DESTINATION RAIL
- Developing novel techniques for improved competiveness of railways

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What is the DESTinationRAIL Project

- DESTINATION RAIL - Decision Support Tool for Rail Infrastructure Managers

- Horizon 2020 funded

- Runs for 3 years from May 2015 to April 2018

- Looking at reducing Infrastructure Costs

- Delivers practical solutions

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Decision Support Tool for Rail Infrastructure
EU Project No. 636285

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Consortium

Participant organisation name	Country
Gavin and Doherty Geosolutions (GDG)	Ireland
Irish Rail (IÉ)	Ireland
Transport Research Laboratory (TRL)	United Kingdom
Robson's International Rail Consultancy (RIRC)	United Kingdom
University of Zagreb (UZ)	Croatia
Croatian Railways (HŽ)	Croatia
Technical University of Munich (TUM)	Germany
Slovenian National Building and Civil Engineering (ZAG)	Slovenia
Norwegian Geotechnical Institute (NGI)	Norway
Norwegian National Technical University (NTNU)	Norway
University of Twente (UT)	Netherlands
Open Track Railway Technology (OTRT)	Austria
Roughan O'Donovan Innovation Solutions (ROD)	Ireland
Eidgenoessische Technische Hochschule Zurich (ETH)	Switzerland
Slovenian Railways (SŽ)	Slovenia

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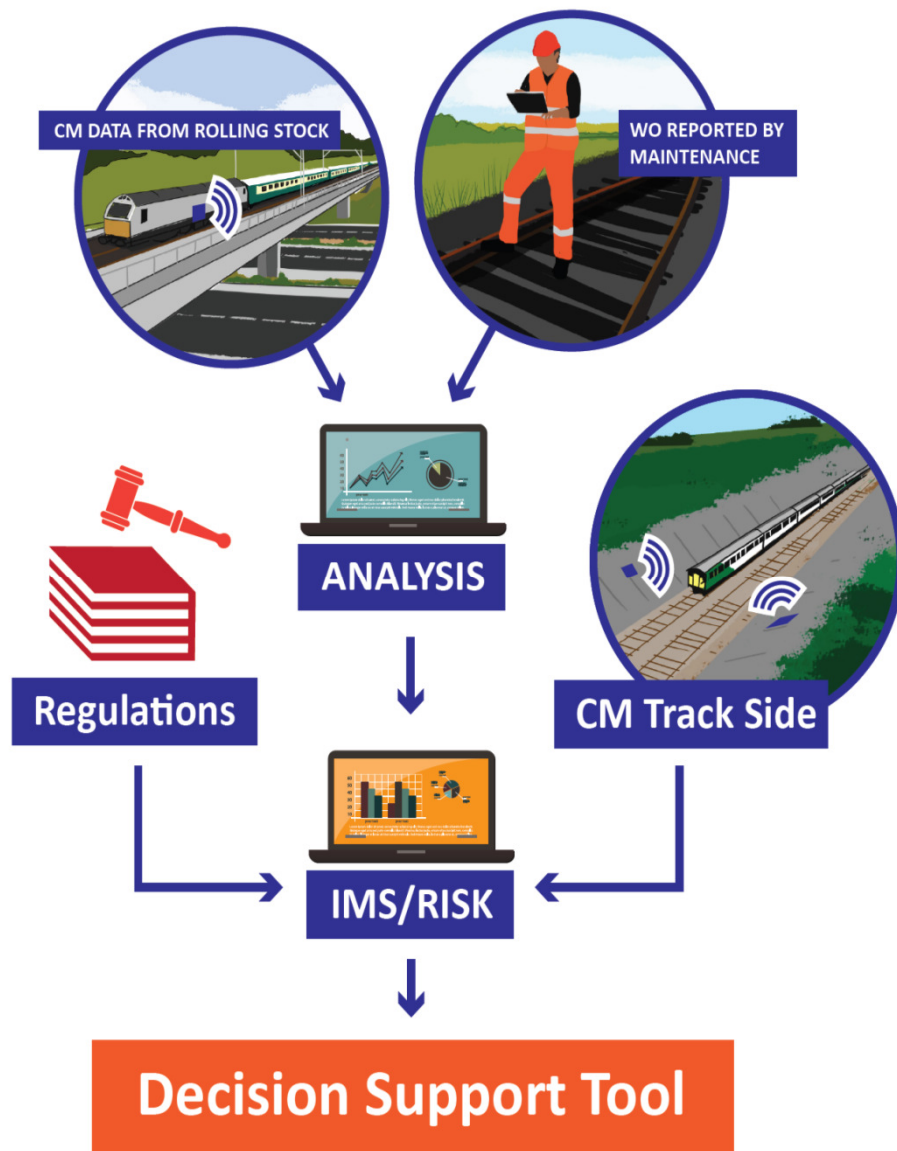
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Project Aim and Objectives

The aim of DESTination RAIL is to provide solutions for a number of problems faced by EU infrastructure managers.

Novel techniques for identifying, analysing and remediating critical rail infrastructure will be developed.

ROCK FALLS

SCOUR

BRIDGE SCOUR

FLOODING

COASTAL FLOODING

EARTHQUAKES

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HORIZON 2020

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Objectives

FIND
↓
ANALYSE
↓
CLASIFY
↓
TREAT

These solutions will be implemented using a decision support tool, which allows rail infrastructure managers to make rational investment choices, based on reliable data

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Challenges

Despite the very encouraging safety record, a number of high profile failures of rail infrastructure have occurred in recent years, with the incidence appearing to increase in response to climate challenges and aging networks amongst other factors.

Ground Penetrating Radar (GPR)

- Ground Penetrating Radar is used as a non-destructive method of surveying a stretch of track

- GPR surveying relies on the propagation of electromagnetic waves - and thus the magnetic and electric properties of the materials in the ground

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Field tests

GPR mounted in Robel for on the field test

Water being poured continuously for the measurement

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Mud pumping/Wet Spots

Fines from mud pumping clearly visible on sleeper ends and adjacent ballast. Red circle indicates the area where water was introduced into the track.
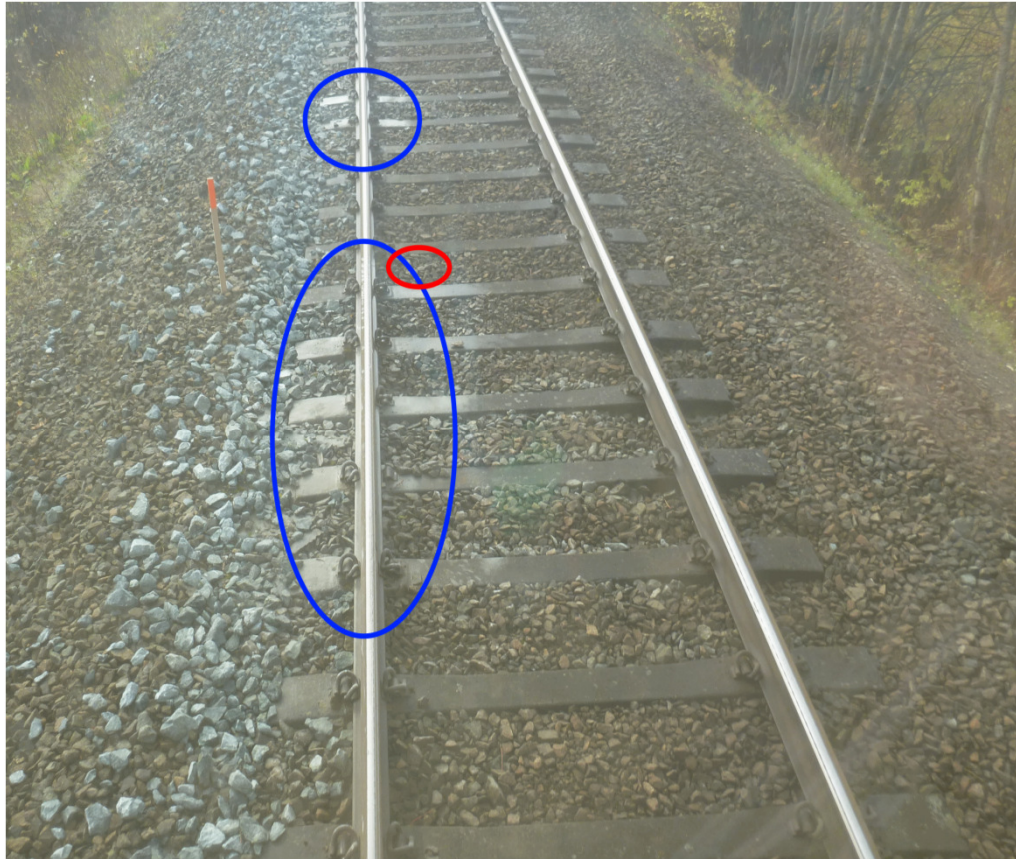
Blue markings indicate the extent of mud pumping sleepers at the site.

Ground Positioned Radar Interferometric (GPRI)

- Ground-positioned radar interferometric monitoring for displacement measurement and height mapping

- Same method as *InSAR* but ground based with reduced errors because of fixed position

- Operational range: 0.1 to 4 km

- Range resolution (direct): 0.75 m

- Azimuth resolution (normal to look direction): 6.9 m at 1 km, 13.9 m at 2 km

- Precision: < 2 mm along look direction

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GPRI – Case study, monitoring rock slide

- Monitoring of exposed highway sections along highway E16 in Western Norway. Sites are monitored twice a year.

- Figure shows result for one of potential rock fall areas based on a change detection between 2014 and 2015. Two areas with potential for significant movement are detected. Green areas in figure are considered stable and Red areas indicate movement.
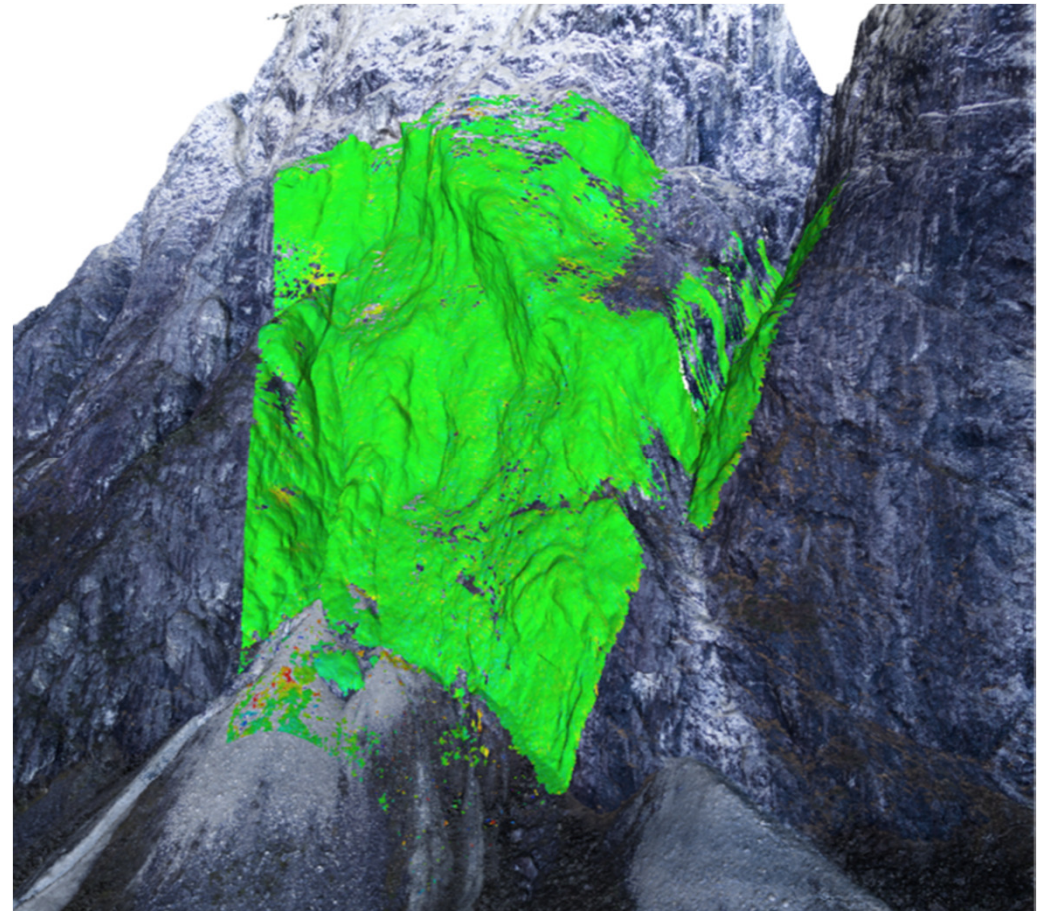
Use of Drones for monitoring slope stability

- Monitoring, collection, systematization and analysis in real time
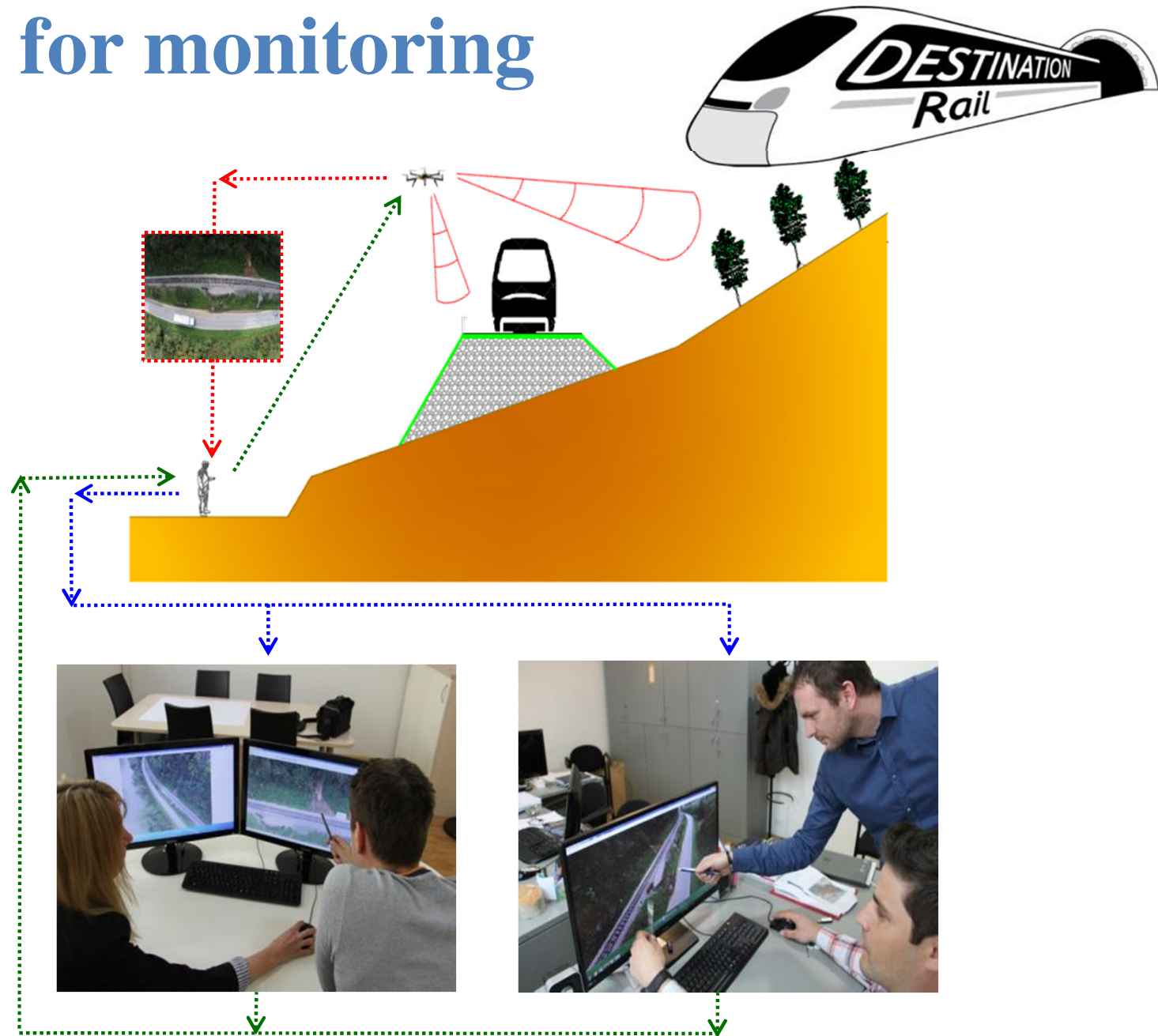
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Use of Drones for estimating slope stability

Relating the surface roughness with shear strength characteristics for the rock joints surface
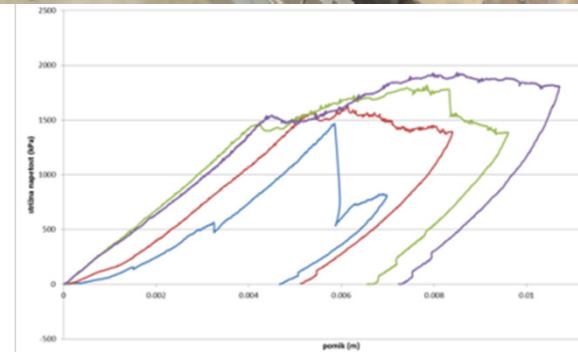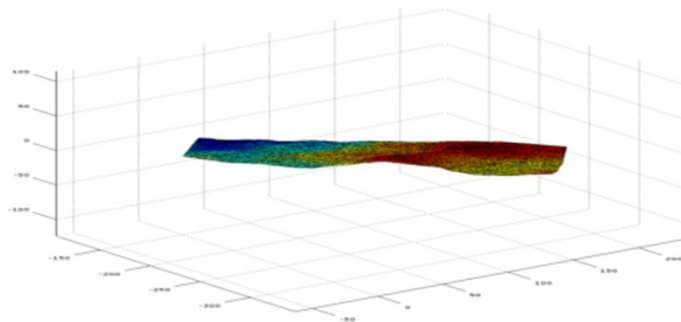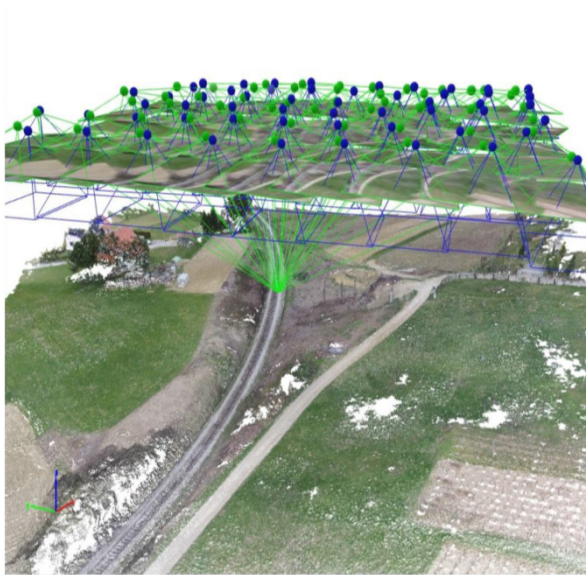
Monitoring of Structures
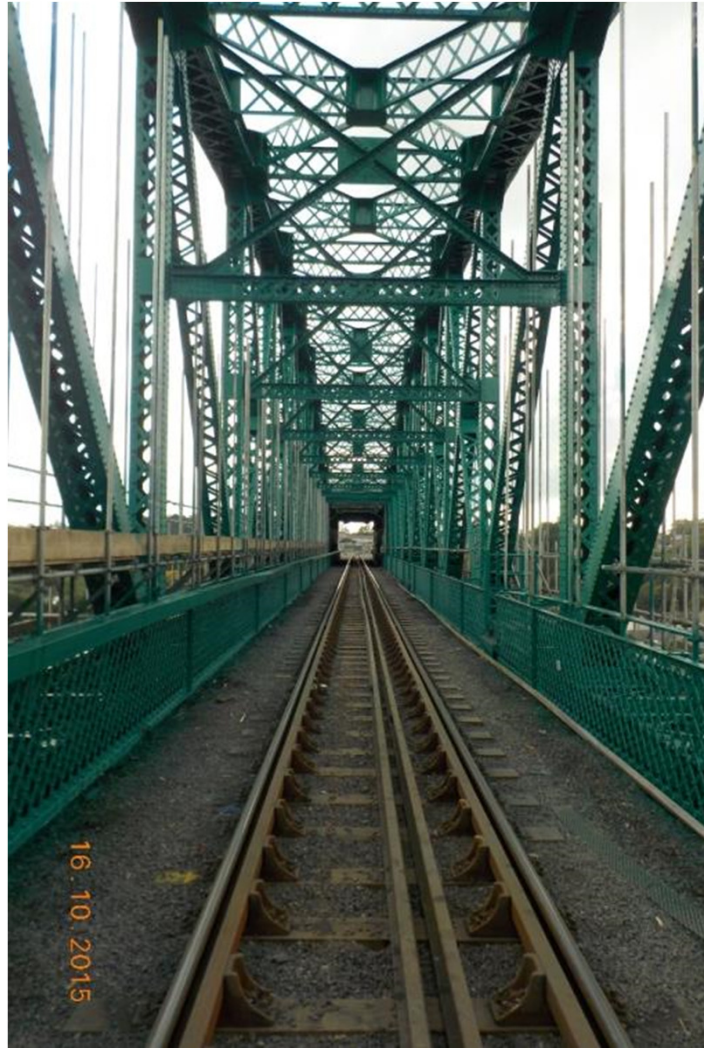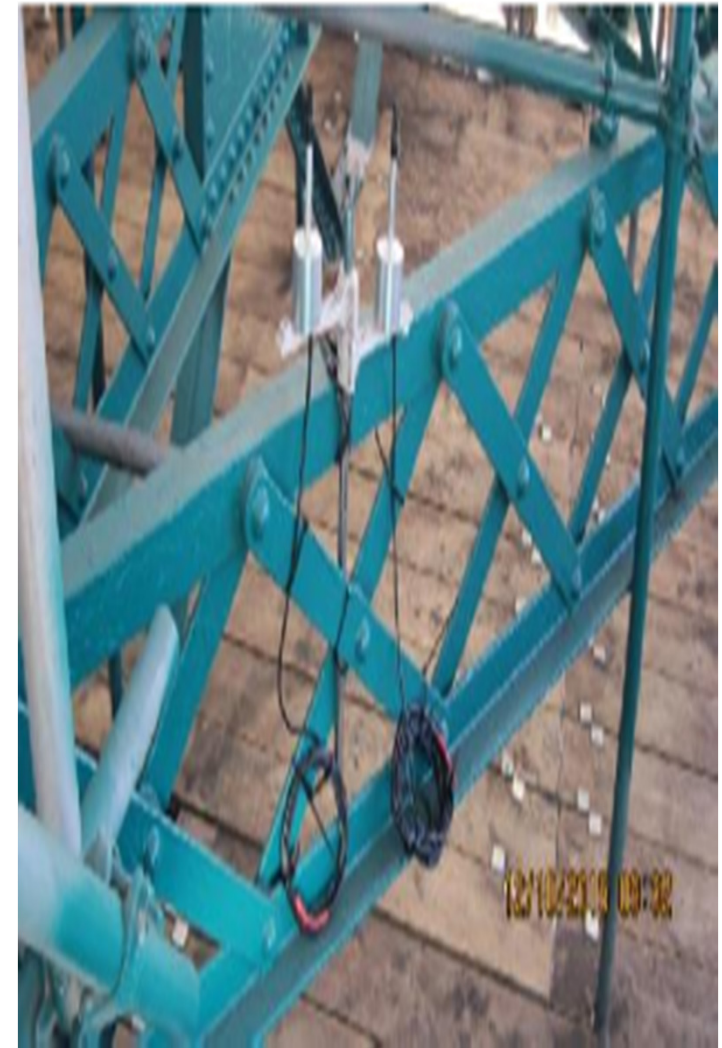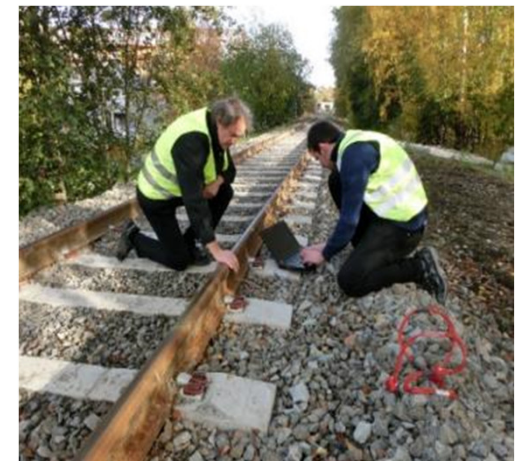
Impact – Pilot Projects

A number of Pilot Projects are being performed where elements or processes can be developed, tested and validated at scales ranging from lab to field.

Point cloud data from drone flight at location of landslide, Croatia

Railway track stiffness measurements, Slovenia

Installation of track Monitoring - Norway

New construction techniques

- Rehabilitation of existing structures with minimal interruption of traffic:
  a) Improvement of deteriorated rail structures by the injection of high-pressure expansion polyurethane resins

- New structures/reconstructions:
  b) Improved performance in transition zones
  c) Use of marginal material
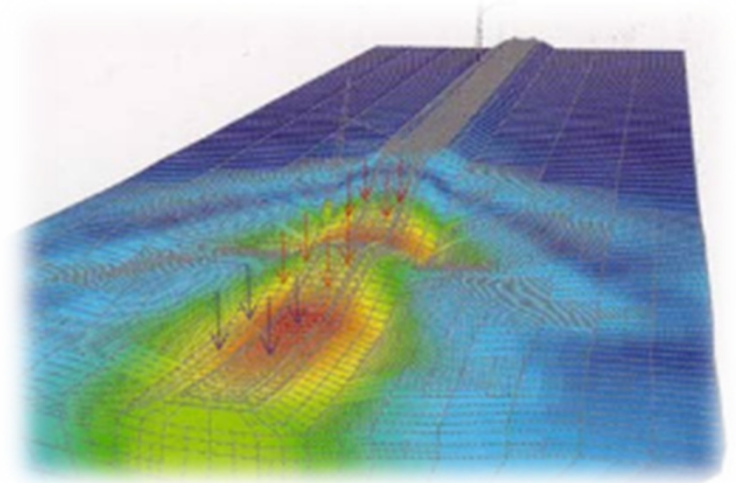
Demonstration Projects

Two major demonstration projects are being undertaken.

Boyne Viaduct in Ireland – demonstrate monitoring and collection of data for real-time risk assessments. Thus the fully implemented Decision Support Tool can be demonstrated to IM's and certification bodies. System live in October 2015.

Remediation of an **ageing railway embankment on the Slovenian rail network** will be used to demonstrate the effect of novel products and high-end design procedures on the **whole life-cycle cost of reconstruction.**

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