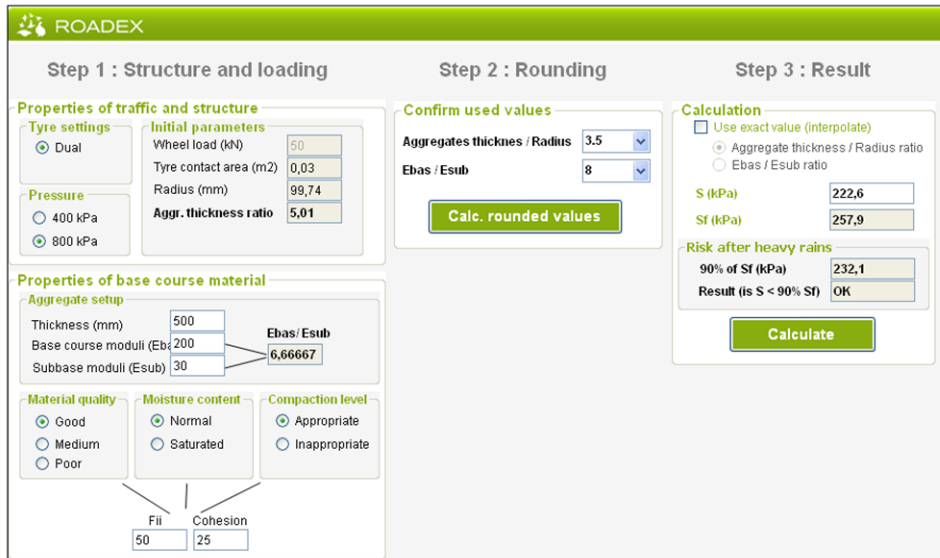
Tube suction test



Large triaxial test, TUT

ROADEx successes

- Survey methods and analysis techniques
- The importance of correctly functioning drainage
- New materials and testing methods
- **Design methods against permanent deformation**



ROADEx

Step 1 : Structure and loading

Properties of traffic and structure

Tyre settings

☒ Dual

Initial parameters

Wheel load (kN) 50

Tyre contact area (m²) 0,03

Radius (mm) 99,74

Aggr. thickness ratio 5,01

Pressure

☐ 400 kPa

☒ 800 kPa

Properties of base course material

Aggregate setup

Thickness (mm) 500

Base course moduli (E_{bc}) 200

Subbase moduli (E_{sub}) 30

E_{bas} / E_{sub} 6,66667

Material quality

☒ Good

☐ Medium

☐ Poor

Moisture content

☒ Normal

☐ Saturated

Compaction level

☒ Appropriate

☐ Inappropriate

F_{ll} 50

Cohesion 25

Step 2 : Rounding

Confirm used values

Aggregates thickness / Radius 3.5

E_{bas} / E_{sub} 8

Calc. rounded values

Step 3 : Result

Calculation

☐ Use exact value (interpolate)

☒ Aggregate thickness / Radius ratio

☐ E_{bas} / E_{sub} ratio

S (kPa) 222,6

Sf (kPa) 257,9

Risk after heavy rains

90% of Sf (kPa) 232,1

Result (is S < 90% Sf) OK

Calculate

ROADEx software tool for design against Mode1rutting



Applying basecourse on geogrid



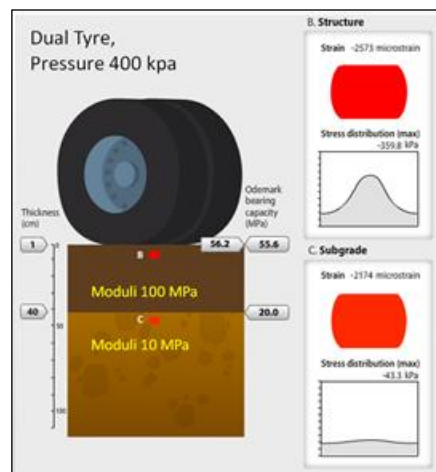
Drainage improvement – always!

ROADEX successes

- Survey methods and analysis techniques
- The importance of effective drainage
- New materials and testing methods
- Design methods against permanent deformation
- **Road friendly trucks and tyre pressure control**



Tyre pressure control on tyre valve



ROADEX stress/strain software



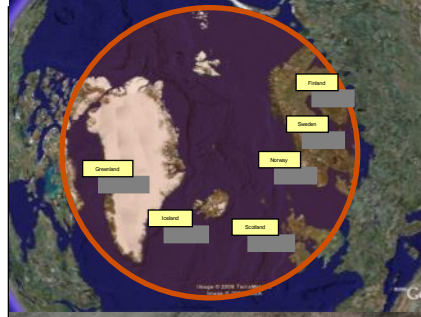
TPC test, Stynie Wood, Scotland



TPC traction test, Ivalo, Finland

ROADEX 1998 - 2020

22 years of rural road collaboration



Thank You



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Be part of the
ROADEX Network