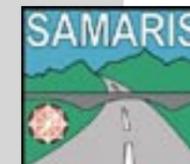


SAMARIS NEWS

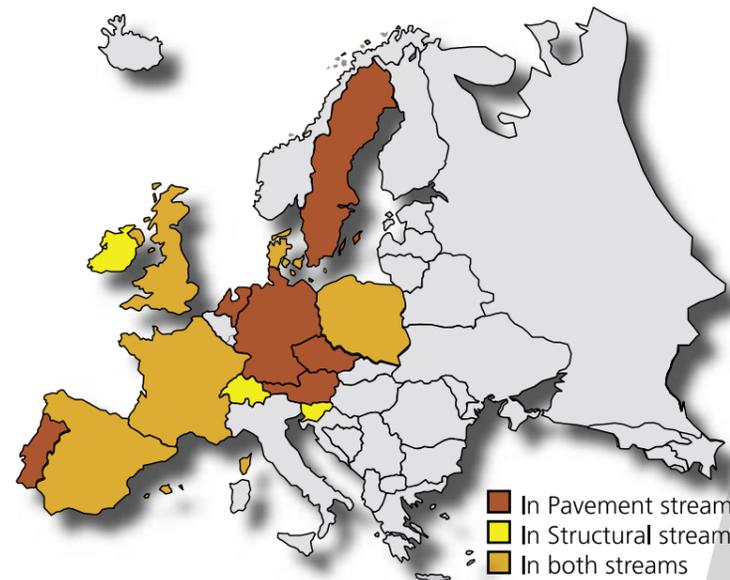


New repair strategies for civil engineering structures

- by Dr. Richard Woodward,
TRL – Transport Research Laboratory, UK

Rehabilitation of highway structures is an important issue as the European road network grows and the need for un-hindered transport increases. Structures are vital elements in the road network and the imposition of restrictions on their use (such as lane closures or weight restrictions or even complete closure) may have severe economic and political consequences.

The SAMARIS work package 12 is currently investigating new methods for selecting the most cost effective repair strategy, taking into account environmental and social as well as economic aspects. The overall aim is to develop guidelines for selecting the most suitable repair option from either traditional repair methods or new innovative techniques.



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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- High performance concrete
- Survey of highway structures
- New repair strategies



FEHRL



Welcome to the first issue of the SAMARIS newsletter

- by Jørgen Christensen, SAMARIS project coordinator

Welcome to this first issue in a suite of newsletters which are planned to highlight selected results and aspects of the research in project SAMARIS. We, the partners and leaders of the project organisation, hope through this communication to catch the attention of some of the potential end users of our research: the national road agencies, the contractors, the consulting engineers, the providers of materials for road infrastructure construction and maintenance. - and, of course, fellow researchers, who do not participate in our research, but observe and evaluate it with a critical mind.

It is our intention to bring the individual news in a very short and rapidly read form. We know that we are trying to catch the attention and stir the interest of very busy people and do not expect them to have time to stay on this topic for many minutes. The strategic aim is to prepare the readers for the implementation of the results, in which they have a main role and obligation. Recent data show that time to implementation in the road sector is far too long. We want to contribute to a change in this wasteful habit.

In this issue you can learn more about our progress towards new inventive ways to avoid unnecessary repairs, thus saving time and resources on the road networks and providing for more durable and safer roads and structures. Further information can be found on our web site, <http://samaris.zag.si>. And you are of course always welcome to contact the SAMARIS secretariat with any questions or comments you may have.



Corrosion inhibitors - long live the bridge!

- by Dr. Mark Richardson, University College Dublin, Department of Civil Engineering

Premature durability failure of reinforced concrete bridge structures has been a disappointingly common feature of the developed world's road infrastructure. The capacity of our road infrastructure is below its maximum due to lane closures required when surveying and repairing deteriorated bridges.

The use of new techniques in repair and construction may lead to fewer closures and thus better mobility. The SAMARIS Project is investigating two innovative repair strategies, one of which is the use of surface applied corrosion inhibitors.

The aim of work package 13 is to find the material and environmental exposure conditions under which surface-applied corrosion inhibitors represent an optimal repair strategy. This involves consideration of the inter-relation of inhibitor depassivation mechanism, inhibitor migration, and the characteristics of the deteriorated concrete, especially chloride content and permeability. The work is divided into six tasks including laboratory and field research studies.

Permanent deformations - an important problem!

- by Erik Nielsen, Danish Road Institute

Permanent deformation (or rutting) in road construction is dangerous and costly. Now two reports on the SAMARIS project website give an up-to-date, state-of-the-art presentation of models describing permanent deformation in unbound granular materials and asphalt materials.

Rutting imposes a great threat to the road-users due to increased risk of aquaplaning. To the road owners it is also an indication that deterioration in the pavement structure will increase the damaging effect from the traffic leading to premature repair or rehabilitation. Contractors try to avoid rutting by careful selection of the right materials, design and construction techniques. For all parties concerned more information and knowledge on how to cope with this problem is needed.

Work package 5 in SAMARIS will contribute to this by presenting new models which render the possibility to evaluate the utilisation of materials which have not yet been used in road construction. These "alternative" materials could be



introduced if the environmental assessment scheme from WP 3 comes out in favour of its use for the given application.

The "litmus test" for the proposed models will be the calibration and validation of the models against real data, which is the next point on the agenda for WP 5 leading towards the objective of pre-normative research of performance based specification with regard to permanent deformation.

Ultra High Performance Concrete - highly recommended

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

It is well known that the fewer repairs on structures, the fewer are the problems for road traffic and road transport. Ultra High Performance Fibre reinforced concrete (UHPFC) – may be the way to avoid multiple interventions on structures during their service life.

These materials have three major advantages compared to common composites. Firstly, extremely low permeability, secondly, long-term durability and thirdly, its excellent mechanical properties. This makes UHPFC an obvious choice for thin watertight overlays, as well as repair layers and for application to critical zones such as transitions from joints to main elements.

The SAMARIS work package 14 provides guidelines for use of these materials and their further optimisation (numerical simulation tools, test methods, limit states for design, etc.). It also investigates the early age and long-term behaviour of these materials, the mechanical and physico-chemical com-

patibility with substrate along with the protective function and the effect of damage on transport properties. Finally, the work package looks into the influence of the geometry of elements to be repaired, the statistical distribution of properties, test methods and compliance criteria and the modelling of mechanical behaviour.

Survey of highway structures in a new way

- by Aleš Žnidarič, Slovenian National Building and Civil Engineering Institute

The SAMARIS work package 15 aims to produce an updated inventory and assessment of highway structures in selected EEA and CE countries. The work focuses on procedures used for assessment of the structural condition and will compare different CA methodologies.

As a part of the survey on traffic loading, the WP 15 has for the first time ever installed a weigh-in-motion system without any interference with the traffic. The so-called Free-of-axle-detector bridge WIM system was mounted on a bridge near Warsaw in Poland and was collecting data on vehicle classes, axle loads and speed for an entire week just by using signals from sensors installed inside the bridge.

The work of WP15 also includes producing an elaborate questionnaire and a handbook on damages. The purpose is to give straightforward instructions on how to detect possible deterioration processes, how to indicate the condition of structures and their elements, how to assess the condition of the whole structure, how to rank structures for urgent repair and maintenance and how to optimise allocation of budgets.