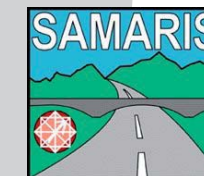


# SAMARIS NEWS



Issue 7, November 2005

## SAMARIS final seminar - time to register

The main results of SAMARIS will be presented and discussed at the final seminar, to be held in the École Polytechnique Fédérale de Lausanne, near Geneva in Switzerland, on the 16th and 17th of February (noon-to-noon) 2006. The main aim of the seminar is to give guidance to the practical application of the results of the project, which will be presented and discussed in two parallel main sessions:

- Advances in the rehabilitation of highway structures in Europe, and
- Premium pavements from alternative materials for European Roads

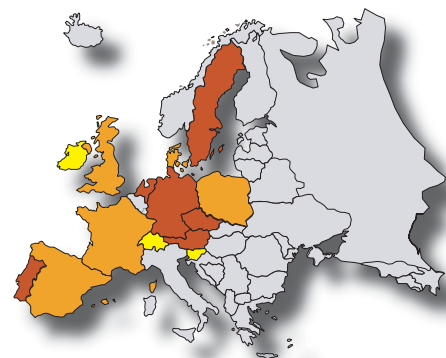
Therefore, if new developments in cost-effective use of materials and techniques for the construction and maintenance

of highway pavements and/or structures are your business, then be sure that you don't miss this event.

See the programme and use the registration form and hotel list in the latest information bulletin, which can be downloaded from our website, <http://samaris.zag.si>.

Note that the registration fee before the 15th of January 2006 is EUR 225. In the case of later registration the fee is EUR 300.

All documentation from the seminar and copies of the SAMARIS final summary report with technical publications on a CD-ROM are included in the fee. Refreshments and lunches are also included.



- In Pavement stream
- In Structural stream
- In both streams

## The SAMARIS consortium

SAMARIS (Sustainable and Advanced Materials for Road Infrastructure) is a Shared-cost RTD and Demonstration research project from the Growth program of the 5th Framework Programme, partially financed by the European Commission and partially from the partners' national resources. The project was initiated in FEHRL, the Association of European National Highway Research Laboratories.

[www.samaris.zag.si](http://www.samaris.zag.si)

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### Latest on:

- SAMARIS final seminar - time to register
- Build to last and save money!
- Handbook of damages
- Tests for the presence of tar



FEHRL

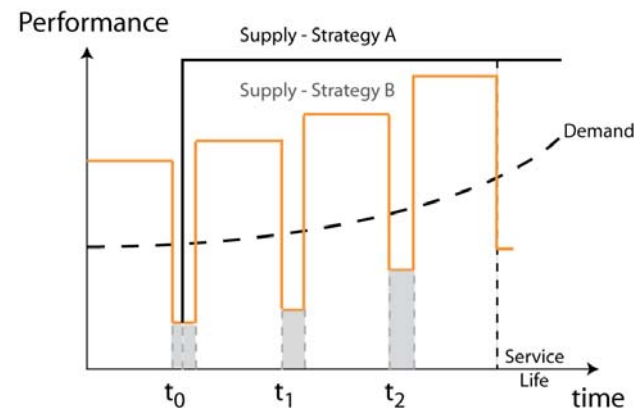
## Build to last and save money!

- by Dr. Emmanuel Denarié, Ecole Polytechnique Fédérale de Lausanne (EPFL), CH

UHPFRC such as CEMTECmultiscale® have demonstrated their technical efficiency to rehabilitate structures in simpler and more durable ways. A comparative economical analysis based on practical experiences reveals that their construction costs are not significantly more expensive than more traditional solutions.

The analysis of the costs of the first full scale application of UHPFRC on a road bridge in Switzerland, in 2004, shows that the rehabilitation realized with UHPFRC and no waterproofing membrane (Strategy A) is only 12 % more expensive than a more traditional solution with waterproofing membrane and rehabilitation mortar (Strategy B), with limited durability. However, in the latter case, the duration of the site would be largely increased by the drying period of the rehabilitation mortar, prior to the application of the waterproofing membrane (up to 3 weeks).

Further, with a price drop of 30 % for the raw components of the UHPFRC, the intervention with UHPFRC becomes only 7 % more expensive than the traditional method with mortar and waterproofing membrane. Such a price drop is realistic and can be expected if the use of UHPFRC spreads. Moreover, the small scale of the bridge used for this application and its character of prototype tend to overestimate the



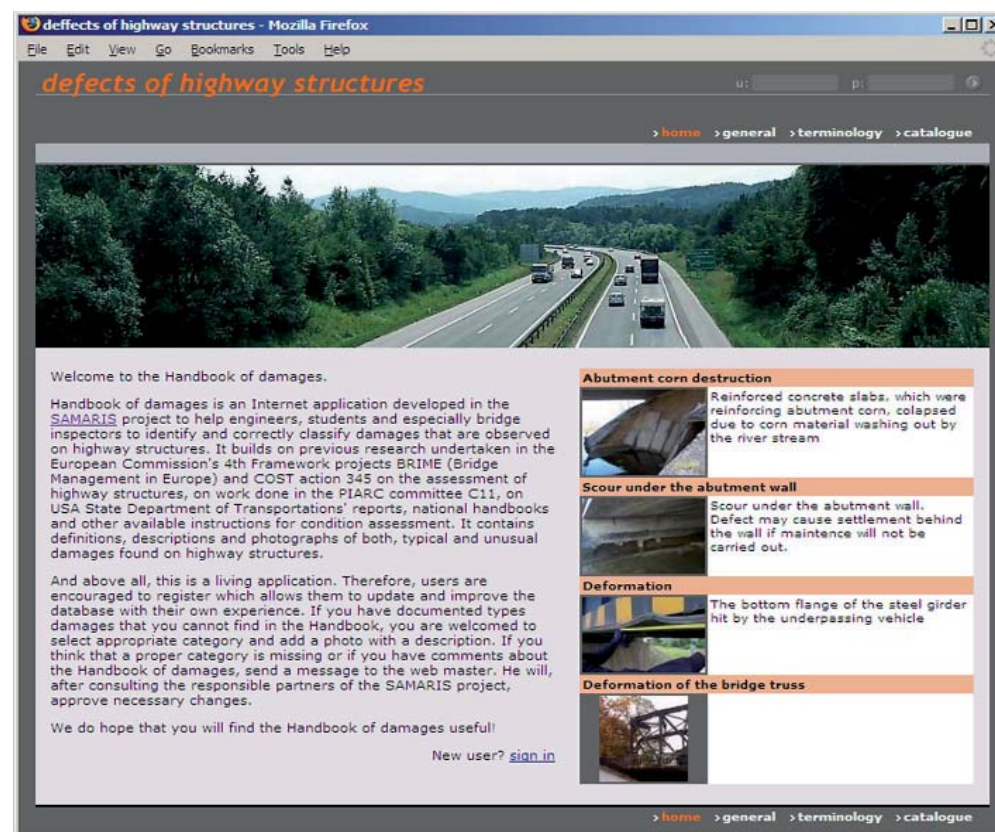
UHPFRC application (strategy A) vs. contemporary techniques (strategy B)

costs of using UHPFRC. It can thus be expected that with a wider dissemination of the concept of application of UHPFRC for the rehabilitation of bridges, this technique will become cheaper than traditional ones, not to mention its outstanding advantages of long term durability and reduction of traffic disruptions due to multiple interventions.

## Handbook of damages

- by Aleš Znidaric, ZAG, Slovenia

The Handbook of damages is an Internet application at <http://defects.zag.si/>, which was developed to identify and correctly classify damages recorded on highway structures. The database contains definitions and photographs of typical and unusual damages on bridges, culverts, tunnels and retaining walls and thus helps the bridge inspectors or other technical personnel to classify properly the damage observed during the inspections of their structures. The Handbook of damages builds on previous research undertaken as a part of the Fourth Framework project BRIME (Bridge Management in Europe), the COST action 345 on the assessment of highway structures, the PIARC committee C11, on USA State Department of Transportations' reports, national handbooks and other available instructions for condition assessment. It contains definitions, descriptions and photographs of both, typical and unusual damages found on highway structures.



Opening screen picture of Handbook of Damages.

Handbook of damages is a living application. Therefore, users are encouraged to register, which allows them not only to browse through the existing database in the catalogue section, but also to update and improve the database with their own experience. If you have documented types of damages that you cannot find in the Handbook, you are welcome to

first, register, and then, to select appropriate category and add a photo with a description. If a proper category is missing or if you have comments about the Handbook, send a message to the web master. He will, after consulting the responsible partners of the SAMARIS project, do the necessary changes.

## Tests for the presence of tar

- by Dr. Virginie Mullet, LCPC, France

Coal tar is a complex liquid mixture of hydrocarbon compounds that is derived from the destructive distillation of coal in cooking ovens. The polycyclic aromatic compounds (PACs) are often carcinogenic and some are phototoxic. One of the best known PAHs is benzo(a)pyrene (BaP), which is an established human carcinogen. In coal tar pitch, the BaP content is 1000 to 10 000 times higher than in bitumen (which is generally < 2 mg/kg for bitumen). Therefore, as part of its investigation into potential hazards for recycling, tests for the determination of tar have been reviewed.

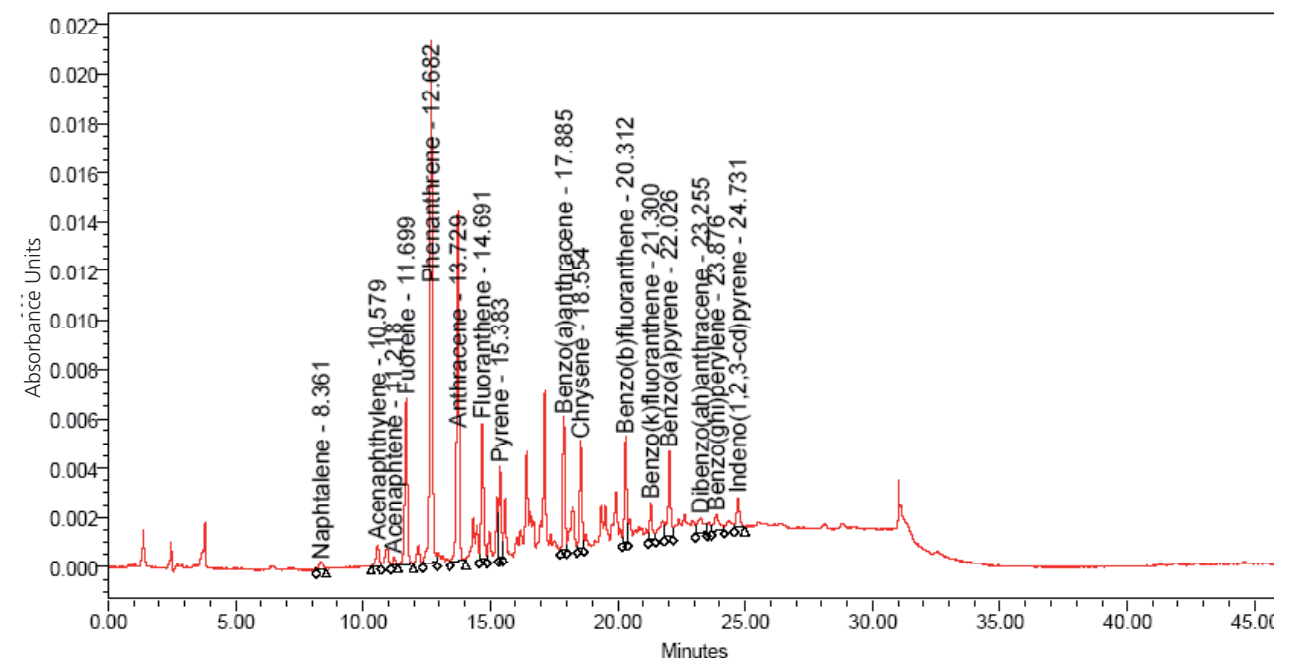
There are various possible tests available, which include:

- Screening tests
  - PAK-Marker® test, a simple test involving spraying a proprietary road paint spray before studying the appearance under UV-light for a yellowish colour that indicates the presence of tar.
  - The staining test, in which toluene is dropped onto a little heap of granulates from an asphalt planing lying on a piece of paper filter with an orange edged ring being obtained if the binder contains tar.
- Semi-quantitative detection method
  - Thin layer chromatography, in which the migration of PAH spots on a thin layer chromatography-plate in a chromatography chamber is compared to standard solutions.

- Quantitative detection methods
  - Gas chromatography with mass spectrometric detection, which is a special kind of ionisation detector.
  - High pressure liquid chromatography using either UV-absorption or fluorescence measurements.
  - The vacuum sublimation test, in which the sample is sublimated under vacuum with the quantitative determination of collected sublimate by either UV-absorption or fluorescence measurements.

The choice of method depends on the objective of analysis (analysis in the field or the laboratory). The preferred option selected from the research is to collect samples from the source and, after recovering binders from reclaimed asphalt (RA), to test the recovered binders in the laboratory to precisely assess the environmental acceptability of the material. This procedure involves two steps: a pre-separation of bitumen samples through application, extraction onto the thin layer chromatography (TLC) plate to the scanning of the fluorescent spots and a quantification of individual PAHs by high pressure liquid chromatography (HPLC). The entire process of quantification of individual PAHs from recovered binders can be completed in 6 h. This laboratory measurement permits detection limits to be obtained, based on 5 % of binder by mass in the mixture, of:

- about 250 mg PAHs / kg of RA; and
- about 7 mg BaP / kg of RA.



Typical chromatogram of PAHs in coal tar.