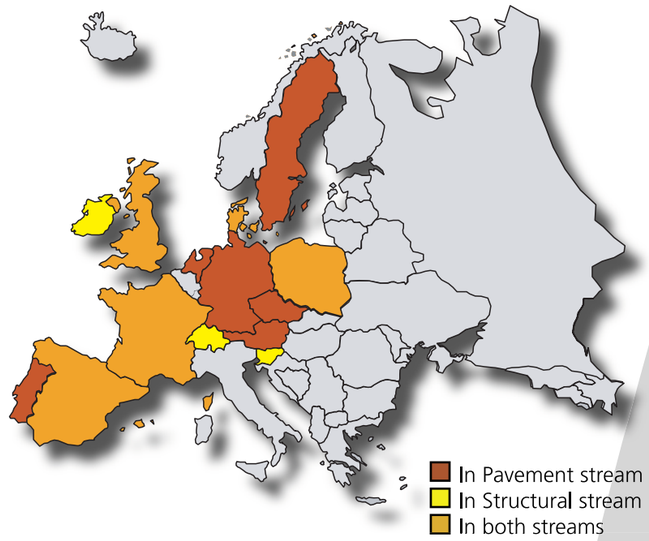
tests do have the right approach, but the fire loads are not appropriate for highways situation.
The fire load of vehicles varies considerably, from cars with near-empty fuel tanks up to lorries with highly combustible loads and full tanks of fuel, so it is complex to define a single scenario. Nevertheless, proposals are being developed for modifications to some existing fire tests to make them more realistic to the pavement situation.

The next stage will be testing some asphalts to the developed tests. It is proposed to include both mastic asphalt, as the type with the highest binder content, and porous asphalt, as the type with the easiest access to the binder, as well as some examples of other types.

It is anticipated that the results will be able to demonstrate that conventional asphalt does not constitute a danger in a fire and that all individual mixtures will not need separate testing. However, the tests will need to be repeated when new or alternative component materials are planned to be used, particularly if these materials are flammable. Once such a material had passed the test, it would then join the "safe" list.




## 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.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# SAMARIS NEWS

Second issue, January 2005

## Latest on:

- What is SAMARIS ?
- An everlasting winter coat for the bridges
- Test pavement with alternative materials
- Reaction to fire of asphalt pavements

FEHRL

# What is SAMARIS ?

The SAMARIS project, to run through 2003 - 2005, will provide new knowledge about the use of various new and alternative materials in pavements and concrete structures in the road infrastructure. The goal is to deliver results that translate into more value for the money, reduced maintenance, more durable repairs, better protection of the environment and safer roads.

It is our ambition that results of SAMARIS can be accepted for implementation with no delay by our target groups: the road owners, the road contractors and the consulting engineers who advise them. SAMARIS is a 4,6 Mill. euro project in the GROWTH subprogram of the European Union's 5th Framework Program for Research and Technological Development.

The GROWTH subprogram is intended to promote sustainable growth in Europe. The initiative to propose the project was taken by the Forum of European Highway Research Laboratories (FEHRL) as an element of its 2nd Strategic European Road Research Program. Learn more on SAMARIS on http://samaris.zag.si/

## An everlasting winter coat for the bridges

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

With the support of the road administration of the Swiss canton Valais, and under the guidance of MCS-EPFL, the bridge over the river la Morge, nearby Sion, has been rehabilitated and widened by using Ultra High Performance Fibre Reinforced Concretes (UHPFRC), according to the concepts set forth in SAMARIS WP 14. It was indeed the first time that UHPFRC of the CEMTEC$_{multiscale}$® family, specially tailored for this application, were cast in-situ, on a bridge. The entire surface of the bridge has been treated in three steps during the autumn 2004. Firstly, the downstream curb has been replaced by a new prefabricated UHPFRC curb on a new reinforced concrete beam. Secondly, the chloride contaminated concrete of the upper surface of the bridge deck has been replaced by 3 cm of CEMTEC$_{multiscale}$®, on October 22 for the first lane and November 5, for the second lane. Finally, the concrete surface of the upstream curb has been replaced with 3 cm of CEMTEC$_{multiscale}$® on November 9. The bridge was reopened to traffic on November 15, just one month after the beginning of the construction works. Besides the intrinsic benefits associated to the outstanding properties of UHPFRC, this innovative rehabilitation technique simplifies the construction process, saving money and reducing time of intervention. No waterproofing membrane is needed, the fresh material is self-compacting, and the thickness of the bituminous concrete can be reduced to a minimum. All works went perfectly well as planned. The CEMTEC$_{multiscale}$® was easy to produce and place, and very robust and tolerant to the unavoidable uncertainties of the construction site. Air permeability tests performed after 7 days, on site, confirmed the very low permeability of the material cast on the bridge. Finally, the visual aspect of the finished UHPFRC turns out to be very agreeable. Read more about the pilot test with UHPFRC in the next issue, which will be a focus issue.

*This full scale realization in realistic site conditions clearly demonstrates that the technology of UHPFRC is now mature for cast in-situ applications of rehabilitation, using standard equipments.*

*Samples of pavement to be tested in the laboratory.*

*Construction of pavement consulting of alternative materials.*

## Test pavement with alternative materials

*- by Erik Nielsen, Danish Road Institute*

Work Package 5 focus on mathematical modelling of permanent deformation behaviour of unbound granular and bituminous materials. To achieve valid models it is necessary to calibrate and validate them against real data either from well documented test pavements or accelerated loading tests.

To this end two experiments have been found for the unbound granular part at the LCPC test track at Nantes, France, and an accelerated loading experiment in Sweden by VTI using a Dynatest Heavy Vehicle Simulator. For the bituminous part a test pavement at EPFL-LAVOC, Lausanne, Switzerland has been selected, which was built for COST 347 and FORMAT.

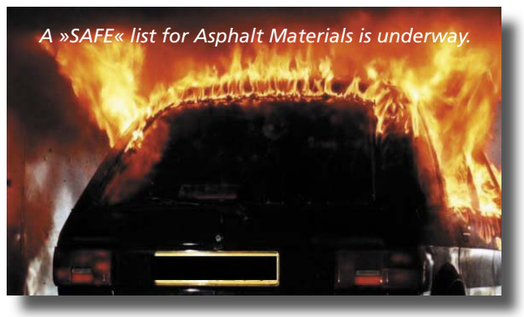
These three experiments all contain standard, "virgin" pavement materials. But the SAMARIS project is also about "sustainable materials". In order to provide this kind of input a bituminous test pavement has been constructed in Denmark using so called "alternative" materials as the second data source for the bituminous models.

The 23rd November 2004 a bituminous pavement was constructed on a gravel foundation consisting of bituminous binder course and a dense graded asphalt concrete. Apart from two percent of limestone filler in the wearing course and the bitumen the rest were alternative materials. The "aggregate" part of binder course contained 70 % rail road track ballast not containing dangerous substances and 30 % recycled asphalt concrete. The wearing course contained 98 % unprocessed slag from iron and steel industry: All three materials are mentioned in The European Waste Catalogue and used in asphalt mix design in accordance with Danish Road Standards.

The test pavement is now cut into large pavement slabs to be used in the Danish Asphalt Rut Tester, which is an ALT device at Danish Road Institute capable of performing detailed permanent deformation studies of full scale bituminous pavements. Smaller samples and materials have taken in order to provide data from triaxial testing and on laboratory scale wheel tracking equipment in accordance to EN 12697-22. The test will be performed in the first half of 2005.

## Reaction to fire of asphalt pavements

*- by Dr. J.C. Nicholls, Infrastructure Division, TRL Limited*



*A »SAFE« list for Asphalt Materials is underway.*

Reaction to fire is an essential requirement for pavement materials according to the EU mandates for the harmonised European standards, but as yet there is no definitive test regime to assess this property for asphalt. The essential requirement is primarily aimed at the influence of the surfacing on fires in tunnels, but it is not written to exclude other situations. However, it should be borne in mind that there are not widespread reports, if there are any at all, of the road surface having contributed to fires.

Task 2 of SAMARIS Work Package 4 is to look at the available fire tests and see if they are appropriate for road pavement materials. As might be expected, some roofing and flooring