

MAIN LINE

**MAINTENANCE, RENEWAL AND
IMPROVEMENT OF RAIL TRANSPORT
INFRASTRUCTURE TO REDUCE
ECONOMIC AND
ENVIRONMENTAL IMPACT**

Björn Paulsson, UIC/TRV, Project Manager

**Lennart Elfgren, Thomas Blanksvärd, LTU,
Scientific & Technical Coordinators**

CIR Meeting Göteborg 2013-01-29



*This project is co-funded
by the European Commission with the FP7*

Presentation of the MAINLINE Project

2

Background

Builds on earlier projects as Sustainable Bridges (2003-07)

Scope

- ❑ Make **rail infrastructure** more **cost effective**
- ❑ Model **degradation** due to increased traffic and time/age
- ❑ Create tools for **whole life assessment** to make it possible to balance **economic** end **environmental** costs

Presentation of the MAINLINE Project

3 years (Oct 2011 - Sept 2014)

Total budget 4.5 M€ (3 M€ from EC)

Project Manager: Björn Paulsson, UIC/TRV + ARTTIC/FR

19 Participants whereof:

- 7 Infrastructure Managers (DB, NR, MAV, TCDD, TRV, SETRA, UIC)
- 2 Contractors (COMSA, SKANSKA)
- 5 Consultants (COWI, DAMILL, SKM, TWI, ARTTIC)
- 5 Universities (Barcelona, Graz, LTU-SBU, Minho, Surrey)
- from 11 countries (AT, CZ, DE, DK, ES, FR, HU, PT, SE, TR, UK)

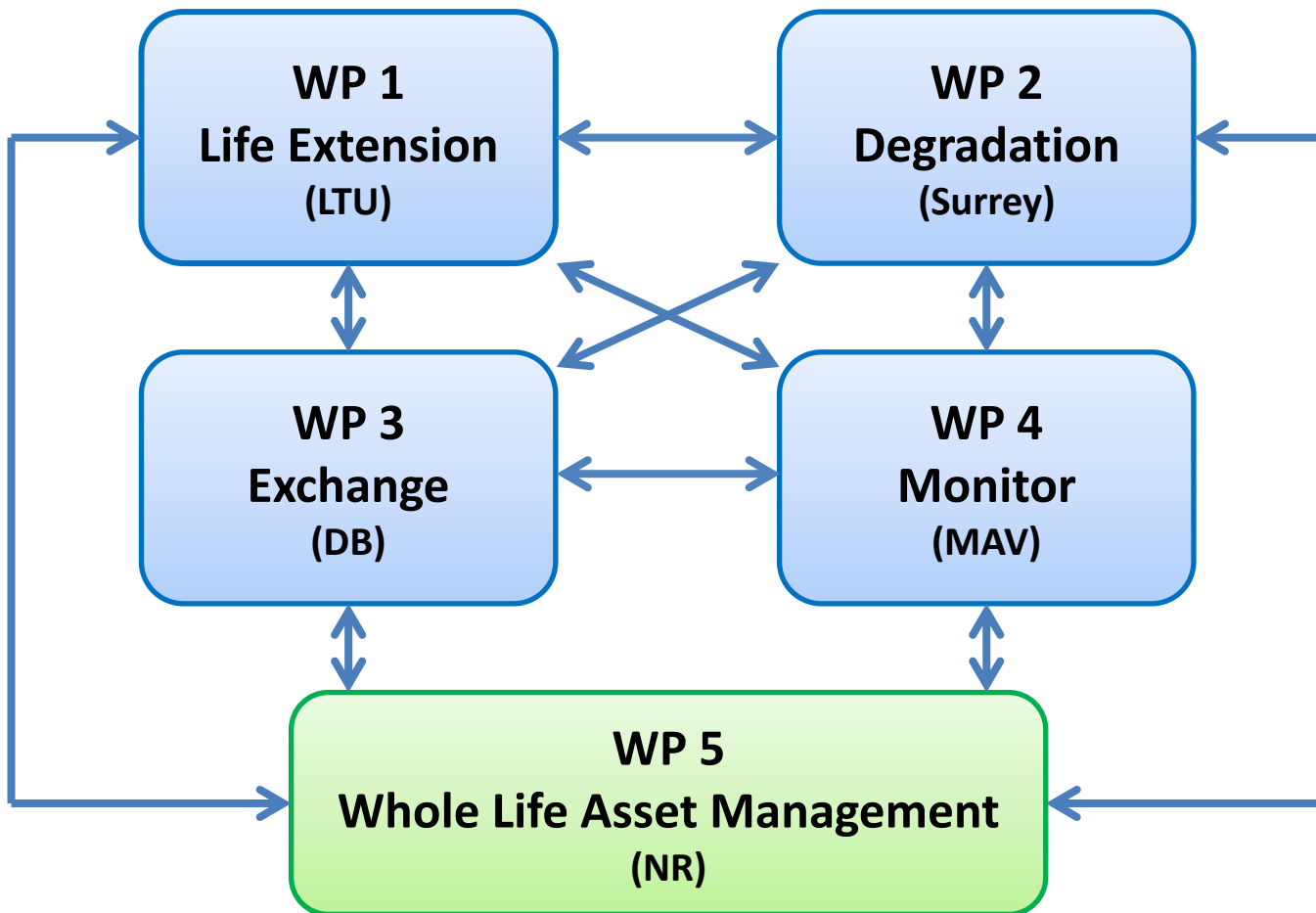
Swedish Participants: Damill (D Larsson); TRV (B Paulsson & A Carolin); LTU-SBU (L Elfgren, Th Blanksvärd, B Täljsten, J Nilima, U Kumar & M Veljkovics/LTU, O Larsson/LTH, K Lundgren & M Plos/Chalmers, R Karoumi & H Sundquist, KTH)

Partners in the MAINLINE Project

4

N°	Org.	Short Name	Country
1	UIC	UIC	FR
2	Network Rail I	NR	UK
3	COWI	COWI	DK
4	Sinclair Knight Merz	SKM	UK
5	University of Surrey	Surrey	UK
6	TWI Ltd	TWI	UK
7	University of Minho	UMINHO	PT
8	Luleå tekniska universitet	LTU-SBU	SE
9	DB Netz AG	DB	DE
10	MÁV Magyar Államvasutak Zrt	MAV	HU

N°	Org.	Short Name	Country
11	Universitat Politècnica de Catalunya	UPC	ES
12	Graz University of Technology	TUGraz	AT
13	TCDD	TCDD	TR
14	DAMILL AB	DAMILL	SE
15	COMSA EMTE	COMSA	ES
16	TRAFIKVERKET	TRV	SE
17	SETRA	SETRA	FR
18	ARTTIC	ARTTIC	FR
19	Skanska a.s	SKANSKA	CZ



WP 6 Dissemination
WP 7 Management
WP 8 Scientific & Technical Coordination
(UIC)

WP1 Extend Life

6

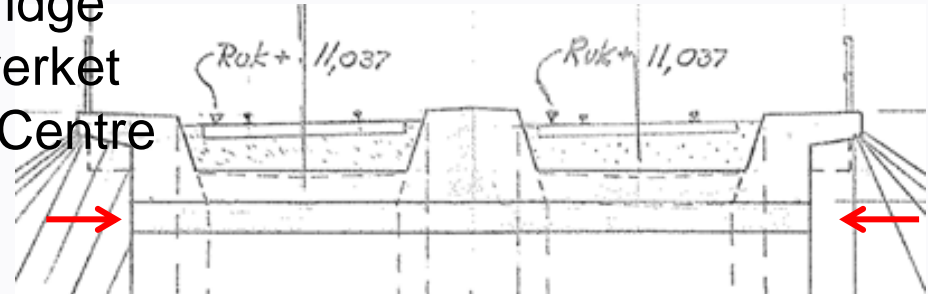
- Explore and evaluate **new technologies** to extend life of old infrastructure
- Develop **assessment methods** to determine if the life can be extended
- Develop **new technologies** and a **guideline** for the application
- **Transfer** knowledge to Eastern Europe and developing economies

WP1 Extend Life

Tests are made on three bridges:

- Post-stressing of a concrete trough bridge (Shear capacity)
- Test to failure of a steel truss bridge (Stability, Fatigue, Rivets)
- Test of strains in a steel sister bridge

With additional funding from Trafikverket
and Hjalmar Lundbohm Research Centre



Nilimaa, Jonny (2012): Upgrading Concrete Bridges

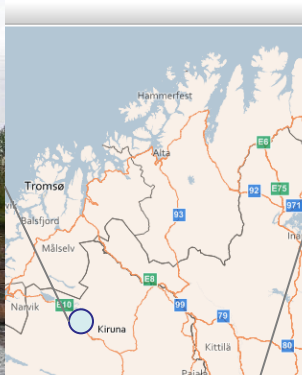

http://pure.ltu.se/portal/files/41761237/Jonny_Nilimaa.Komplett.pdf

Three bridges to be tested/upgraded

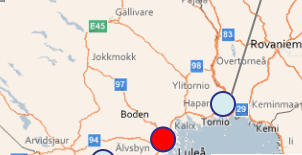

BaTMan BRO OCH TUNNEL MANAGEMENT

Rapporter ▾ Objektdata ▾ Förvaltning ▾ Information ▾ Mina sidor ▾ Kontakta oss ▾ Om ▾ Skriv ut ▾

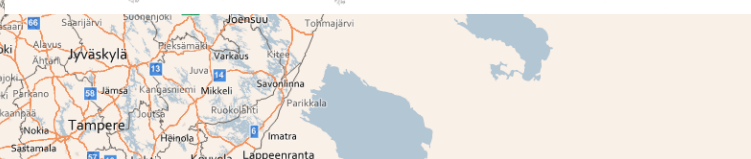
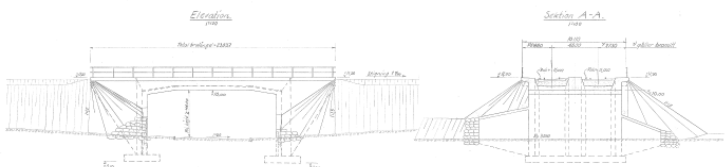


Rautasjokk



Haparanda VP



Åby älv



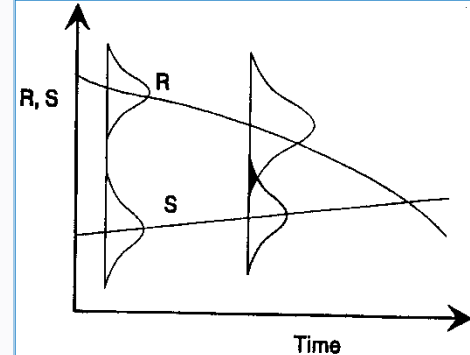
WP2 Degradation & structural models

Asset types identified as focus areas:

- Cuttings
- Metallic bridges
- Tunnels with concrete/masonry linings
- Plain line and switches & crossings
- Retaining walls

Deliverables

- Model of different degradation types
- Effect of changes due to maintenance, repair and strengthening
- Validate models through case studies



WP 3 Replacement of obsolete infrastructure

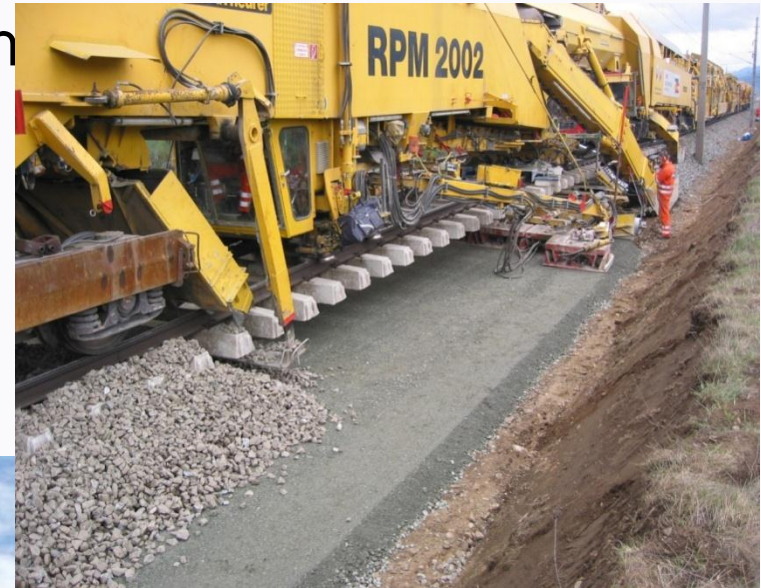
- **Benchmark of new technologies Methods used across Europe.**
- **Development of new construction methods to replace old infrastructure**



(i) new bridge transported to site, (ii) turning of bridge, (iii) switching of the bridges, (iv) new bridge in place and old bridge to be transported away.

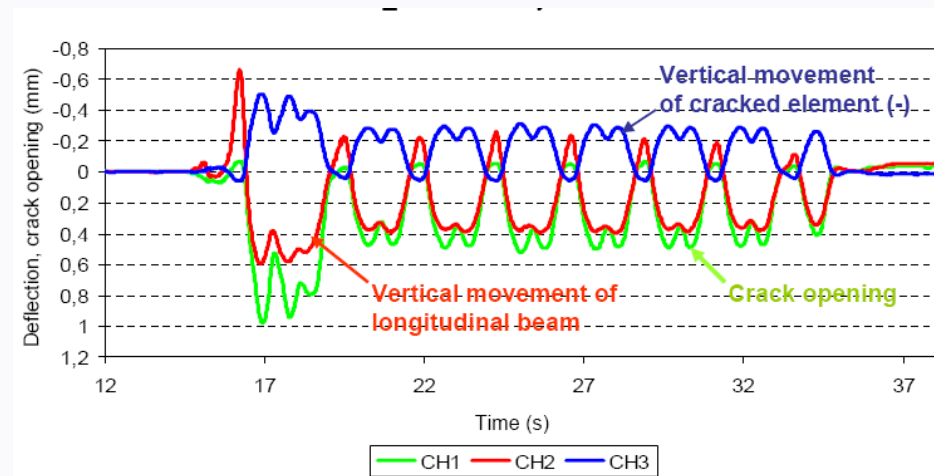
WP 3 Replacement of obsolete infrastructure

- Development of new construction methods to replace old infrastructure
- How can we enhance existing methods ?



WP 4 Monitoring and examination techniques

- Case study in Hungary on a steel truss bridge:
 - repair of a fatigue crack with FRP
 - monitoring and examination
 - evaluation of data
- Questionnaire on monitoring and examination techniques
- Revision of documents of interacting WP-s



WP5 Whole life environmental and economic asset management

- **Benchmark existing asset management tools for Life Cycle Analysis (LCA) and Life Cycle Costs (LCC)**
- **Develop a Life Cycle Assessment Tool (LCAT) for**
 - **Bridges (metallic underline) & Tunnels**
 - **Earthwork cuttings & Retaining walls**
 - **Track (Plain line, Switches & crossings)**

Planning at SKM in London



24th Jan 2013

Presentation of the MAINLINE Project

Thank you for your kind attention!

