



ROADEX
Network
For better rural roads

13.5.2019

The ROADEX Network

Ron Munro

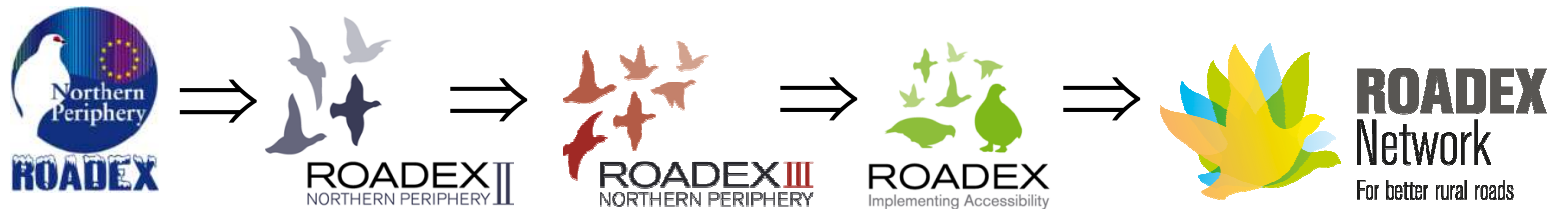
Munroconsult Ltd, Scotland

www.roadex.org



The ROADEX Network
20 years in rural road collaboration

ROADEX 1998- 2019



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 20 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



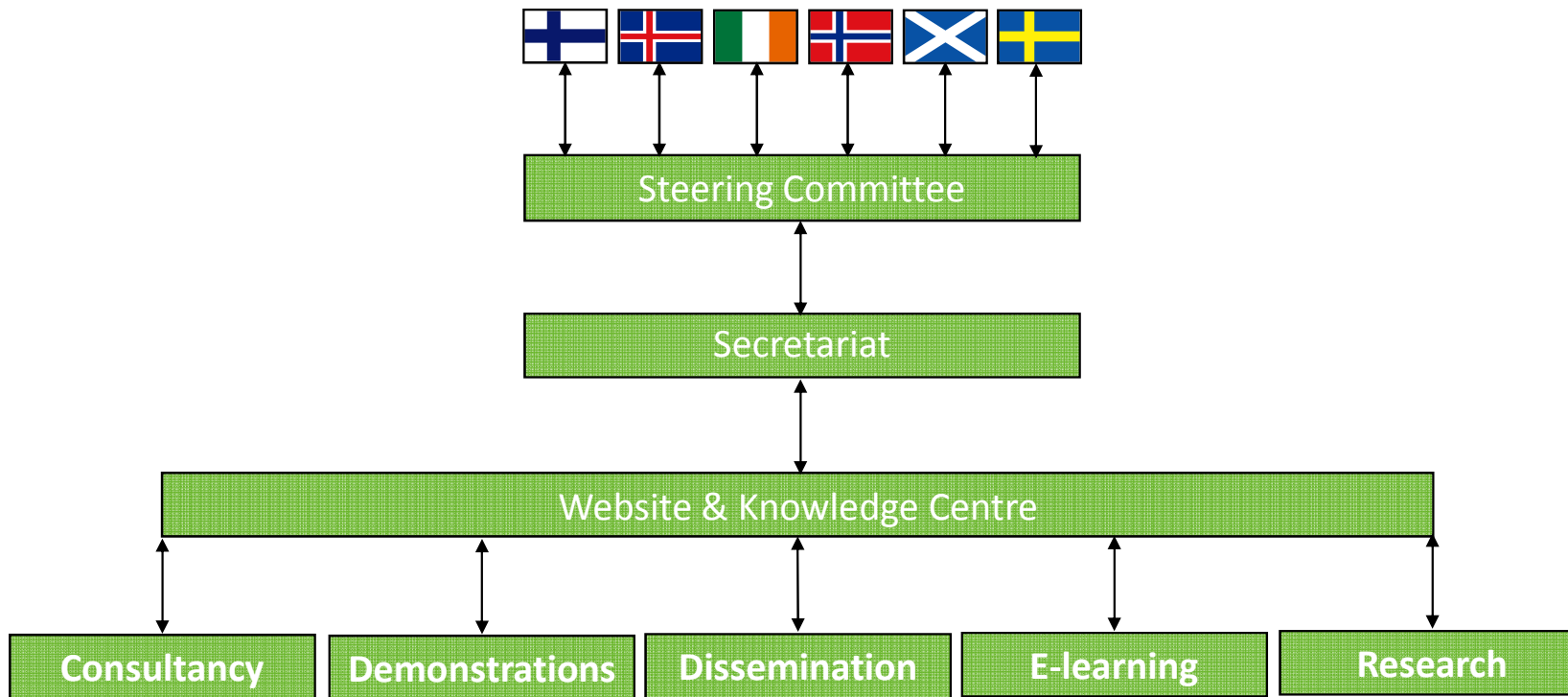
Department of Transport Tourism & Sport, Road Management Office, Department of Agriculture, Food and the Marine



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

Project Consultant: Roadscanners Oy, Finland

ROADDEX Network structure



Why collaborate?

Why ROADEX?

All Partners have common 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



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



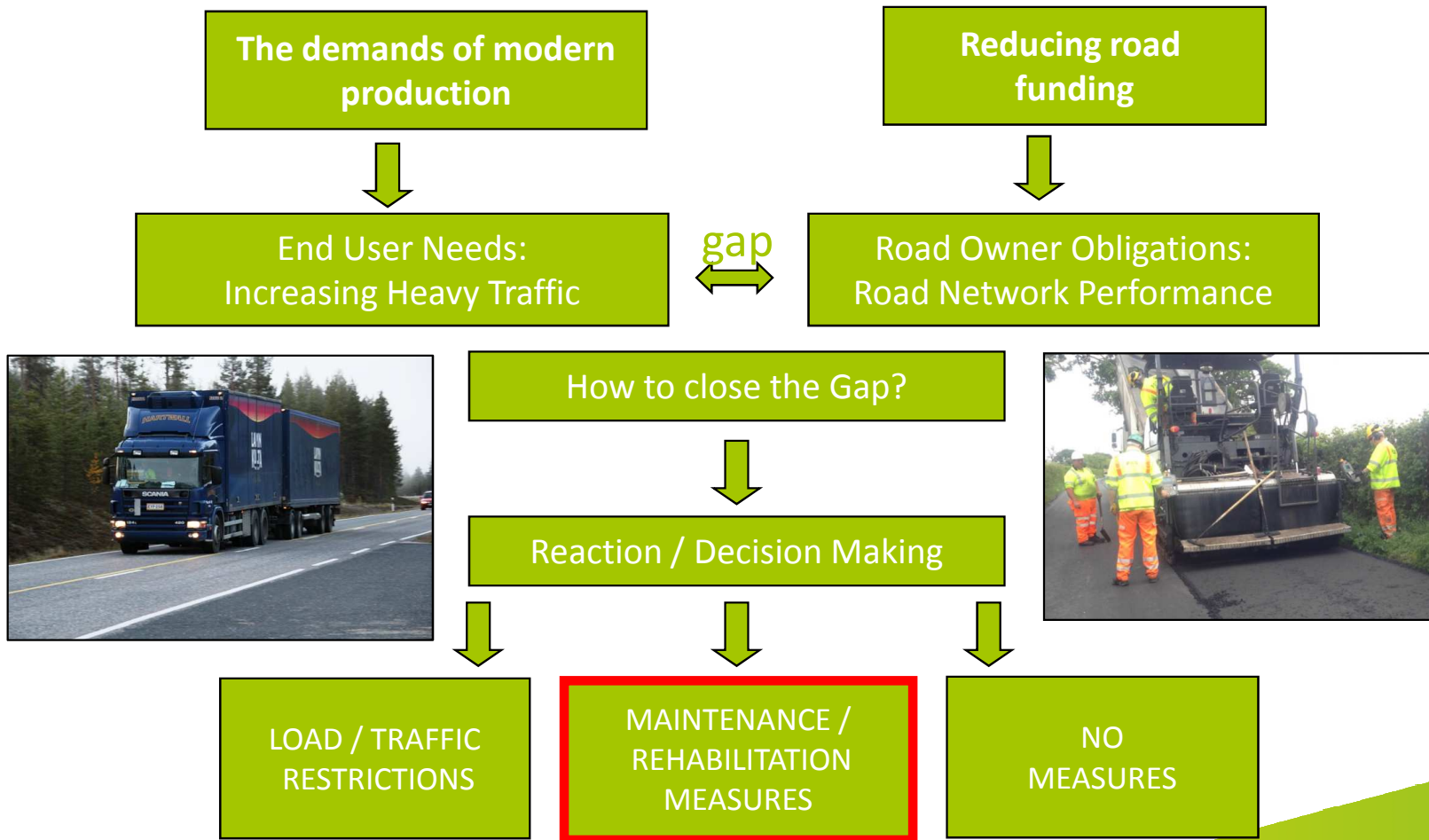
Common problems across the Northern Periphery

- 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”

- Use precise survey to map the weak sections and focus in on them
- Focus on understanding the underlying reasons for the problems
- Innovate and design ‘fit for purpose’ structures and treatments for the weak sections
- Look at the timing of remedial works – and improving the drainage
- Don’t forget follow-up preventative maintenance after the work



Survey, data collection & mapping

ROADDEX 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:

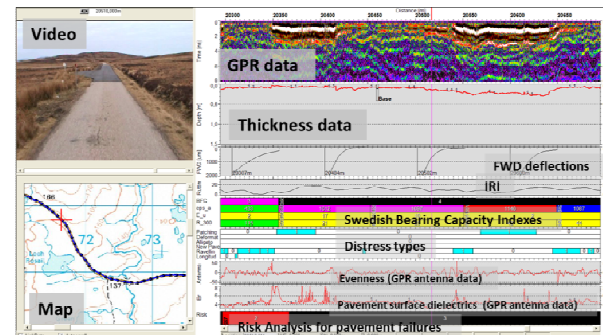
- Cloud based data handling
- Road Doctor processing
- Map presentation
- Point cloud models



FWD & GPS



GPR, GPS & Video

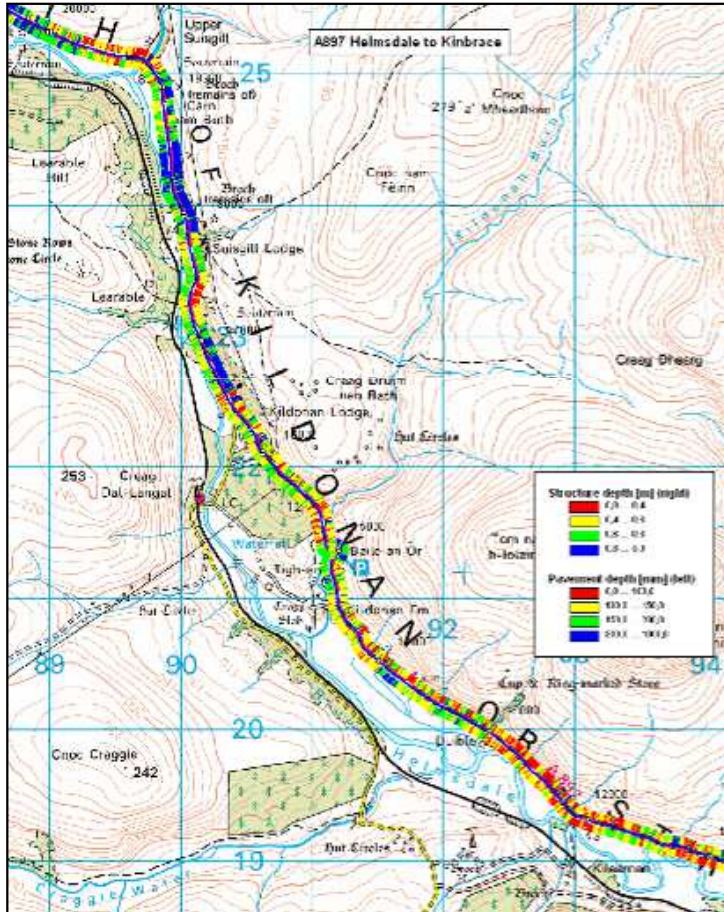


Integrated analysis & mapping



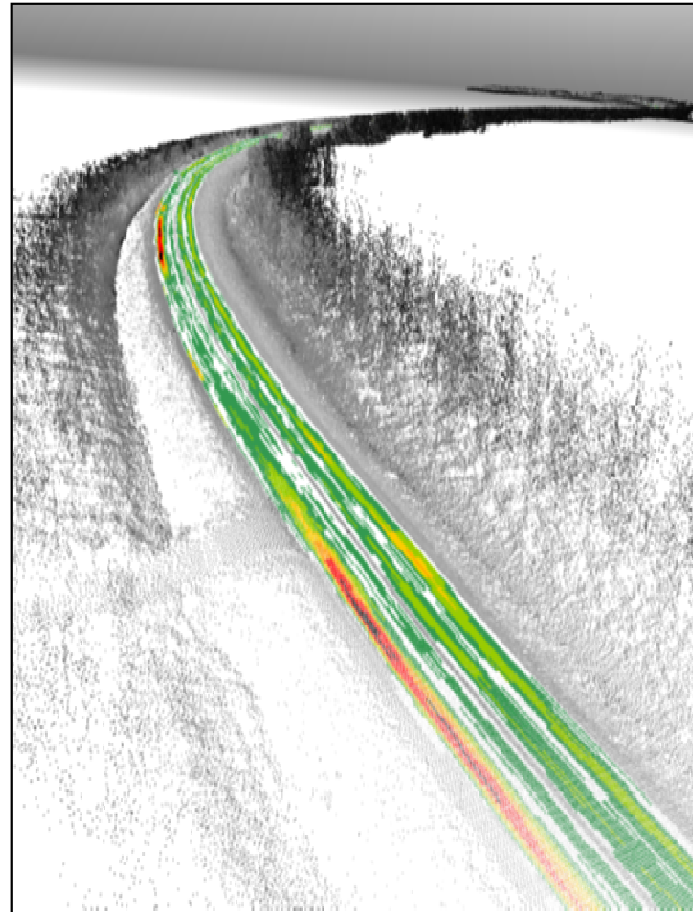
Typical outputs

Map



Pavement & structure depths from GPR data

Point cloud model



Rutting analysis from 2D laser scanner

Dissemination

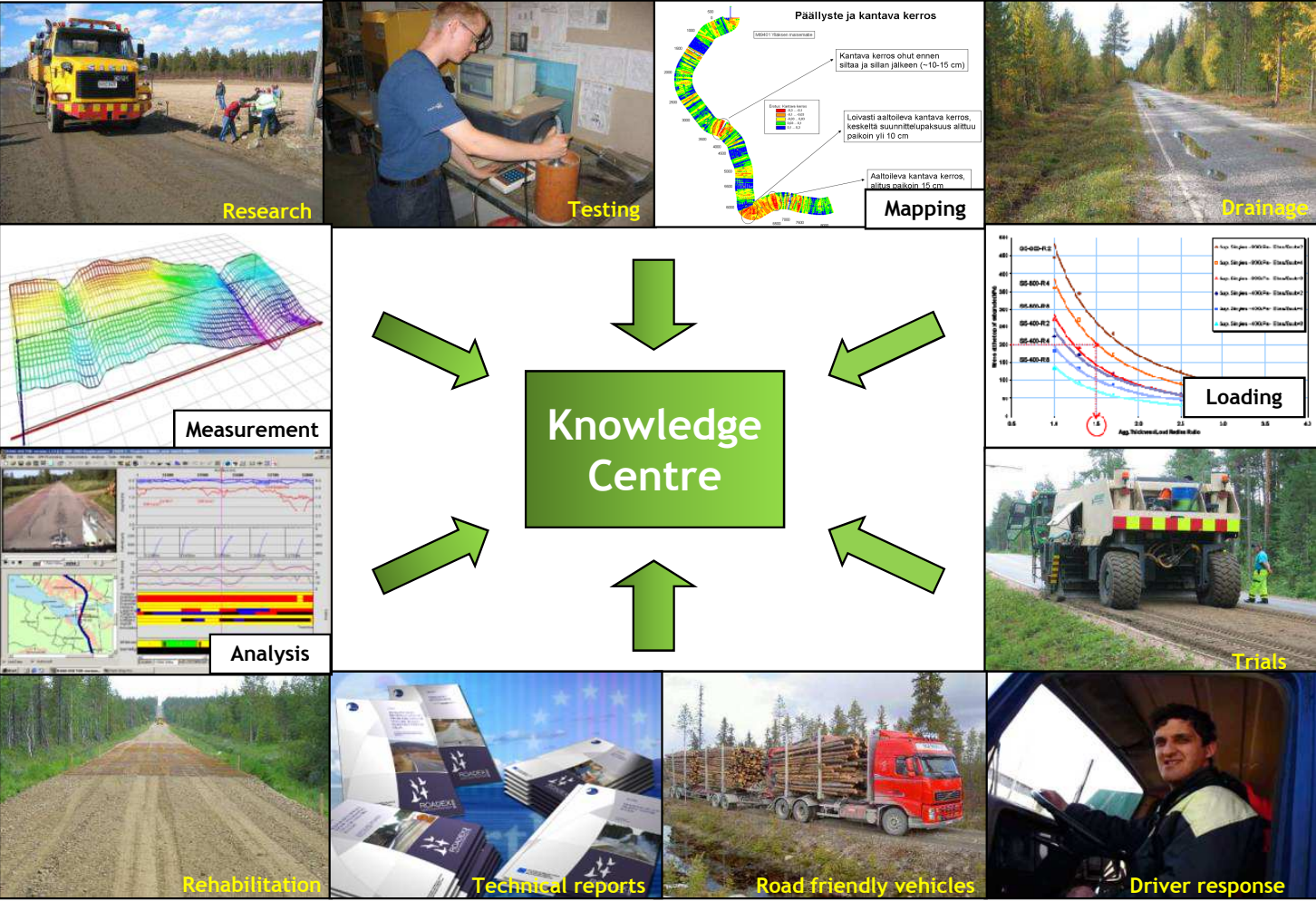


The ROADEX website: www.roadex.org



A screenshot of the ROADEX website homepage. The background is a photograph of a long, straight road stretching into the distance under a cloudy sky. The road is flanked by fields and a fence. In the top left corner, there is the ROADEX Network logo and tagline. In the top right corner, there is a green square button with a white menu icon and the word "MENU" below it. The main heading "THE ROADEX NETWORK" is centered in large, white, bold, sans-serif letters. Below the heading, there is a paragraph of text: "ROADEX aims to continue close working between the Partners on all matters concerning the management of low volume rural roads including the ROADEX Knowledge Centre, website and e-learning system, results, reports etc." Below this paragraph is a green rectangular button with the text "READ MORE" in white. In the bottom right corner of the screenshot, there is a green geometric shape that overlaps the page's footer.

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



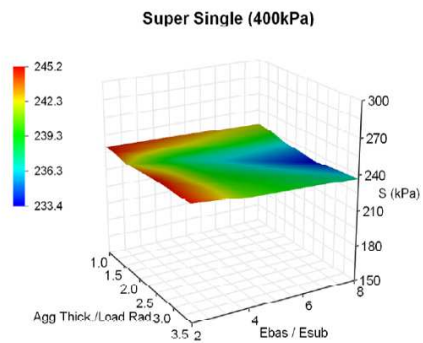
Drainage maintenance



Road friendly vehicles & CTI



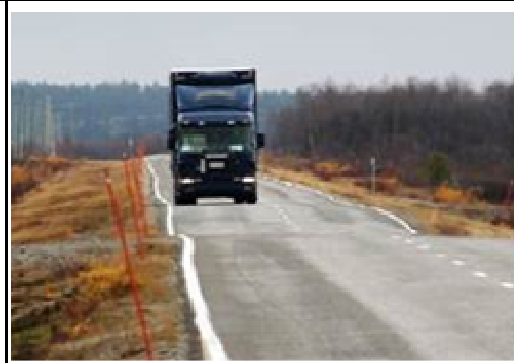
Forest road policies



Road design

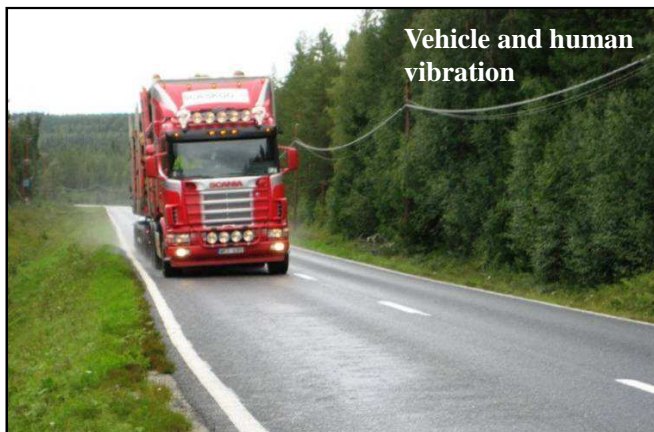


Roads on Peat



Driver health and vibration

ROADEX Research Projects



ROADEX successes

- Survey methods and analysis techniques



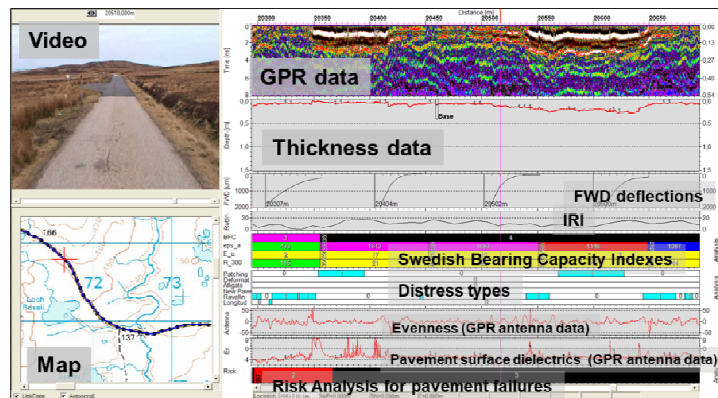
GPR survey vehicle, UK Forestry Commission



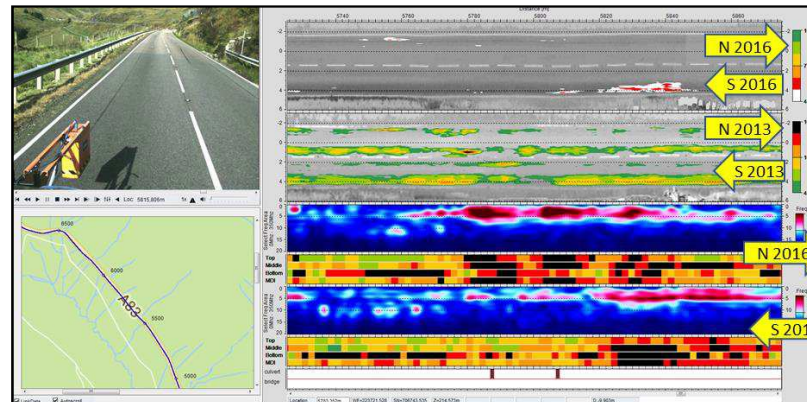
Roadscanners & GeoVap survey vehicles



Drainage survey vehicle, ICERA



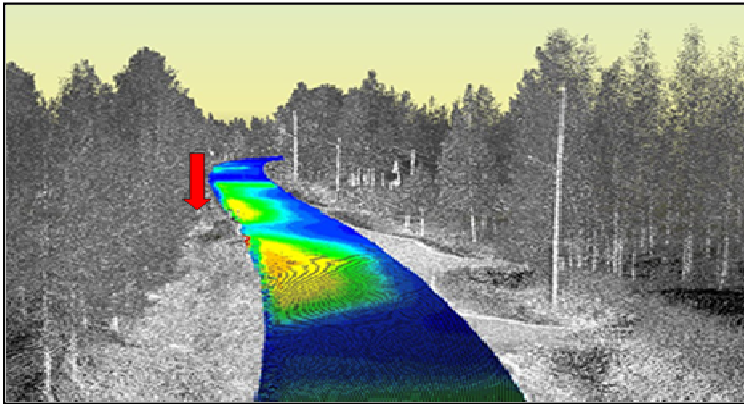
Road Doctor analysis screen displaying all data in one place



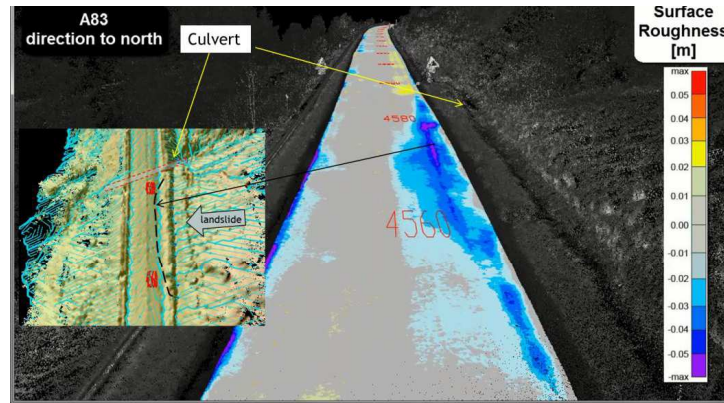
Road structure moisture v. rut depth

ROADEX successes

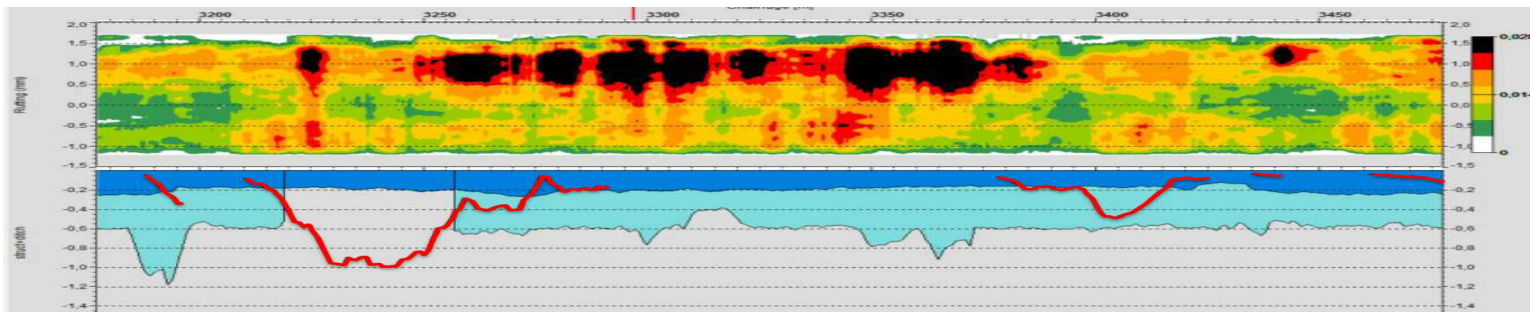
- Survey methods and analysis techniques
- **The importance of correctly functioning drainage**



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**

The screenshot displays the ROADEX software interface, divided into three main steps: Step 1: Structure and loading, Step 2: Rounding, and Step 3: Result.

Step 1: Structure and loading

- Properties of traffic and structure**
 - Tyre settings:** Dual (selected)
 - 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 (selected)
- Properties of base course material**
 - Aggregate setup:** Thickness (mm) 500, Base course moduli (E_b) 200, Subbase moduli (E_{sub}) 30, E_b/E_{sub} 6,66667
 - Material quality:** Good, Medium, Poor (selected)
 - Moisture content:** Normal, Saturated (selected)
 - Compaction level:** Appropriate, Inappropriate (selected)
 - Fill:** 50, **Cohesion:** 25

Step 2: Rounding

- Confirm used values:** Aggregates thickness / Radius 3,5, E_b / E_{sub} 8
- Calc. rounded values** (button)

Step 3: Result

- Calculation:** Use exact value (interpolate) (unchecked), Aggregate thickness / Radius ratio (selected), E_b / E_{sub} ratio (unchecked)
- 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** (button)

ROADEX software tool for design against Mode1rutting



Applying basecourse on geogrid



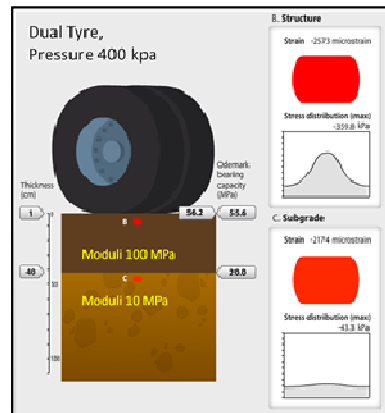
Drainage improvement – always!

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



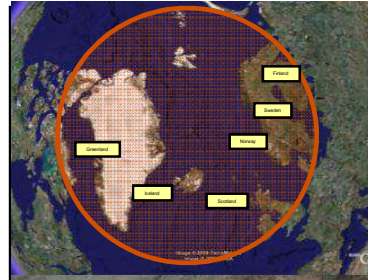
TPC test, Stynie Wood, Scotland



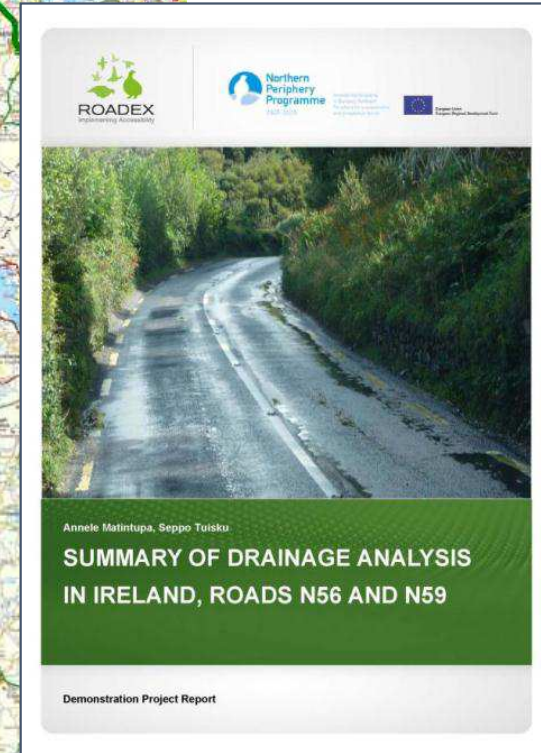
TPC traction test, Ivalo, Finland

ROADEX 1998 - 2019

20 years in rural road collaboration



“Drainage Analysis” Demonstrations, Ireland



N56 Drumnaraw – Cashelmore Route Risk Analysis



**GIS Map of SUBGRADE RISK ANALYSIS
N56 Drumnaraw to Cashelmore
County Donegal**



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www.roadex.org

Thank You

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ROADEX
Network
For better rural roads



Be part of the
ROADEX Network

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