

SMARTTRAIL Final Conference Ljubljana 24/25 August

Dissemination

**Assist. Prof. Dr.h.c. Wolfgang H. Steinicke and Michael
Robson,
EURNEX**

Work Package 5 Results

Face to Face interviews

- **PLK November 2011**
- **HZ November 2011**
- **SZDC May 2012**
- **REFER May 2012**
- **LITH June 2012**
- **MAV May 2012**
- **Questionnaires from OBB,CIE,NRIC**

Workshops

- **Dubrovnik May 2012**
- **INNOTRANS Berlin September 2012**
- **Ljubljana November 2012**
- **Moscow December 2012**
- **EURNEX Executive Board DB Berlin July 2013, June 2014**

Scope and identified requirements for the project confirmed by Infrastructure Managers

- **Embankment stability.**
- **Bridge life extension.**
- **Bridge scour.**
- **Structural Health Monitoring.**
- **New Rehabilitation Technologies.**
- **Track maintenance, e.g. Anchor Rail fastening (ARF).**
- **LCC Database.**



Work Package 5 Results

Conference Presentations

- TRA Athens 2012.
- CETRA Dubrovnik May 2012.
- TRA Paris June 2014.
- UIC Structure Group Zagreb September 2013.
- Wider Black Sea Area Bucharest October 2012 and 2013.
- Joint MAINLNE/SMARTTRAIL UIC Paris May 2013.

Conference presentations

- UIC Structures Group Zagreb, 2013.
- Danube Strategy Conference Belgrade, October 2013.
- UNECE TEN/TER Bad Gastein 2013.
- Club Feroviar Sibiu, February 2014.
- International Symposium on Bridges Brno, April 2014.



Work Package 5 Results

Publications

- FEHRL Newsletter.
- Railway Pro.
- Eurail Magazine.
- SMARTTRAIL Flyers.
- Newsletters.
- User Platform Reports.



Work Package 5 Results

Pilot sites visited

- **Buna Bridge (Croatia).**
- **Tunnels Košane-Gornje, Ležeče (Slo)**
- **Open track sections in Litija, Ljutomer and Dolga Gora (Slovenia).**



Practical Solutions : Embankment Stability

- Risk management systems are only as good as the data used to quantify risk
- Overreliance on visual assessment
- More use of non-intrusive testing and SHM encouraged
- Data should then be used in a probabilistic framework

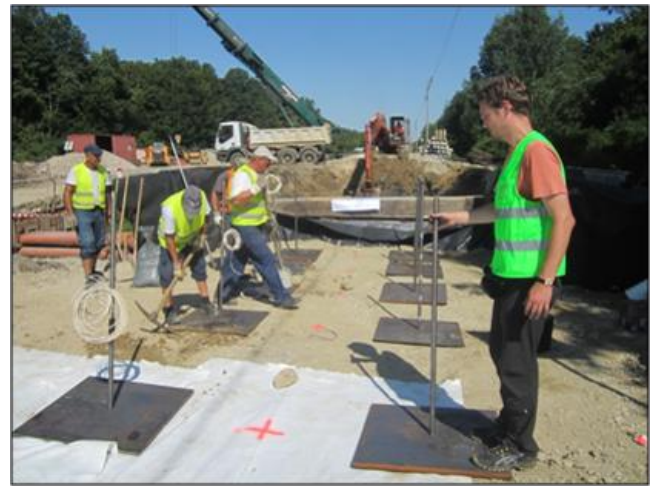
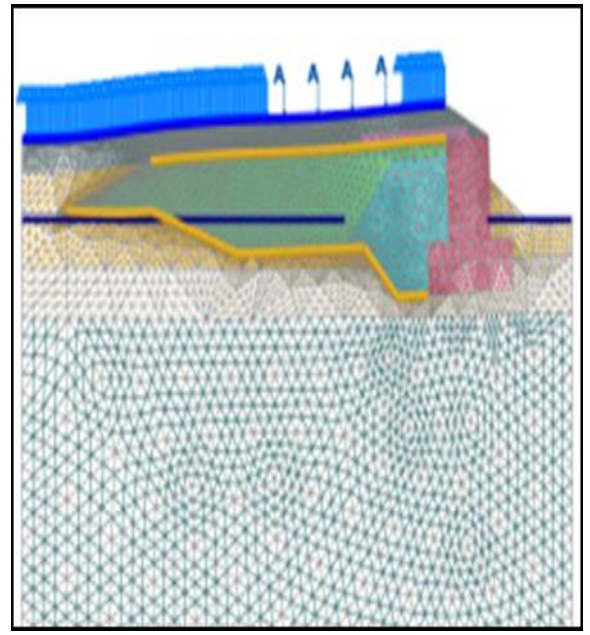


Practical Solution : Structural Health Monitoring

- Rail transport infrastructure safety framework has been developed and report is being finalised.
- Single span steel bridge has been assessed and the simplified LFRD method has been demonstrated. In-situ Measurements (10 Days) have been used in the analysis.
- Finite Element model of steel bridge validated using measurements.
- Nieporęt Bridge in Poland has been modelled using finite element package and model has been calibrated using measurements from the bridge.
- Adaptronica testing wireless sensors.
- Probabilistic slope stability models developed:

Practical Solution : Bridge Life Extension

- Test results using new materials to strengthen bridges
- Monitoring new methods of infilling transitions zones with results available



Practical Solution : New Maintenance Techniques

- **Documentation produced on the results of using different materials in transition zones**
- **Use of Geosynthetic mats tested with results available**
- **Concrete spraying of tunnels demonstrated as a practical solution for rehabilitating them**





EUROPEAN
COMMISSION

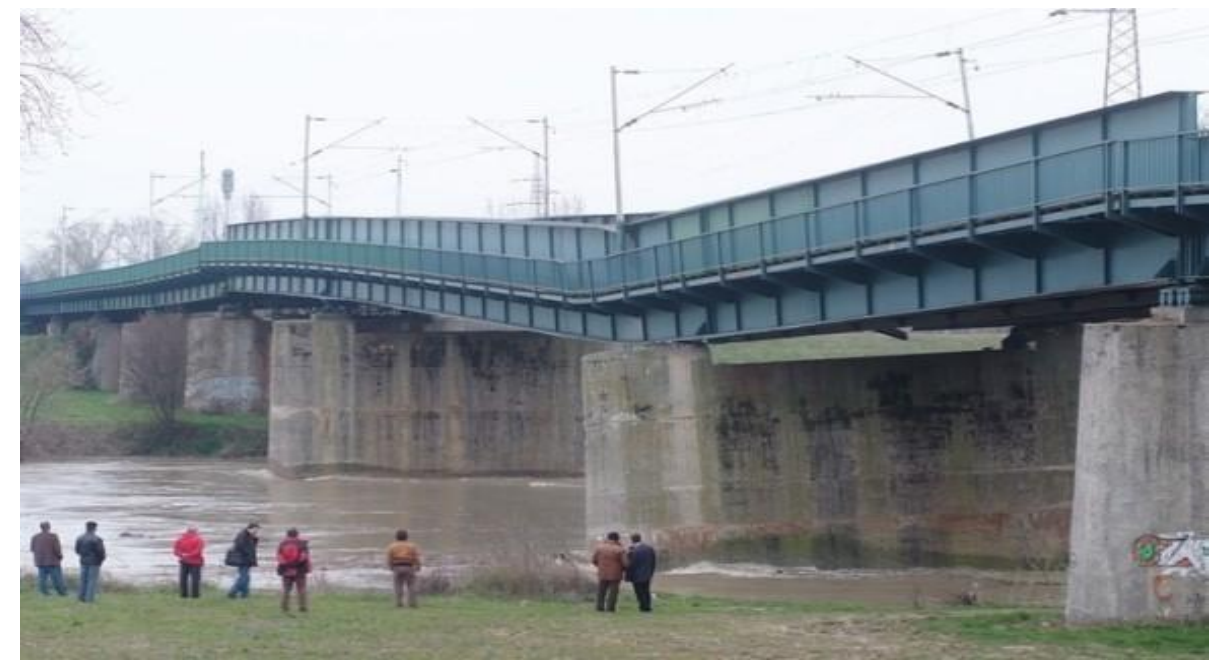
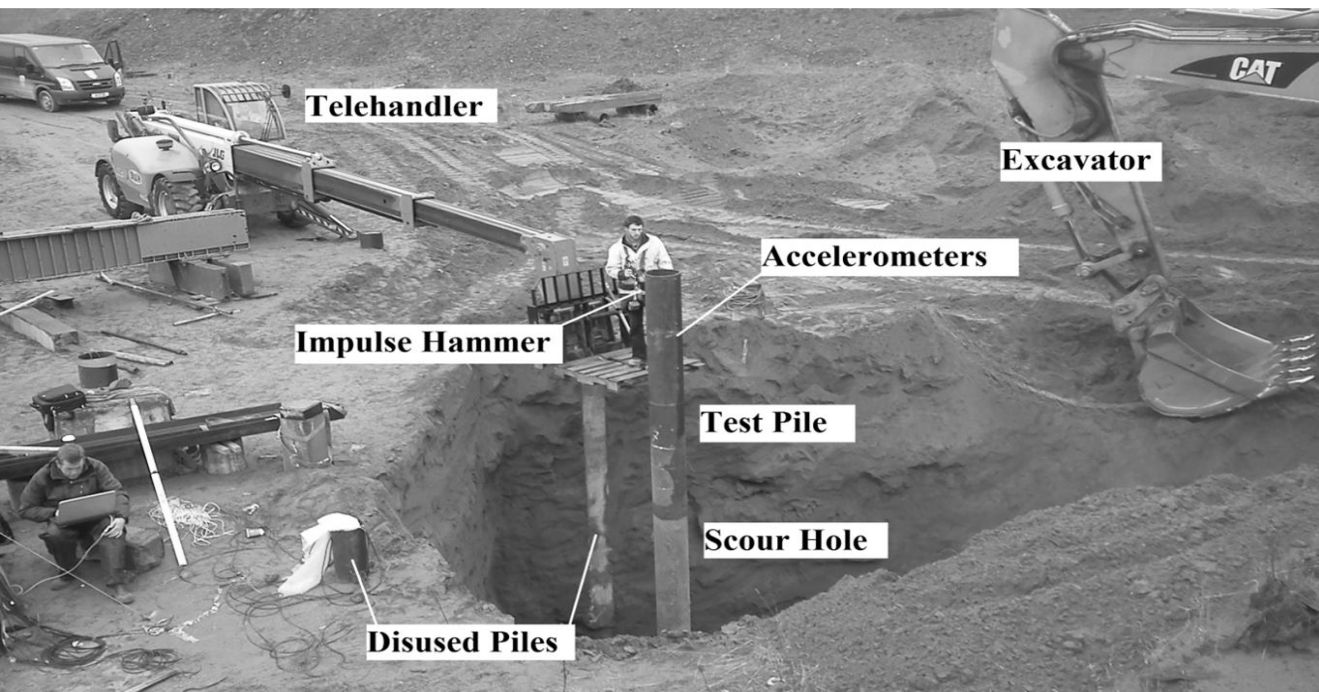


Community research
Research DG
H2 Surface Transport



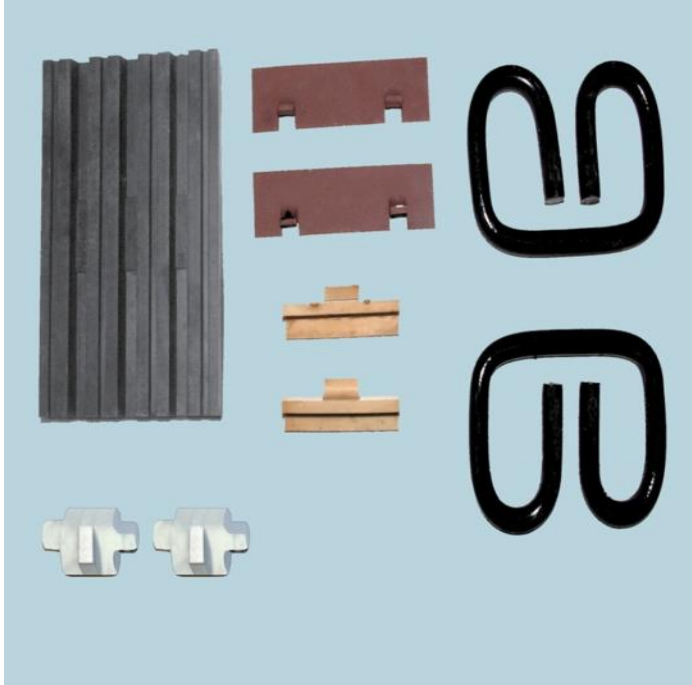
Practical Solution : Bridge Scour

- Test carried out with results available
- Models being prepared to aid managers in assessing the rate of scour



Practical Solution : Anchor Rail Fastening

- Used by RZD
- Reduction in maintenance costs of 20%
- Documentation on fastenings available



Practical Solution : Life Cycle Cost, LCC

- Report Produced on Life Cycle Cost Model
- Database prepared to be populated by railways & Model produced

Life time (in years)	No.1 Variant (without geotextile)	No.2 Variant (with geotextile)	No.3 Variant (with geotextile)	No.4 Variant (with geotextile)
Ballast	25	35	35	38
Sleepers	20	20	25	30
Rails and fastening system	30	30	33	45
Elastomeric pads	30	30	30	45
Geocomposite	/	35	35	38
Frequency of maintenance (no. per 60 years)	No.1 Variant (without geotextile)	No.2 Variant (with geotextile)	No.3 Variant (with geotextile)	No.4 Variant (with geotextile)
Ballast tamping	45	30	30	25
Ballast stabilizing	45	30	30	25
Rail milling	15	15	15	10



EUROPEAN
COMMISSION



SEVENTH FRAMEWORK
PROGRAMME

Community research
Research DG
H2 Surface Transport



Summary

- **User needs identified and fed into the project.**
- **Various target audiences involved through face to face interviews, workshops, conference presentations, site visits together with articles in magazines and the website.**
- **Practical solutions provided for a number of issues.**
- **Sound basis for further research**



EUROPEAN
COMMISSION



SEVENTH FRAMEWORK
PROGRAMME

Community research
Research DG
H2 Surface Transport



Thank you

**Further information on the project can be obtained by visiting
the website at www.smartrail.org**