

PROJECT

SMART RAIL

Smart Maintenance and Analysis of Transport Infrastructure

Funding: European (7th RTD Framework Programme)

Duration: Sep 2011 - Aug 2014

Status: Complete with results

Total project cost: €3,823,676

EU contribution: €2,782,055



Call for proposal: FP7-SST-2011-RTD-1

[CORDIS RCN : 100584](#)

Background & policy context:

Europe needs a safe and cost effective transport network to encourage movement of goods and people within the EU and towards major markets in the East. This is central to European transport, economic and environmental policy.

Many parts of Europe's rail network were constructed in the mid 19th century long before the advent of modern construction standards. Historic levels of low investment, poor maintenance strategies and the deleterious effects of climate change (for example scour of bridge foundations due to flooding and rainfall induced landslides) has resulted in critical elements of the rail network such as bridges, tunnels and earthworks being at significant risk of failure. The consequence of failures of major infrastructure elements is severe and can include loss of life, significant replacement costs (typically measured in millions of Euros) and line closures which can often last for months.

Objectives:

The SMART Rail project brings together experts in the areas of highway and railway infrastructure research, SMEs and railway authorities who are responsible for the safety of national infrastructure.

The goal of the project is to reduce replacement costs, delay and provide environmentally friendly maintenance solutions for ageing infrastructure networks.

Methodology:

This will be achieved through the development of state of the art methods to analyse and monitor the existing infrastructure and make realistic scientific assessments of safety. These engineering assessments of current state will be used to design remediation strategies to prolong the life of existing infrastructure in a cost-effective manner with minimal environmental impact.

Parent Programmes:

[FP7-TRANSPORT - Transport \(Including Aeronautics\) - Horizontal activities for implementation of the transport programme \(TPT\)](#)

Institute type: Public institution

Institute name: The European Commission

Funding type: Public (EU)

Lead Organisation:

University College Dublin, National University Of Ireland, Dublin

Address:

Belfield Campus
4
Dublin
Ireland

Organisation Website:

<http://www.ucd.ie>

EU Contribution: €459,968

Partner Organisations:**Iarnrod Eireann****Address:**

Amiens Street Connolly Station
1
Dublin
Ireland

EU Contribution: €71,007

Instytut Kolejnictwa**Address:**

Chlopickiego 50
04 275 Warszawa
Poland

EU Contribution: €99,965

Roughan & O'donovan Limited**Address:**

Arena Road Arena House
18
Sandyford
Ireland

EU Contribution: €199,013

Eurnex E. V.**Address:**

Fasanenstrasse 85
10623 Berlin
Germany

EU Contribution: €438,340

Technische Universitaet Muenchen**Address:**

Arcisstrasse 21
80333 MUENCHEN
Germany

Organisation Website:

<http://www.tu-muenchen.de>

EU Contribution: €150,000

Universiteit Twente**Address:**

Drienerlolaan 5
7522 NB Enschede
Netherlands

EU Contribution: €42,369

Institut Igh Dd**Address:**

Janka Rakuse 1
10 000 Zagreb
Croatia

EU Contribution: €172,635

De Montfort University**Address:**

The Gateway
Leicester
LE1 9BH
United Kingdom

EU Contribution: €135,000

Slovenske Zeleznice Doo**Address:**

Kolodvorska Ulica 11
1000 Ljubljana
Slovenia

EU Contribution: €95,022

Forum Des Laboratoires Nationaux Europeens De Recherche Routiere**Address:**

Boulevard de la Woluwe 42
1200 Brussels
Belgium

Organisation Website:

<http://www.fehrl.org>

EU Contribution: €408,764

The University Of Nottingham**Address:**

University Park
Nottingham
NG7 2RD
United Kingdom

EU Contribution: €15,000

Zavod Za Gradbenistvo Slovenije

Address:

DIMICEVA ULICA 12
1000 LJUBLJANA
Slovenia

Organisation Website:

<http://www.zag.si>

EU Contribution: €343,354

Hz Infrastruktura D.o.o.**Address:**

Ulica Antuna Mihanovica
10000 Zagreb
Croatia

Organisation Website:

<http://www.hznet.hr>

EU Contribution: €49,999

Adaptronica Zoo Sp**Address:**

Ul. Szpitalna 32
05 092 Lomianki
Poland

EU Contribution: €101,620

Technologies:

Infrastructure management
Information system for infrastructure management

Development phase: Research/Invention

Key Results:**Innovative solutions for maintaining Europe's rail infrastructure**

Europe's rail sector needs to overcome limitations in ageing infrastructure. An EU initiative developed a new automatic sensor system to replace visual inspections of such infrastructure in order to optimise monitoring and prioritisation of repairs.

Much of Europe's rail system dates from the 19th and early 20th centuries and is degraded. The vital continual assessment and maintenance must be cost effective and efficiently prioritised. This was the task of the EU-funded project <http://smartrail.fehrl.org/> (SMART RAIL) (Smart maintenance and analysis of transport infrastructure).

Initially, the project conducted in situ assessments of specific rail infrastructure around Europe. Assessments included the current conditions of the infrastructure, plus estimates of likely damage given different usage or weather conditions.

Novel techniques to obtain real-time data on the performance of rail infrastructure such as bridges, tracks and slopes were developed and tested on railway infrastructure across the EU. These include sensors to monitor the corrosion rate of steel and concrete bridges, geophysical techniques to assess the condition of open track and embankments, accelerometers to measure the development of bridge scour and an early warning system for landslides.

A life-cycle tool was developed to demonstrate the environmental and economic cost benefits concerning the tested techniques. Demonstrations were carried out on railway networks in Ireland, Croatia, Poland and Slovenia.

Guidelines for the implementation of practical solutions to meet user needs and to facilitate widespread exploitation of outcomes were made available on the project website. Dedicated workshops and conference sessions were organised and scientific papers published.

Thanks to SMART RAIL, infrastructure operators and managers have at their disposal innovative methods and cost-effective measures to ensure the future safety and quality of Europe's infrastructure.

Documents:

 [Final Report Summary - SMART RAIL \(Smart Maintenance and Analysis of Transport Infrastructure\)](#)

STRIA Roadmaps: Infrastructure

Transport mode: Multimodal transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Deployment planning/Financing/Market roll-out

Geo-spatial type: Other