Sustainable Pavements for European New member States 2006 - 2009
Summary

- Objectives
- Consortium
- Scope of the work
- Conclusions
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.
The objective of the SPENS research project is to develop appropriate tools and procedures for the rapid and cost-effective rehabilitation and maintenance of roads in the EU New Member States (NMS).
During the three years (September 2006 –August 2009) we are 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.
The work focuses on procedures for producing and implementing materials for road construction, taking into account the tradition, the availability of materials and construction techniques.
Partners

**ZAG**  Slovenian National Building and Civil Engineering Institute  SI
**KTI**  Institute for Transport Sciences  HU
**VTI**  The Swedish National Road and Transport Research Institute  SE
**arsenal research**  AT
**CDV**  Transport Research Centre  CZ
**IBDiM**  Road and Bridge Research Institute  PL
**TUZA**  Zilina University  SK
**FEHRL**  Europe’s National Road Research Centres with
  *IGH* - Civil Engineering Institute of Croatia (Croatia),
  *IP* - Institut za puteve (Serbia),
  *TECER*- Transport and Road Research Institute (Estonia),
  *CRBL* - (Bolgaria)
**DDC**  Consulting & Engineering Ltd.  SI
**FENO**  Ferriere Nord SpA  IT
Partners

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WP 1 Management

- day to day management

WP 2 Road assessment and monitoring
  - 2.1 Traffic load equivalency factors
  - 2.2 Non-destructive testing
  - 2.3 Decision making methodology

WP 3 Improvement of pavement structure
  - 3.1 Reinforcement of pavements
  - 3.2 Road construction (recycled material)
  - 3.3 Asphalt mixture design

WP 4 Evaluation of materials for road upgrading
  - 4.1 Performance of modified bitumen
  - 4.2 High Modulus Asphalt tests
  - 4.3 Upgrading of asphalt macadam

WP 5 Environmental assessment
  - 5.1 Environmental assessment of pavements
  - 5.2 Role of road network as source of noise emission

WP 6 Dissemination and exploitation
  - Final symposium
Sustainable road construction – test fields
long-term behaviour (skid resistance) of the wearing course
with slag aggregate in typical climate

- **Type of road**: regional
- **Annual average daily traffic**: 4000
- **Width**: 6 m **Length**: 300 m
- **Thickness of new asphalt layer**: 4 cm
- **Type of asphalt**: AC 11 (asphalt concrete)
Sustainable road construction – test fields
long-term behaviour of the slag aggregate wearing course

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

• On one lane slag aggregate
  (0/4, and 4/8 and 8/11 + carbonate aggregate 0/2 mm).
Sustainable road construction – test fields
long-term behaviour of building rubble in unbound layer

• Type of road: regional
• Width: 6 m  Length: 300 m
• Thickness of unbound layer: 30 cm
Sustainable road construction – test fields
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 to be used

natural aggregate to be used

crushed concrete

spreading of building rubble crushed concrete
| Probes for moisture content measurements | Soil pressure gauge | Vertical deformation probe |

![Probes](image1.png)  ![Soil pressure gauge](image2.png)  ![Vertical deformation probe](image3.png)
Upgrading of roads – test fields in Dragučova
typical pavement structures - accelerated loading tests

- **Type of road**: local (in Dragučova)
- **Annual average daily traffic**: very low
- **Date of construction**: November 2007 (SCT, d.d.)
- **Type of road structures**: asphalt – 6 different pavement structures
- **Width**: 3,6 m
- **Length**: 6x50m=300 m
- **Thickness of unbound base layer**: 20cm of gravel
- **Thickness of asphalt layer**: 6 to 13cm
Upgrading of roads – test fields in Dragučova
6 different pavement structures

Test Field 1  Test Field 2  Test Field 3

1  2  3  4  5  6

min. 50 m  min. 50 m  min. 50 m  min. 50 m  min. 50 m  min. 50 m
Upgrading of roads – test fields in Dragučova
2 very weak pavement structures
Upgrading of roads – test fields in Dragučova
2 weak pavement structures
Upgrading of roads – test fields in Dragučova
one reinforced pavement structure
Upgrading of roads – test fields in Dragučova instrumentation in the pavement
Upgrading of roads – test fields in Dragučova asphalting works – November 2008
Upgrading of roads – test fields in Dragučova construction control
Upgrading of roads – test fields in Dragučova testing – April 2008
Upgrading of roads – test fields in Poland
Implementation of high modulus asphalt concrete concept

Goal: to develop a concept of high modulus asphalt mixtures (HMAC) for the implementation in the Central and Eastern European countries

General plan:
Preparation of initial recommendations ✓
Laboratory implementation and tests ✓
Construction of trial sections ✓

Accelerated loading tests – June 2008
Analysis and final report (recommendations) - February 2009
Upgrading of roads – test fields in Poland
Implementation of high modulus asphalt concrete concept

Test 1 – direct comparison between AC and HMAC
Upgrading of roads – test fields in Poland
Implementation of high modulus asphalt concrete concept

Test 2 – Innovative structures
Upgrading of roads – test fields in Poland
Implementation of high modulus asphalt concrete concept
DISSEMINATION ACTIVITIES  2009-2010

SPENS dissemination activities are the task of FEHRL representatives.

The Coordination Action CERTAIN will work on complementary dissemination and implementation issues.
the executive summary of the final report, and some other documents, will be available in five languages (September 2009),

technical backup for some national and international workshops will be provided. The regional workshops will be performed in the mother-tongue of the organisers.
DISSEMINATION ACTIVITIES  2009-2010

http://spens.fehrl.org
CONCLUSIONS

SPENS (2006-2009) is in the midpoint of the work.

- rehabilitation and maintenance of roads in the EU New Member States
  - The NMS issues have been addressed

- Implementation of EU standards and new methods for testing
- New procedure for quality control in pavement works and earthworks.

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

⇒ Diversity of partners
✓ language is not an obstacle in communication

⇒ Little experience in EU projects
✓ learning fast

⇒ Scope of the work
➢ SPENS provides research into road assessment, materials for pavements and environmental impact
➢ the research has raised new issues, additional testing would be helpful
post constructional (long-term monitoring) needed
CONCLUSIONS

ていきます　with other EU project
✓ the results of past EU projects have been implemented,

ていきます　Dissemination
✓ SPENS partners and CERTAIN will disseminate the results especially within the NMS countries
   September 2009 to June 2010

✓ Close contacts, informal, day-to-day, quick exchange of experience
✓ Comparison of laboratory test results
   (round robin test)

http://spens.fehrl.org