Review of some road research projects

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FEHRL’s main objectives

Through the specification and delivery of research, FEHRL’s main objectives are to:

• Provide scientific input to European and national government policy on road engineering and road transport matters.
• Create and maintain an efficient and safe road network in Europe.
• Increase innovation in European road construction and road-using industries.
• Improve the energy efficiency of road engineering and operations.
• Protect the environment and improve quality of life.
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**FEHRL**
Setting the Road Research programme 1991-2011

• In 1991, FEHRL published its first document describing a Strategic European Road Research Programme (SERRP).
• In 1996, SERRP II was published as the research agenda for 1999-2004.
• Published in 2001 and 2006, III and IV both followed extensive consultation with Road Directors and Industry
• Common elements in all four documents included research and standardisation in design, construction, operation, safety and environment
• Latest edition in series is recently published SERRP V
Context:
• European commitment into Environment-friendly and sustainable development of industrial products and processes
• A high contribution of road infrastructures to waste production
• Nowadays different practices between European countries to recycle road and road-related wastes (tyres, …) as new road materials
• National experience almost never benefits to other European countries and especially not to new member states

Objectives:
To share national knowledge and practice regarding dismantling and recycling of road and road-related materials back into roads
Product:
• an European data base online on Internet and guides for good practices,
  • Large access to national data (15 European countries).

Benefits & Users:
• Standardization, European integration of road materials research,
• Practitioners, stakeholders.

Expected impacts:
• Valuation and promotion of enterprises know how,
• Decision aid tool for ordering parties and practioners.
INSAFETY: "A self-explaining road (SER) is a road designed and built in such a way as to induce adequate behaviour and thereby avoid driving error."

• The SER concept is of a traffic environment that elicits safe driving behaviour simply by its design.
• It aims to do this by informing the driver what to expect and how to behave accordingly which may include:
  ✓ choice of speed,
  ✓ choice of lateral position,
  ✓ expectation of the presence of other types of road user,
  ✓ expectation of the behaviour of other road users,
  ✓ expectation of changes in the road environment ahead.

SPACE is particularly interested in identifying measures that lead to the adaption of speeds that are safe and appropriate to the conditions.
Objective:
to identify best practices in road assessment.

- look at data collection, assessment and reporting regimes,
- new challenges (low volume roads, road management, climate change, traffic configuration, new materials, road users expectations),
- identify the key technical components of assessment regimes,
- determine whether they are best practice or not,
- identify indicators at different assessment levels (road operators, decision makers and public),

Result:
pick out the key good parts and provide advice to the customer on how they could use them leading to a better understanding of a holistic road performance assessment
European countries have developed a wide variety of measures for characterising road surface skidding resistance. Different …

- measuring policies
- measuring methods
- measured parameters

Skid resistance (safety)
Rolling resistance (energy)
Noise emission (health)

Tyrosafe aimed to harmonise the measurement of skidding resistance across Europe.

**Benefits:**

- Provide basis for common skidding resistance policy
- Support the introduction of performance based specifications
- Generate European market for higher friction surfacings
Aims: To reduce the use of new materials and to limit energy consumption while building new roads.

- reducing the consumption of new materials (binders and aggregates),
- recycling 99% of old roads for building new roads,
- limiting the « down-grading »,
- managing polluted materials (e.g. materials with cold tar and asbestos)

Global approach integrating economic and environmental aspects ...
SMART Rail  Smart Maintenance and Analysis of Transport Infrastructure

Background:
In order to achieve the SMART Rail concept, we require the following critical and interdependent elements:

- an embedded sensor network,
- state of the art Structural Health Monitoring (SHM),
- suite of low-cost remediation measures that are region-specific.

**Technical Perspective:**
- monitoring establishes current condition
- SHM defines reliability/safety,
- remediation required?
- Life Cycle Analysis quantifies cost and benefit.
Highlights of SERRP V

• Updated ‘Vision 2025’ on key stakeholder concerns and needs
  ✓ 2009-2013 Strategy of CEDR (European Road Directors),
  ✓ Recent European Commission (EC) Transport White Paper.
• Programming and instruments for delivery
  ✓ Continues with effective current instruments,
  ✓ Adds approaches, such as:
    o FEHRL’s role in road operations research programming,
    o PPPs between European Technology Platforms (ETPs) and EC,
  ✓ Implementation, international cooperation and multi-modality,
• The Forever Open Road concept as the core of the strategy.
Forever Open Road

• A combination of national and multi-national activities to be implemented as of 2011
• Involving a wide range of partners from public and private sectors
• Will be the fifth generation road for the 21st century at an affordable price
• A new concept for intelligent roads that are adaptable, automated and climate change resilient
The Adaptable Road

- Fully adaptable to changes in demand
- Based on a pre-fabricated/modular system that can gradually be implemented across Europe’s motorway, rural and urban road networks.
- It will adapt to increasing travel volumes and to changes in demand for public transport, cycling and walking.
- It will power vehicles, harvest solar energy, measure its own performance and even repair itself.
• Fully integrated with the user, vehicle and operations
• Will incorporate a fully integrated information, monitoring and control system;
• Will support a co-cooperative vehicle-highway system that will manage travel demand and traffic movements.
• Will measure, report and respond to its own condition, providing instant information on weather, incidents and travel information.
The Resilient Road

- Planting and soil stabilisation for storm water protection.
- Pavement to building heat exchange for resilience to extreme weather.
- Drainage system and reservoirs for storm control and water management.
- In-vehicle weather incident warning and information system.
- Geothermal and solar energy harvesting for resilience to extreme weather.
- Integrated road de-icing system.
- Demand and condition responsive traffic control for extreme weather conditions.
- Real-time local weather forecast information system.
The Resilient Road

- Fully adaptable to extreme weather conditions
- Will adapt itself to the impacts of extreme weather conditions and climate change.
- Will monitor flooding, snow, ice, wind and temperature change, and mitigate their impacts through integrated storm drainage, automatic heating and cooling,
- Will be linked to the integrated information system for travellers and operators.
Thank you for your attention

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