

SPENS Final seminar  
27 – 28 August 2009

# Sustainable Pavements for European New member States

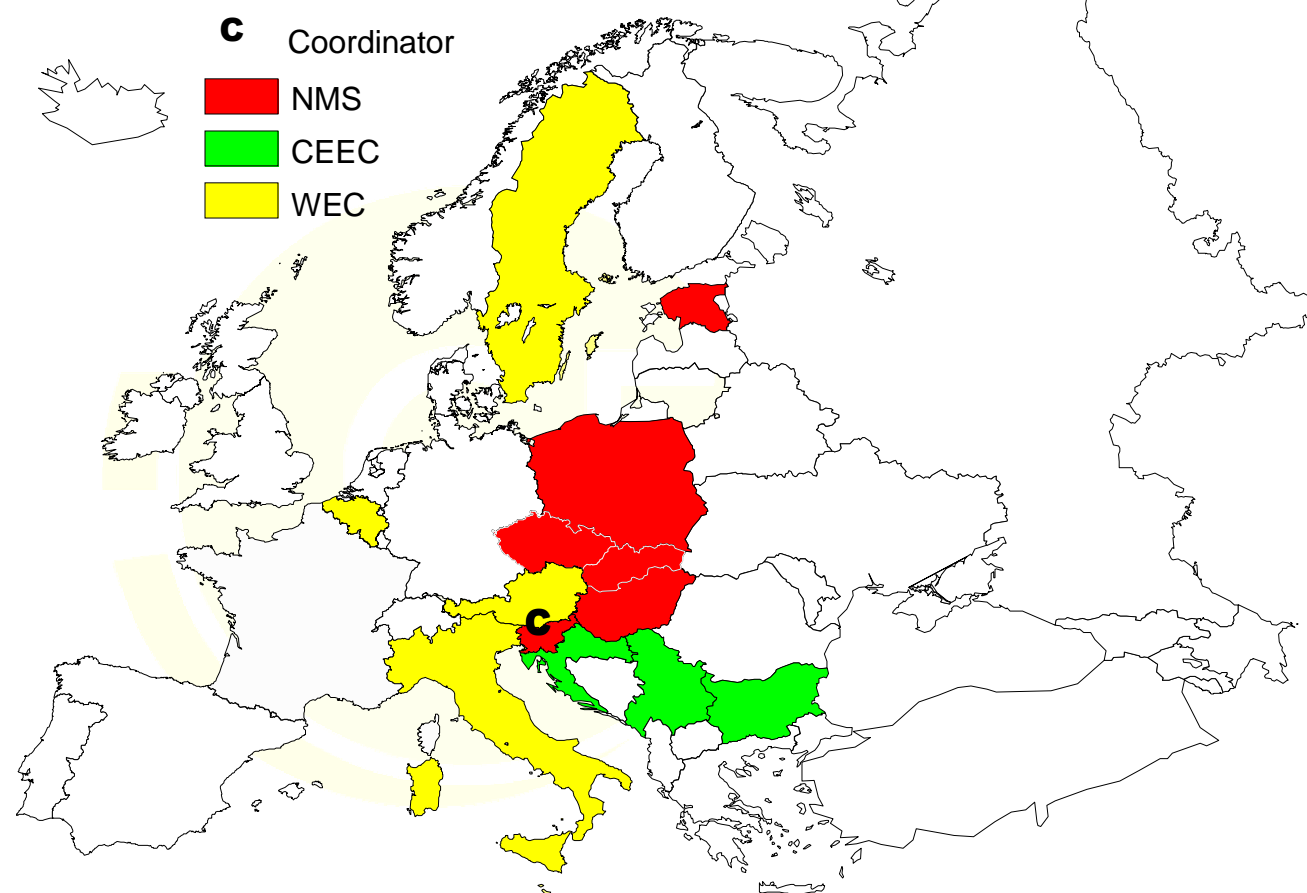
**Mojca Ravnikar Turk - ZAG Ljubljana**  
project coordinator

**Ljubljana, Slovenija**



# Summary

- Objectives
- Consortium
- Scope of the work and Deliverables
- Conclusions
- Dissemination



## Objectives

The standard of the road infrastructure differs throughout the European Union member states. The present volume of heavy road transport requires a sustainable road infrastructure immediately. There is a constant need for new resistant pavement materials, that should comply with the EU regulations.



## Objectives

The objective of the SPENS research project was to develop appropriate tools and procedures for the rapid and cost-effective rehabilitation and maintenance of roads especially in the EU New Member States.

**Priority:**   
**Sustainable Surface  
 Transport 1.6.2**



## Objectives

During the three years (September 2006 – August 2009) we were searching for materials and technologies for road pavement construction and rehabilitation that would:

- behave satisfactorily in a typical climate,
- have an acceptable environmental impact,
- be easy to incorporate within existing technologies,
- be cost-effective and easy to maintain,

taking into account the availability of materials and traditional construction techniques.





# Consortium

**Project start:**  
09/2006

**Duration:**  
3 years

**Partners:**  
10, majority from NMS

**Budget:**  
~ 2,47 mio€ (total cost)

**Coordinator:**  
ZAG (Slovenia),  
Mrs. Mojca Ravnikar Turk

**Website:**  
<http://spens.fehrl.org>

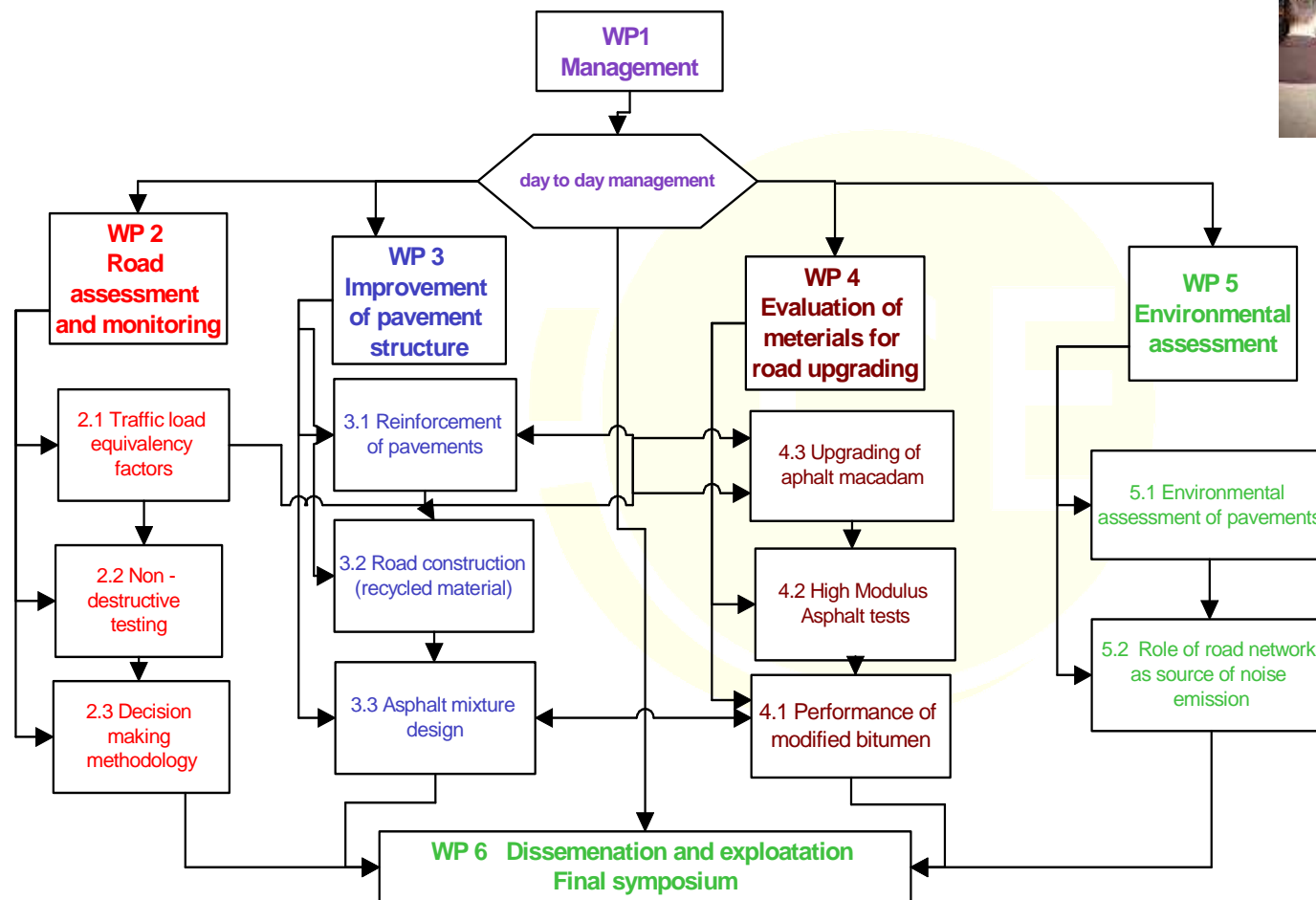


A grid of logos for the consortium members, arranged in three rows. A vertical green banner on the left contains the URL <http://spens.fehrl.org/>. At the bottom of the grid is the FEHRL logo and contact information.

 VTI - Sweden	 DDC - Slovenia	 CDV - Czech Republic	 Ferriere Nord - Italy	
 KTI - Hungary	 IBDIM - Poland	 ZAG - Slovenia	 Arsenal - Austria	
 TUZA - Slovakia	 IGH - Croatia	 IP - Serbia	 Tecer - Estonia	 CRBL - Bulgaria

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# Consortium



# Consortium

WP No.	WP Leader	Affiliation	Deputy	Affiliation	Task	Task leader	Affiliation
WP 1	Mojca Ravnikar Turk	ZAG	Aleš Žnidarič	ZAG		Mojca Ravnikar Turk	ZAG
WP 2	László Gáspár	KTI	Josef Stryk	CDV	2.1	Darko Kokot	ZAG
					2.2	Roland Spielhofer	AIT
					2.3	Slovenko Henigman	DDC
WP 3	Safwat Said	VTI	Ana Mladenović	ZAG	3.1	Safwat Said	VTI
					3.2	Ana Mladenović	ZAG
					3.3	Imre Pap	FEHRL (IP)
WP 4	Marjan Tušar	ZAG	Wojciech Bańkowski	IBDiM	4.1	Bjorn Kalman	VTI
					4.2	Wojciech Bańkowski	IBDiM
					4.3	Leif G Wiman	VTI
WP 5	Manfred Haider	AIT	Lennart Folkesson	VTI	5.1	Lennart Folkesson	VTI
					5.2	Manfred Haider	AIT
WP 6	Steve Phillips	FEHRL	Adewole Adesiyun	FEHRL	6.1	Mojca Ravnikar Turk	ZAG
					6.2	Steve Phillips	FEHRL
					6.3	Adewole Adesiyun	FEHRL



## WP2 Road assessment and monitoring

**D12 Recommendations for traffic equivalency factors**

**D13 Guidelines of a complex methodology for non-destructive pavement measuring techniques**

**D11 Guidelines on systematic decision making methodology on the pavement rehabilitation of low volume road**



EUROPEAN COMMISSION  
DG RESEARCH



SIXTH FRAMEWORK PROGRAMME  
Sustainable Surface Transport

Sustainable Pavements for European New Member States



FINAL PLAN FOR USING AND DISSEMINATING  
THE KNOWLEDGE

Deliverable no.	D14
Dissemination level	Public
Work Package	WP1 Task 1.1
Editor	Mojca Ravnikar Turk
Authors	Adewole Adesiyun, Aleš Žnidarič
Status (F: final, D: draft)	Draft v2
File Name	SPENS-01-D14_12March09.doc
Project Contract No.	Contract No. 031467 (STREP, Priority 1.6.2)
Project Start Date and Duration	01 September 2006, 36 months

In EU member states there is a variety of apparatus in use today for non-destructive pavement measuring techniques. There are five surface parameters that are of major importance for pavement management systems:

- longitudinal evenness
- bearing capacity
- skid resistance (in combination with macro texture)
- surface defects
- transversal evenness (not covered in SPENS report)



## Harmonisation tests – Vienna, May 2008

**For skid resistance** measuring exercise, six test pavements were selected with various skid resistance. The 9 devices coming from 7 countries run the 100-m long test sections at 30-60-90 km/h measuring speeds.





*D13 Guidelines of a complex methodology for non-destructive pavement measuring techniques*



Harmonisation tests – Vienna, May 2008

**For longitudinal unevenness** measuring test, the device Primal (VTI) was selected as reference instrument for the harmonisation exercise. Six test pavements were chosen with various unevenness. The 7 devices coming from 6 countries run the 500 m-long test sections at 30-60-90 km/h measuring speeds.



Harmonisation tests – Vienna, May 2008

**For bearing capacity** measuring devices, the methodology developed in COST 336 action for calibration and harmonisation was applied. 7 Falling Weight Deflectometers (FWDs) from 6 countries participated in the exercise. The maximum surface deflection values were compared to each other.



## WP3 Improvement of pavement structures

**D9 Long-term performance of reinforced pavements**

**D18 A methodology for testing and implementing selected recycled materials and industrial by-products in road construction**

**D10 Practical mix design model for asphalt mixture**



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**test fields in Slovenia**

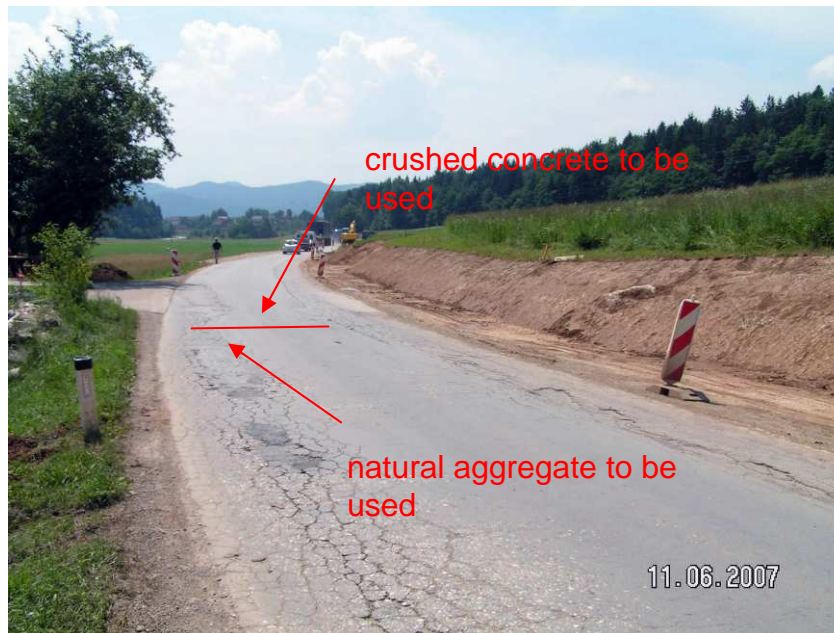
long-term behavior (skid resistance) of the **wearing course with slag aggregate** in typical climate

On one lane  
conventional natural aggregate  
(silicate 4/8 and 8/11 + carbonate aggregate 0/2 mm)

On the other lane  
slag aggregate  
(0/4, and 4/8 and 8/11 + carbonate aggregate 0/2 mm).



**test field in Slovenia**  
long-term behaviour of **building rubble** in unbound layer



Determination of long term behaviour (bearing capacity, deterioration) of the unbound layer

spreading of building rubble crushed concrete

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## ***WP4 Evaluation of materials for road upgrading***

**D8 Laboratory and field implementation of high modulus asphalt concrete. Requirements for HMAC mix design and pavement design.**

**D15 Recommendations for modified binder usage in pavement**

**D16 Guidelines for selection the most convenient upgrading systems based on results of heavy vehicle simulator tests and cost-benefit analyses of field trials**

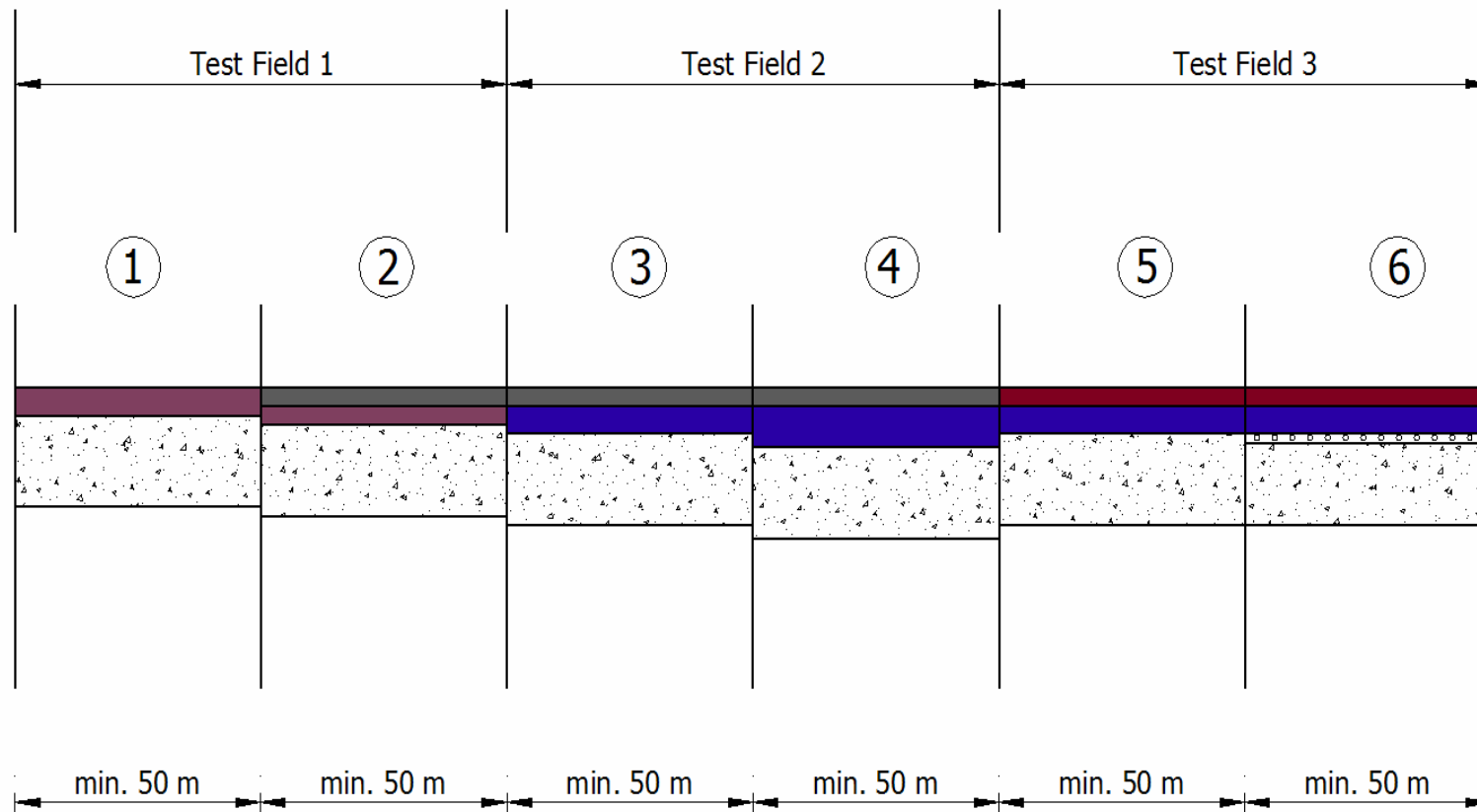


Preparation of initial recommendations  
Laboratory implementation and tests  
**Construction of full scale trial sections  
in Poland**  
Accelerated loading tests  
**Requirements for HMAC mix  
design and pavement design.**



## test fields in Slovenia

### 6 typical pavement structures - accelerated loading tests





*D16 Guidelines for selection the most convenient upgrading systems based on results of heavy vehicle simulator tests and cost-benefit analyses of field trials*





*D16 Guidelines for selection the most convenient upgrading systems based on results of heavy vehicle simulator tests and cost-benefit analyses of field trials*



test fields in Slovenia

6 typical pavement structures - accelerated loading tests





*D16 Guidelines for selection the most convenient upgrading systems based on results of heavy vehicle simulator tests and cost-benefit analyses of field trials*



test fields in Dragučova  
6 typical pavement structures - accelerated loading tests



## WP5 Impact assessment of roads on the environment

### 17 Guidelines for the environmental assessment of various pavement types including recommendations to road authorities in New Member States

Activities were oriented towards two sources of road impact on the environment

- emission of particles,
- noise emissions of typical pavements

Various types of pavement were assessed in laboratories and in-situ with regard to their influence on noise emission by the pavement / tire interaction.





Various types of pavement commonly used in the EU New Member states were assessed in laboratories and in-situ with regard to their influence on traffic-generated **surface wear of pavements and generation (and characterization) of pavement-wear particles**



# Conclusions

## rehabilitation and maintenance of roads in the EU New Member States

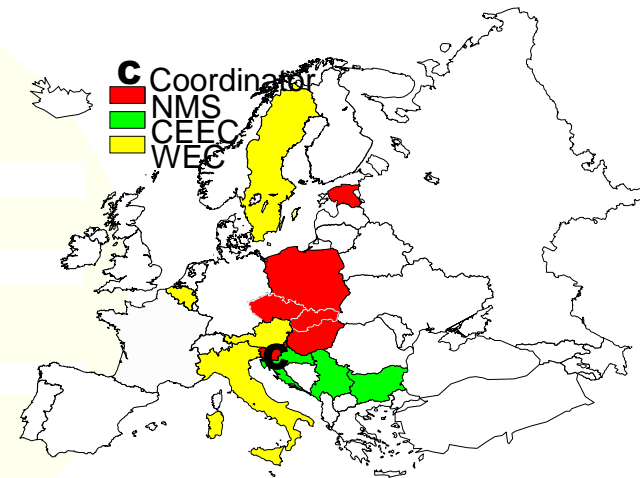
✓ The NMS issues have been addressed, typical (local) materials were used for testing.

## Diversity of partners

✓ Language was not an obstacle in communication

## Little experience in EU projects

✓ We learned fast



☺ Close contacts, informal, day-to-day, quick exchange of experience

☺ Comparison of laboratory test results (round robin test)

## Conclusions

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### Scope of the work

- ✓ SPENS provides research into road assessment, materials for pavements and environmental impact
- ☺ Research results are interesting also for experts from other states (Ukraine, EU-15)
- ☺ the research has raised new issues, additional testing as well as post constructional (long-term monitoring) are needed

### Clustering with other EU project

- ✓ past EU projects have been implemented,

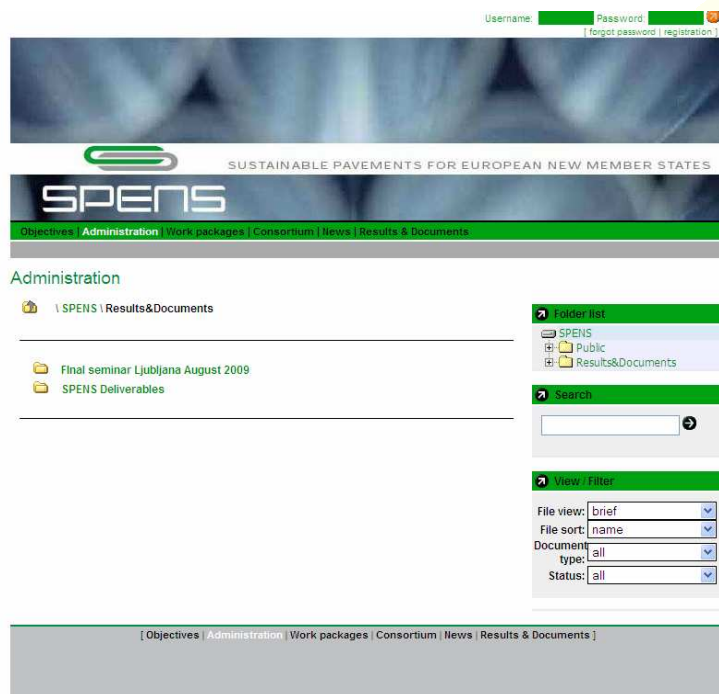
! It is very important to share the experience gained not only within SPENS but also within other (national etc) research projects.



# Dissemination

<http://spens.fehrl.org/>

SPENS partners and CERTAIN will disseminate the results especially within the NMS countries  
September 2009 to June 2010



**TRA, Transport Research Arena 2010**  
Brussels, 07-10 June 2010

# Program of the SPENS Final Seminar

## August 27 and 28, 2009



27.08.2009 Thursday (FINAL program)			
12,00	<i>Registration and coffee</i>		
12,30	<i>Welcome and introduction</i> <i>General Session</i>	<i>Aleš Žnidarič</i> <i>Andraž Legat</i> <i>William Bird</i> <i>Mojca Ravnikar</i> <i>Turk</i> <i>Tomasz Wierzbicki</i>	CERTAIN Coordinator ZAG Director EC Project Officer Ministry of Transportation SPENS Coordinator ARCHES Coordinator
13,45	<b>“Road assessment and monitoring”</b> <b>Chairman Manfred Haider</b>	<i>László Gáspár</i> <i>Roland Spielhofer</i> <i>Slovenko Henigman</i> <i>Manfred Haider</i>	Road assessment and monitoring Guidelines of a complex methodology for non-destructive pavement measuring techniques Guidelines on systematic decision making methodology on the pavement rehabilitation of low volume road Guidelines for the environmental assessment of various pavement types including recommendations to road authorities in New Member States Discussion
15,15	<i>Lunch</i>		
16,15	<b>“Materials for road upgrading”</b> <b>Chairman Marjan Tušar</b>	<i>Marjan Tušar</i> <i>Wojciech Bańkowski</i> <i>Leif Wiman</i> <i>Bjorn Kalman</i>	Evaluation of materials for road upgrading Laboratory and field implementation of high modulus asphalt concrete Guidelines for selection the most convenient upgrading systems based on results of heavy vehicle simulator tests Recommendations for modified binder usage in pavement Discussion
18,00	<i>The end of day 1</i>		
19,00	<i>Sightseeing tour - Ljubljana</i>		

# Program of the SPENS Final Seminar

## August 27 and 28, 2009



<b>28.08.2009 Friday (FINAL program)</b>			
<b>9,00</b>	<b><i>"Improvement of pavement structure"</i></b>	<i>Safwat Said</i> <i>Safwat Said</i> <b>Chairman Safwat Said</b>	Improvement of pavement structure Long-term performance of reinforced pavements A methodology for testing and implementing steel slag in road construction A methodology for testing and implementing crushed concrete in road construction Practical mix design model for asphalt mixture Discussion
<b>10,30</b>	<i>Coffee break</i>		
<b>11,00</b>	<i>Closing Session</i> <i>General Session</i>	<i>Anita Ihs,</i> <i>Stefan Deix</i> <i>Steve Philips</i> <i>William Bird</i> <i>Andraž Legat</i> <i>Aleš Žnidarič</i>	Heavyroute Coordinator FEHRL General Secretary EC Project Officer ZAG Director CERTAIN Coordinator
<b>12,30</b>	<i>Lunch</i>		



