EUROPEAN COMMISSION

SEVENTH FRAMEWORK PROGRAMME

Community research
Research DG
H2 Surface Transport

SMARTRAIL

SMARTRAIL – Work Package 1

Monitoring and Inspection

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Objectives

WP1 aims to bring about a step change in the traditional methods of *visual inspection and ad-hoc monitoring* with integrated monitoring systems which utilize the *latest embedded sensor technology and optimized in-situ testing methods*.

Overview of Tasks

Task 1.1 Network of embedded sensor devices

Task 1.2: Instrumented Smart Slope

Task 1.3: Inspection of Slopes using NDT Techniques

Task 1.4: Development of a methodology for NDT assessment of bridges subjected to scour

Task 1.5: Use of instrumentation to monitor the condition of bridge structures

Participants Overview

Participant number [10]	Participant short name [11]	Person-months per participant
1	NUID-UCD	18.00
2	SŽ	4.00
3	FEHRL	11.00
4	EURNEX	5.00
5	IGH	10.00
6	ZAG	6.00
8	Adaptronica	10.00
10	IK	3.00
13	IE	4.00
	Total	71.00

Task 1.1 Network of embedded sensor devices

Partners Irish Rail, Slovenian Railways, EURNEX (RTU), FERHL (VTI), ZAG and IK.

The participants will specify *embedded sensor systems* to monitor and control old railway networks. Networks of embedded intelligent control devices allow for adaption of the system and control of rolling stock including up to a 10% saving in energy costs. An *intelligent hybrid braking energy storage system* may increase energy efficiency by 25-40% for electric traction and fuel economy of up to 30% for diesel traction. Whilst devices for safe braking allow preventing collisions of trains. *FEHRL* will consider optimisation of data collection. The sensor network will be installed in a test section (demonstration site) on the Slovenian Railway network.

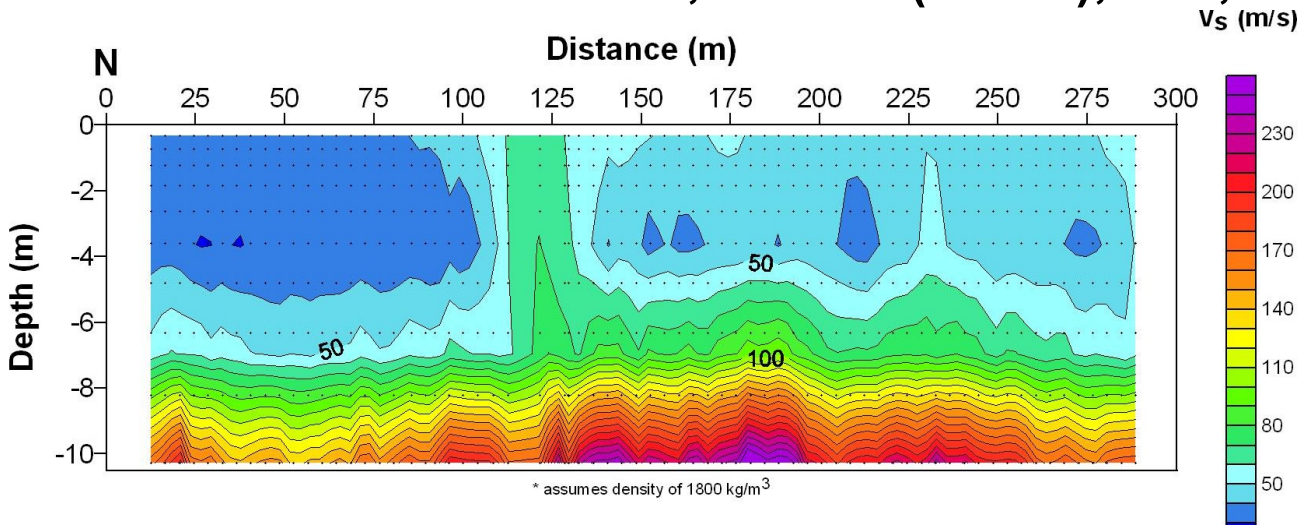
Task 1.2: Instrumented Smart Slope

Partners: UCD and Irish Rail

- An exiting (disused) railway slope will be instrumented with pore pressure sensors, inclinometers, weather station etc.
- Controlled rainfall will be applied using a rainfall simulator
- Live slopes will be instrumented to provide real-time feedback

Task 1.3: Slope Inspection using NDT Techniques

Partners: UCD, FERHL (NTUA), IGH, Irish Rail



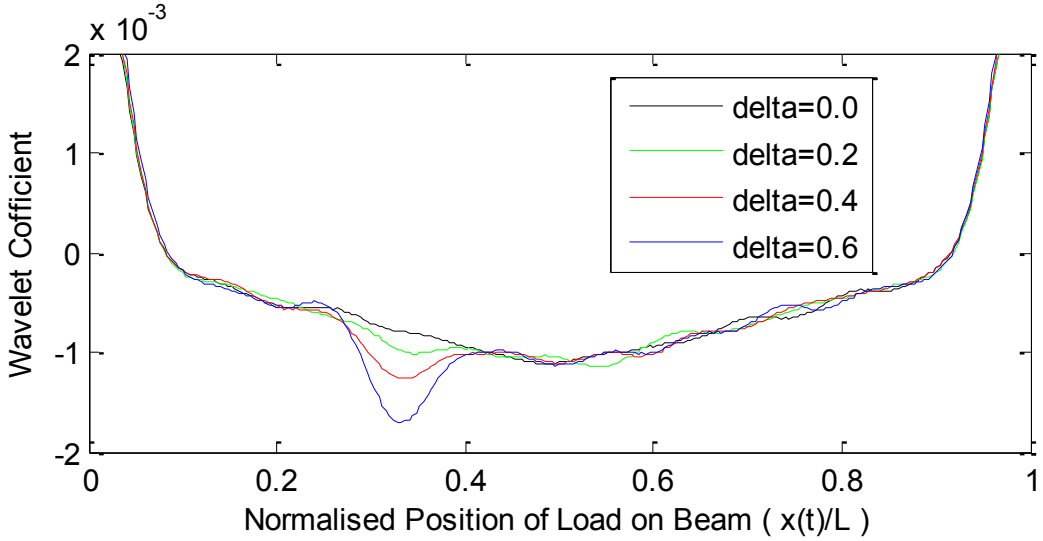
(i) Method to increase data acquisition from MASW

(ii) Develop improved models for interpreting the data e.g. GPR measurements to assess moisture content distributions in a soil mass

(iii) Investigate fundamental relationships between geophysical measurements and soil properties, e.g. Water content and stiffness

Task 1.4: NDT assessment of bridge foundations subjected to scour

Partners: UCD, NTUA, Irish Rail)



(i) Investigate geophysical techniques in field

(ii) Use of accelerometer data to measure changes in frequency response (lab – flume) and field.

Task 1.5 Use of instrumentation to monitor the condition of bridge structures

Partners: Adaptronica and Zag

• Instrumentation of the steel truss railways bridges with piezoelectric strain sensors with graphical interface

•A bridge weigh in motion system which is capable of separating the dynamic response will be developed

Corrosion of concrete bridges

• A demonstration site will be identified in collaboration with the advisory group.

WP1 Deliverables

Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D1.1	Specification	4	1.00	R	PU	2
D1.2	Report on initial output from sensor network	1	1.00	R	PU	6
D1.3	Bridge Monitoring	6	1.00	R	PU	33
		Total	3.00			

Deliverables

Deliverable 1.1:

Specification: Specification for embedded sensor networks which consider the range of measurements required to maintain the performance of ageing rail networks. [October 31st]

Deliverable 1.2:

Report on initial output from sensor network: Output from the embedded sensor networks and NDT investigations will be used as input to SHM models in WP2 [February 28th 2012]

Deliverable 1.3:

Bridge Monitoring: Report on bridge monitoring [November 2014]

Milestones

Milestone 2

Report to demonstrate the efficacy of a range of non-intrusive test methods for assessing railway infrastructure [February 2013]

Questions / Comments?