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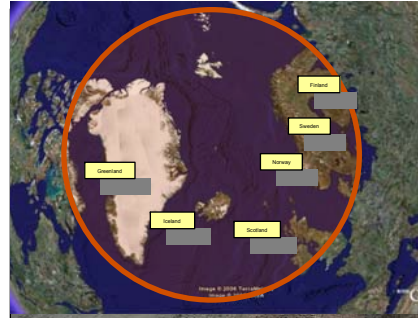
# The ROADEX Projects

## Exchanging information on low volume roads across the European Northern Periphery

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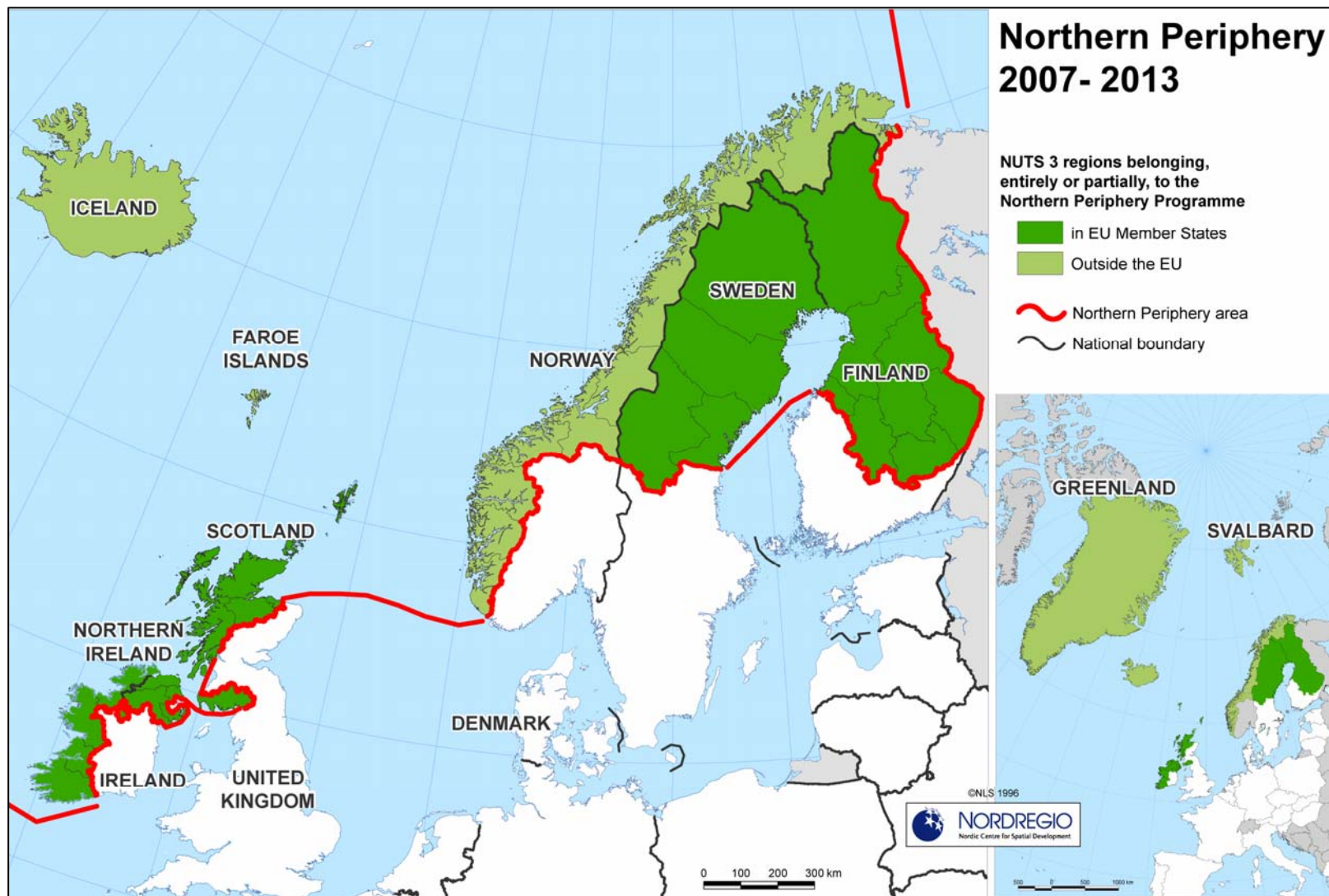
Ron Munro, Project Manager, ROADEX IV

# The ROADEx Project:



# The “ROADEX” co-operation

- A “trans-national” network of Northern Periphery roads organisations committed to:
  - Share best practice
  - Research and develop new knowledge
  - Implement and test new solutions
- Running for 12 years over 4 projects
- Supported by EU funding from the Interreg IIb Northern Periphery Programme.



## The Northern Periphery Programme area

# The ROADEx IV Partners:



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



TRAFIKVERKET



Skogsvårdsstyrelsen  
DALARNA – GÄVLEBORG



Centre for Economic Development, Transport and the  
Environment, Lapland, Keski-Suomi and Savo Karelia regions



Centre for Economic Development,  
Transport and the Environment



The Government of Greenland



The Icelandic Road Administration



The Northern Region, Norwegian Public Roads Administration



The Highland Council, The Western Isles Council,  
**Forestry Commission Scotland**



Forest Enterprise



The National Roads Authority,  
The Department of Transport, Ireland



Comhshaoil, Oidhreacht agus Rialtas Áitiúil  
Environment, Heritage and Local Government



Associate Partner:

**The Forest Engineering Research Institute of Canada, (FERIC)**





## The ROADEX Partner areas

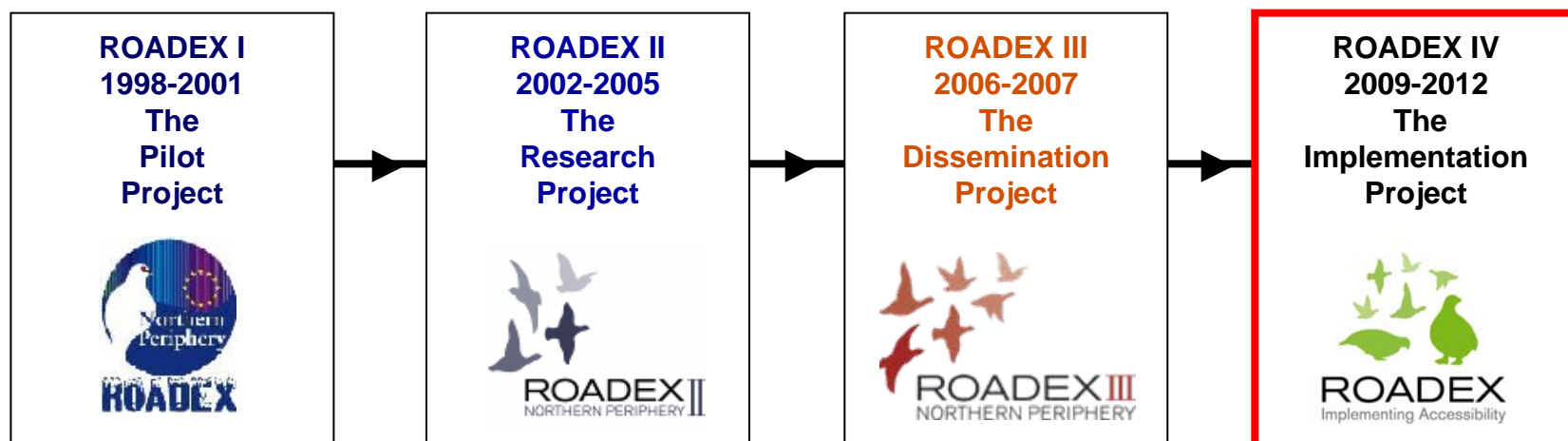


# Why are we collaborating?

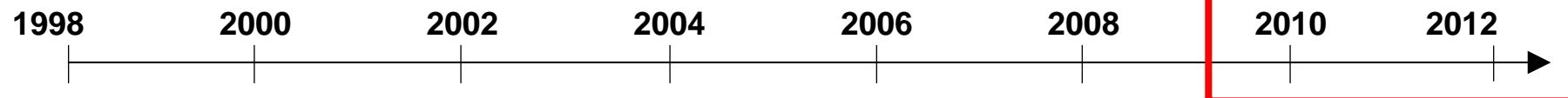
- Common problems of:
  - Mature road networks in peripheral areas
  - Low traffic volumes
  - Lifeline roads to remote communities
  - Limited budgets
  - Increasing user expectations
  - Changing climate
- Looking for sustainable solutions:
  - Affordable
  - Fit for purpose
  - Environmentally sustainable
- All need to get MORE from LESS

# ROADEX IV

## 4 projects since 1998:



### Timeline



# The ROADEX PILOT PROJECT

## 1998-2001



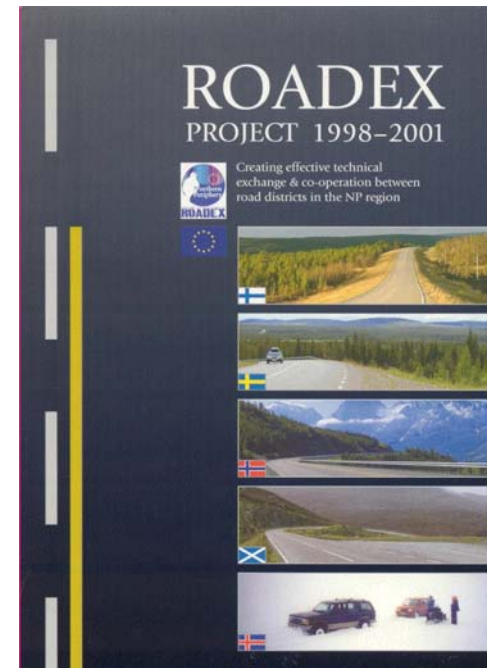
- created the network
- identified and reported best practices and procedures in winter maintenance and road condition management
- started the knowledge sharing



# The ROADEX Pilot Project Results



- 2 State of the Art Reports
  - Winter maintenance
  - Road condition management
- A multi-media CD-ROM
- The **www.roadex.org** website
- Test reports on road trials
- Technical papers in Oslo, Trondheim, Barcelona, Helsinki and Sapporo



# ROADEX II - The Research Project



The Highland Council, Forest Enterprise & The Western Isles Council



Northern Region of The Norwegian Public Roads Administration & The Norwegian Road Haulage Association



Norges Lastebileier-Forbund



Northern Region of The Swedish National Road Administration



Lapland and Keski-Suomi districts of Finra, Metsähallitus, Lapin Metsäkeskus, Metsäliitto & Stora-Enso



Project consultants: Roadscanners Oy



**Modern production**  
"the *management of*  
*logistical chains*"

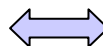
## ROADEX II (2002-2005)

**Reducing road  
funding**

### **The Problem:**

**End User Needs:  
Increasing Heavy Traffic**

**Road Owner Obligations:  
Road Network Performance**



**How to close the Gap?**

**Reaction / Decision Making**



**LOAD / TRAFFIC  
RESTRICTIONS**

**MAINTENANCE /  
REHABILITATION  
MEASURES**

**NO  
MEASURES**



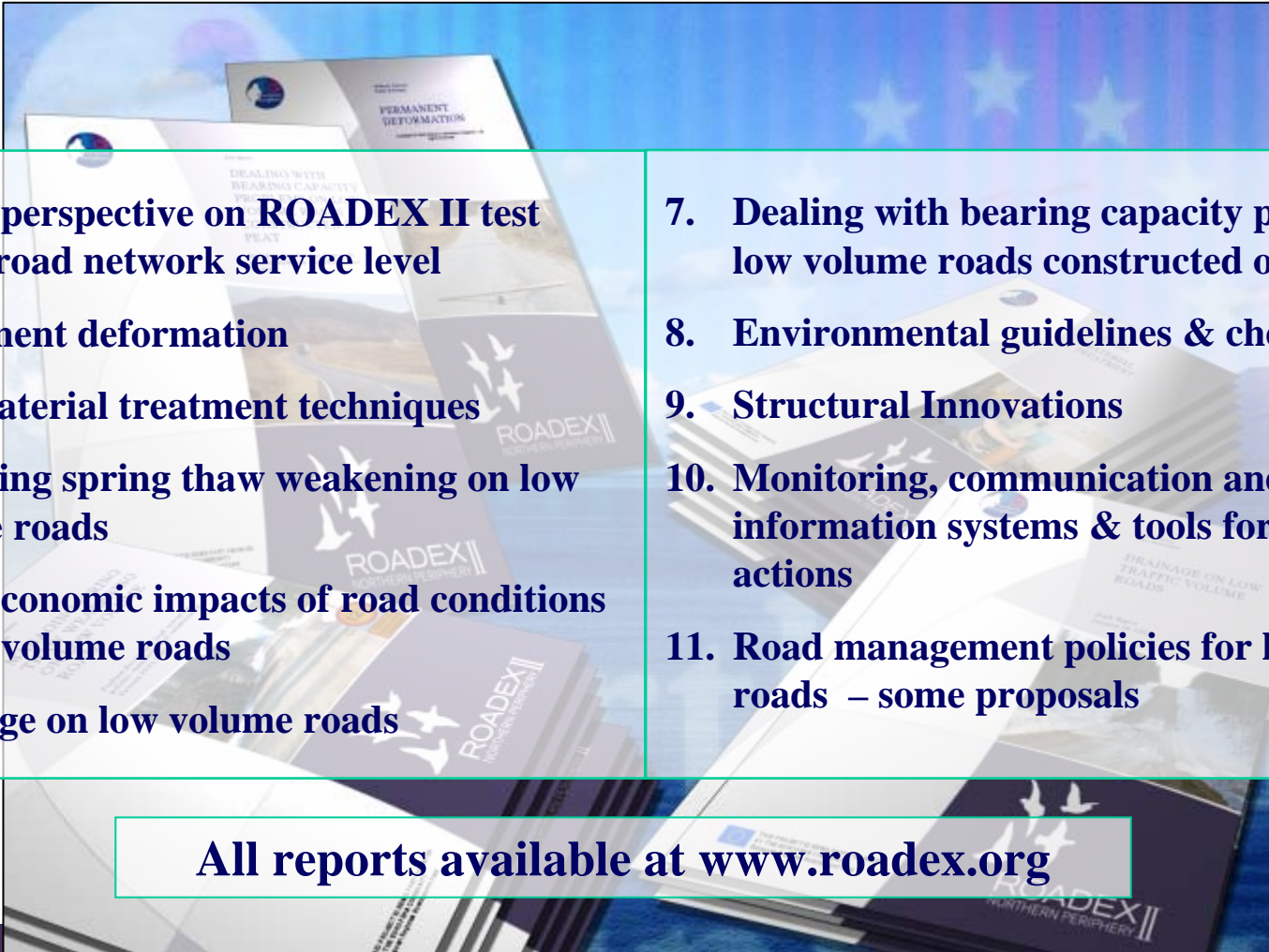
# The ROADEX II Project 2002-2005

## The ROADEX II solution:

- **Map** the weak sections of road and **FOCUS** in on them
- **Understand** the processes causing the problems
- **Innovate** - find new 'fit for purpose' structures and treatments



# ROADEx II “The Research Project” outputs

- 
1. A user perspective on ROADEx II test areas' road network service level
  2. Permanent deformation
  3. New material treatment techniques
  4. Managing spring thaw weakening on low volume roads
  5. Socio-economic impacts of road conditions on low volume roads
  6. Drainage on low volume roads
  7. Dealing with bearing capacity problems on low volume roads constructed on peat
  8. Environmental guidelines & checklist
  9. Structural Innovations
  10. Monitoring, communication and information systems & tools for focusing actions
  11. Road management policies for low volume roads – some proposals

All reports available at [www.roadex.org](http://www.roadex.org)

# The ROADEX III "The Dissemination Project"



The Northern Region, Lead Partner  
Dalarna-Gävleborg Regional Board of Forestry



Vägverket



Skogsvårdsstyrelsen  
DALARNA – GÄVLEBORG



Finra, Savo-Karjala District



FINNISH ROAD  
ADMINISTRATION



The Municipality of Sisimiut



The Icelandic Public Roads Administration



The Northern Region



The Highland Council, Forest Enterprise, The  
Western Isles Council



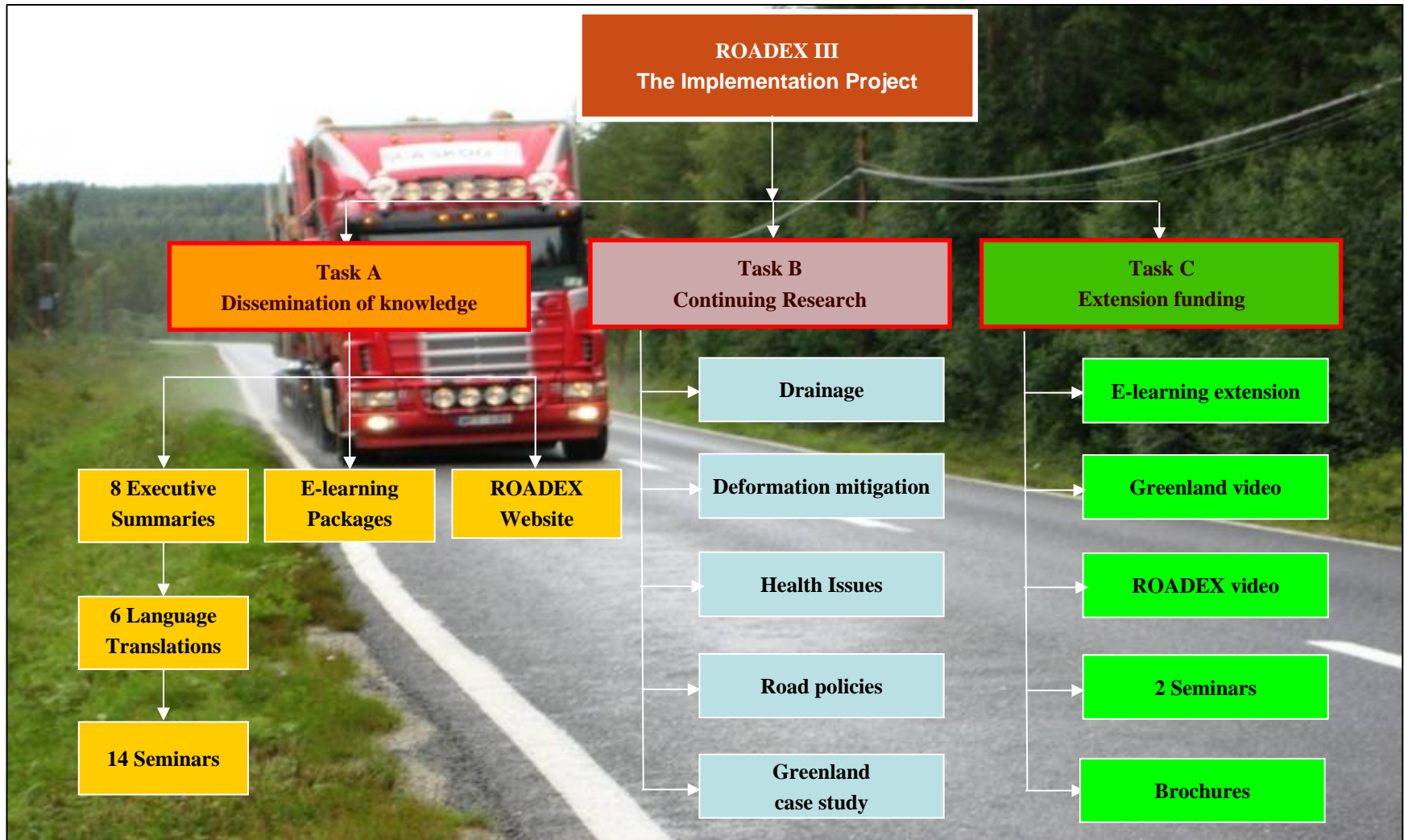
Forest Enterprise



Project consultant: Roadscanners Oy



# ROADEX III - The Dissemination Project





## ROADEX III

### Task A

**8 Executive summaries**

translated into

**6 Partner languages**

available at


[www.roadex.org](http://www.roadex.org)



**local seminars across NPP  
to over 1,500 delegates**



# ROADEx III: E-Learning Lesson on Permanent Deformation



**ROADEx III**  
NORTHERN PERIPHERY

[Permanent Deformation](#) | [Roadex Home Page](#) | [Roadex Research Reports](#) | [Info / Help](#) | [Authors](#) | [FAQ](#)

## Permanent Deformation

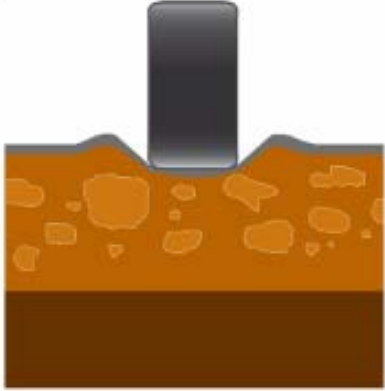
- 1. WHAT IS PERMANENT DEFORMATION AND WHY WE DO NOT LIKE IT
- 2. PERMANENT DEFORMATION RUTTING CLASSIFICATION
  - 2.1 WHY RUTTING CLASSIFICATION IS NEEDED
  - 2.2 MODE 0 RUTTING
  - 2.3 MODE 1 RUTTING
  - 2.4 MODE 2 RUTTING
  - 2.5 MODE 3 RUTTING
- 2.6 COMBINED RUTTING MODES IN NON-FROST AREAS
- 2.7 RUTTING MODES AND SEASONAL CHANGES
- 2.8 PUMPING AND PERMANENT DEFORMATION

### LESSON 2 TEST

- 3. SURVEY AND MONITORING TECHNIQUES
- 4. CLASSIFICATIONS, ANALYSIS AND DIAGNOSTICS
- 5. MANAGING PERMANENT DEFORMATION
- 6. DESIGN & REPAIR PROCESS

## 2.3 Mode 1 Rutting

[PLAY AGAIN](#)



The diagram illustrates Mode 1 rutting. A grey wheel is shown pressing down on a pavement surface. The pavement is depicted in cross-section, showing a top layer of aggregate (orange) and a bottom layer of subgrade (dark brown). A rut is forming in the aggregate layer directly beneath the wheel. The rut is wider at the surface and tapers slightly towards the subgrade. The aggregate layer is shown with some internal voids and a rough texture.

### What is Mode 1 rutting

► In weaker granular materials, local shear close to the wheel may occur. This gives rise to dilative heave immediately adjacent to the wheel track where granular material can undergo large plastic shear strains and consequent dilation, leading to relatively loose material. This rutting can therefore be considered to be largely a consequence of inadequate granular material shear strength in the aggregate relatively close to the pavement surface.

► Evidence from both trial pavements and from theory has demonstrated that the maximum shear in Mode 1 rutting is felt at a depth of approximately 1/3rd of the width of the wheel (or width of the wheel pair where twin tyres are used). In pavements with significant traffic wander (wide lanes, roads with no markings, roads without existing ruts) the depth may even be a little deeper. Similarly, in pavements which have a significant asphalt layer the critical depth is likely to be rather deeper from the surface than a third of the wheel width due to the effects of the asphalt in changing the stress distribution within the pavement. Research results from the ROADEx II project showed that in general the most critical depth is at a

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# ROADEX III research projects



- B1 Drainage guidelines
- B2 Permanent deformation – road user & road owner
- B3 Driver health & vibration issues
- B4 Social and economic need for low volume roads
- B5 Greenland case study

# ROADEX IV “The Implementation Project”

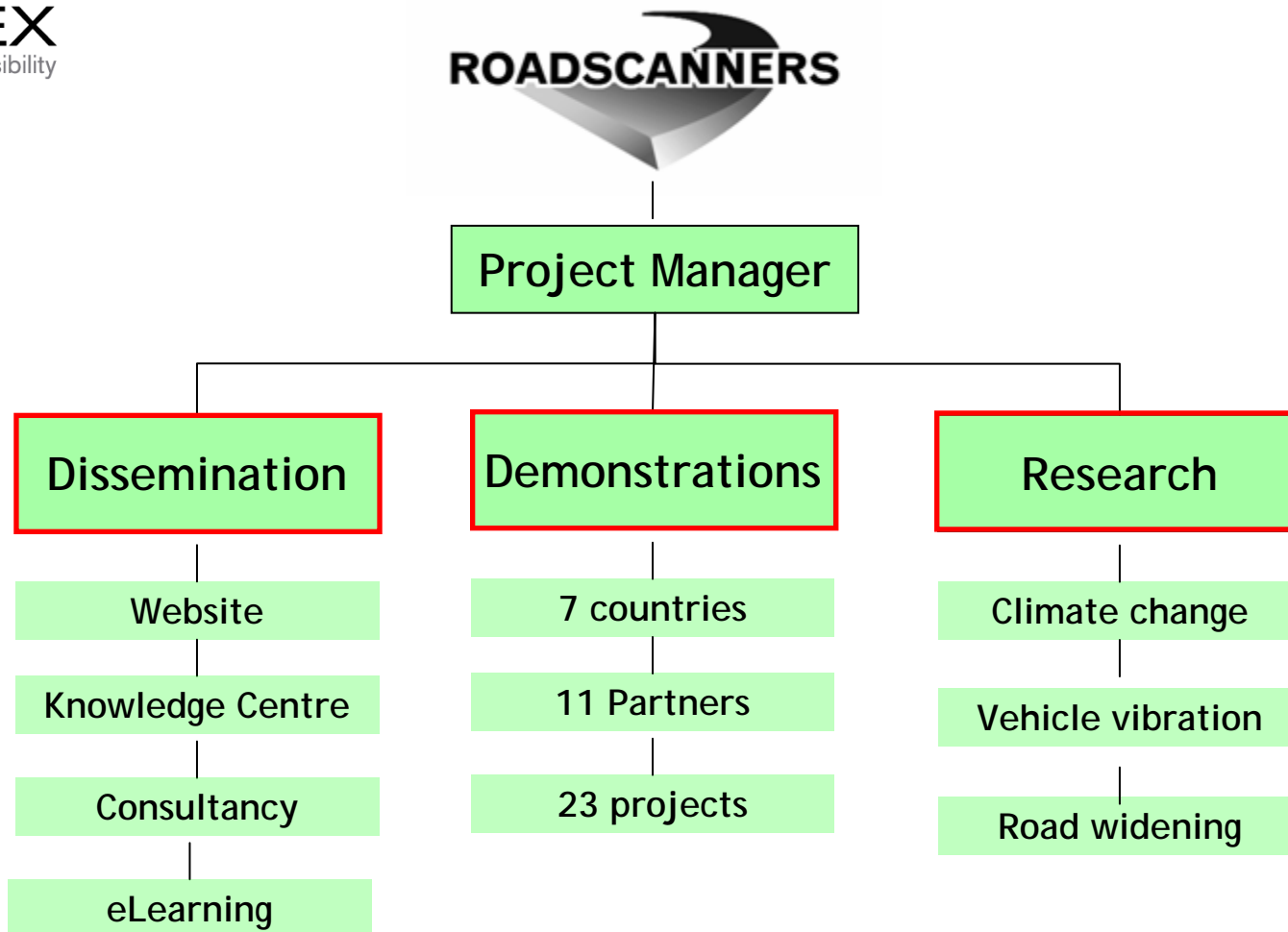


- to implement the ROADEX methods & strategies and have them accepted on the Partner road networks

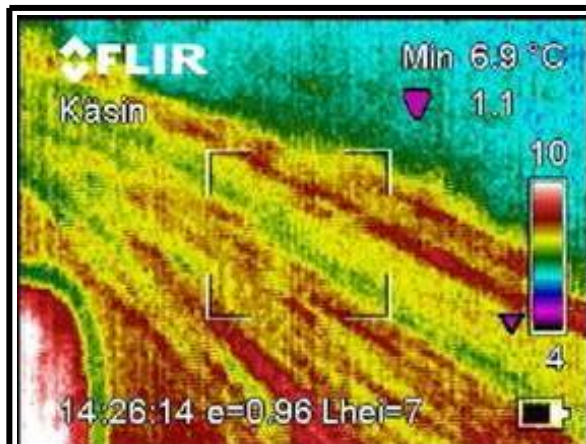




# ROADSEX IV project structure



# Demonstration projects



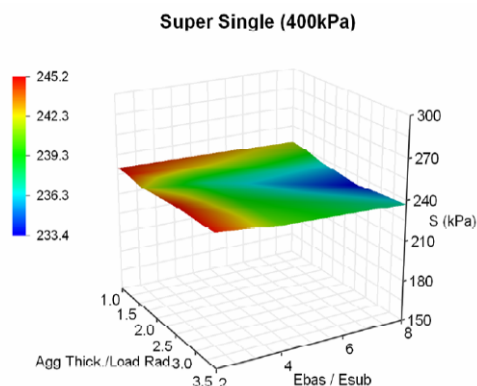
**Drainage maintenance**  
Timo Saarenketo



**Low impact vehicles & TPC**  
Pauli Kolisoja



**Forest road policies**  
Svante Johansson



**Design against rutting**  
Pauli Kolisoja

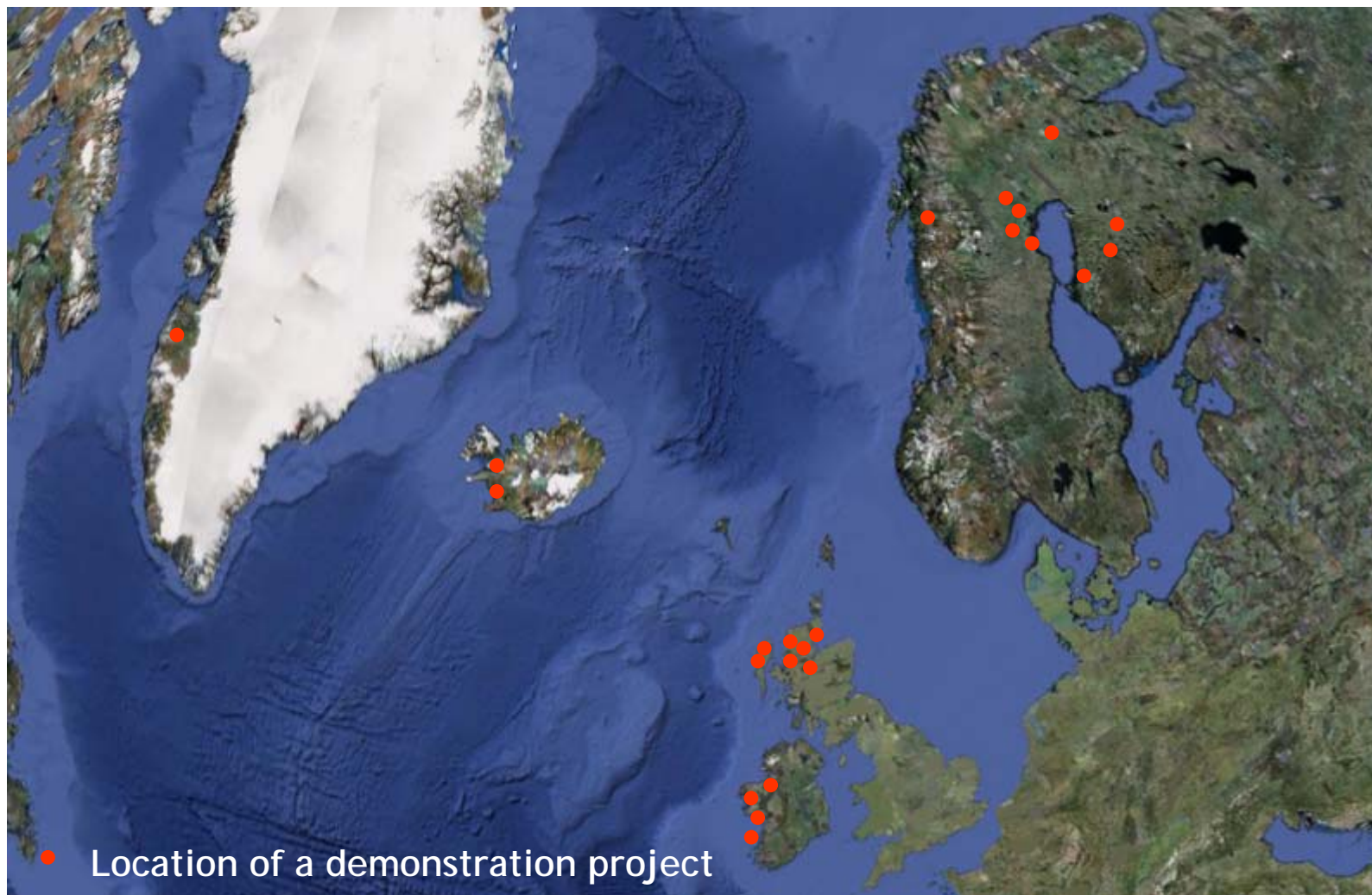


**Roads on Peat**  
Ron Munro



**Driver vibration**  
Johan Granlund

# ROADEx IV demonstration projects



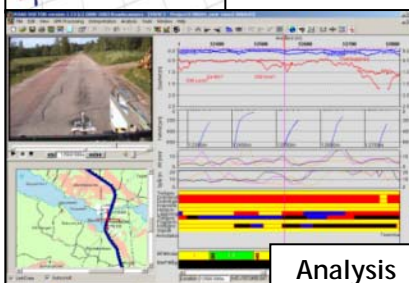
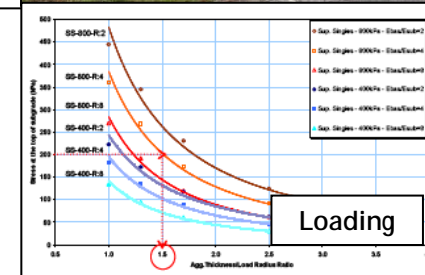
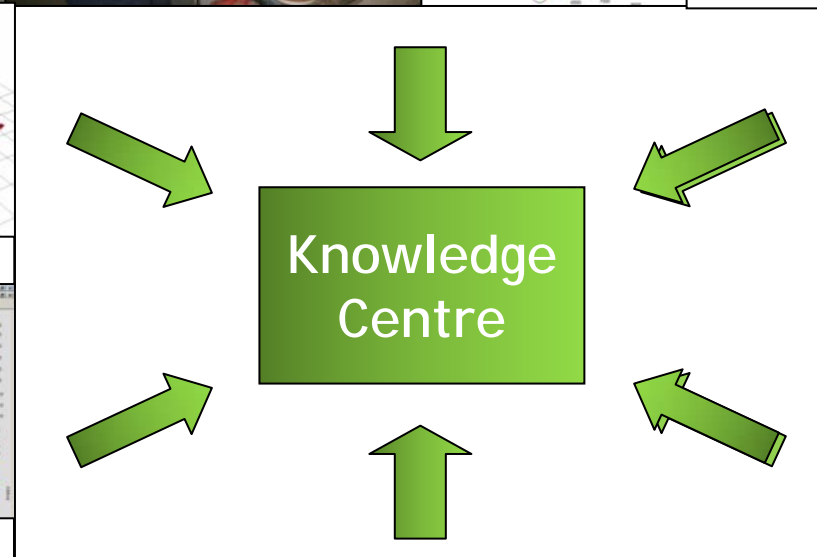
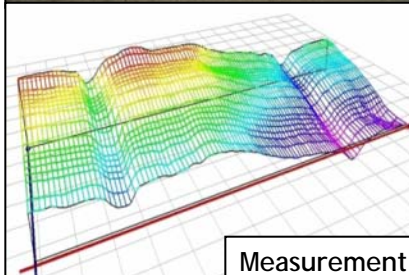
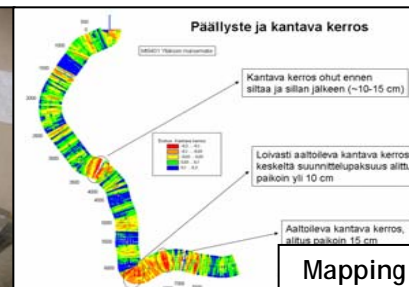
# Local demonstration projects:

- 7 countries
- 13 Partners
- 6 categories
- 23 projects

No	Location	Description
1	Greenland	<b>Drainage maintenance guidelines</b> Timo Saarenketo, Roadscanners Oy
2	Iceland	
3	Ireland	
4	Ireland	
5	Highland	
6	Western Isles	
7	Sweden	
8	Finland	<b>Road friendly vehicles and CTI</b> Pauli Kolisoja, Tampere University of Technology
9	Highland	
10	Sweden	
11	Ireland	<b>Forest Road management and maintenance policies</b> Svante Johansson, Roadscanners Sweden AB
12	Highland	
13	Sweden	
14	Finland	<b>Rutting, from theory to practice</b> Pauli Kolisoja, Tampere University of Technology
15	Iceland	
16	Highland	
17	Western Isles	
18	Sweden	
19	Kerry	<b>Roads on Peat</b> Ron Munro, Munroconsult Ltd
20	Donegal	
21	Finland	<b>Analysis of health problems due to vibration</b> Johan Granlund, Vectura Consulting AB
22	Norway	
23	Highland	



# The ROADEx Knowledge Centre




# ROADEx Research Projects




# ROADEX E-Learning packages

[Extranet Login](#)   [Login](#)




**Latest News:** 13 August 2008. After being hosted for a few months on a temporary web site the e-learning package is now running directly from the ROADEX web site's server.



## E-Learning


An extension of the e-learning project. This permits the production of additional educational material and graphics to make the package more complete and attractive to users.

[Home](#)  
[E-Learning](#)  
Lesson 1  
Permanent Deformation  
Lesson 2  
Road Construction Over Peat  
Lesson 3  
Drainage of Roads  
Lesson 4  
Environmental Considerations for Low Volume Roads  
[Consultancy and Knowledge Centre](#)




Lesson 1  
**Permanent Deformation**  
The importance of the road network to a society can be compared with the vascular system of a human body.

[Continue](#) [Download Lesson 1](#) 4.1MB




Lesson 2  
**Road Construction Over Peat**  
The importance of the road network to a society can be compared with the vascular system of a human body.

[Continue](#) [Download Lesson 2](#) 4.1MB




Lesson 3  
**Drainage of Roads**  
The importance of the road network to a society can be compared with the vascular system of a human body.

[Continue](#) [Download Lesson 3](#) 4.1MB



Lesson 4  
**Environmental Considerations for Low Volume Roads**  
The importance of the road network to a society can be compared with the vascular system of a human body.

[Continue](#) [Download Lesson 4](#) 4.1MB



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# The ROADEX website: [www.roadex.org](http://www.roadex.org)

Latest News: 15.07.2010. ROADEX meets FPInnovations. Scotland, Finland and Sweden were happy to host TPCS expert Al Bradley of FPL... more.



## ROADEX Services

The ROADEX Project offers a number of services to its Partner organisations to support the continual improvement of the organisations' and the rural road networks they manage.

[Home](#)
[About Us](#)
[Background](#)
[ROADEX Services](#)
[Consultancy](#)
[The ROADEX Knowledge Centre](#)
[The Partner Knowledge Bank](#)
[Demonstration Projects](#)
[Research Projects](#)
[ROADEX E-Learning](#)
[News](#)
[Contacts](#)


### The ROADEX Consultancy Service

A consultancy service to support the in-house teams in the application of ROADEX technologies

[Continue](#)


### The ROADEX Knowledge Centre

The place where all published ROADEX publications and media can be accessed

[Continue](#)


### The Partner Knowledge Bank

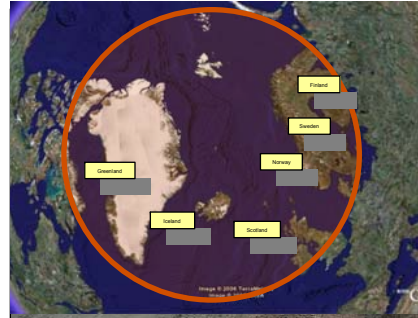
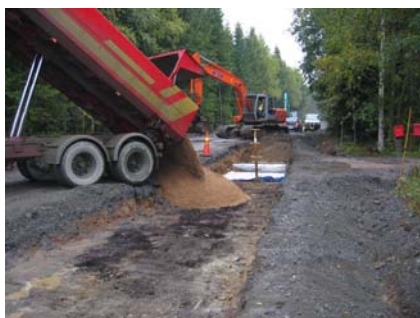
The Partner area of the website where Partners can share in-house information on low volume roads

[Continue](#)


# ROADEx Solutions

- **New survey methods** to help designers focus on problem sections and make correct diagnoses;
- **New risk assessments methods** for heavy traffic on public and forest roads;
- **New models** for designing road structures against permanent deformation;
- **New guidance** for rehabilitating low volume roads;
- **New training packages** for in-house & external staff;
- **New techniques** for real time road condition monitoring;
- **New information** for political decision makers regarding the importance of rural road conditions;
- **And many others .....**

# The ROADEx Project:





**ROADEx**  
Implementing Accessibility

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Thank you

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[www.roadex.org](http://www.roadex.org)