FIBRA

Fostering the implementation of fibre reinforced asphalt mixtures by ensuring its safe, optimized and cost-efficient use

Programm / Ausschreibung	Mobilität der Zukunft, Mobilität der Zukunft, CEDR Transnational Research 2017 - Materials	**Status**	abgeschlossen
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Projektbeschreibung

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Abstract

The objective of the FIBRA project is to overcome the technical barriers for the safe and cost-efficient implementation of fibre-reinforced asphalt mixtures (FRAM) by NRAs with which an increase in the asphalt pavements durability could be achieved.

Existing transport infrastructures are facing important challenges in order to maintain a reliable performance of the road network which is being threatened by the increase of heavy traffic, the opening of new freight corridors and the effect of the climate change, among others. Maintaining a satisfactory service level currently implies frequent roadworks that generate great environmental, economic and societal impacts, reducing at the same time mobility and reliability of the road network and increasing the travel time. Therefore, fostering the implementation of innovative solutions, like the addition of fibres in asphalt mixtures that improve their mechanical performance and durability and consequently the service life of the whole pavement is indispensable.

Despite the promising results achieved in previous research works and the availability of commercial fibres whose providers ensure a pavement life extension of at least a 50% (1) and asphalt mixture life extension of around 200% (2) (depending on the type of fibre and provider), the use of reinforced-asphalt mixtures is not as widespread as could be expected. This is principally due to the existence of gaps in the state of the knowledge that make National Road Administrations be reluctant to their incorporation.

In order to promote its utilization, the FIBRA project will start analysing previous experiences with fibres so as to select the most promising ones. Then, a cost-benefit analysis will be carried out considering also the TRL of each fibre to select the one that will be use throughout the project.

The next step will consist of improving the understanding of the functioning of FRAM by means of studying aspects like the blending procedure, the rheological behaviour or the microstructural properties. This knowledge will lay the foundation for the optimal design of the mixtures that will be characterized under EU and US mechanical tests. Afterwards, the optimal position of the FRAM layer will be defined in terms of service life extension of the pavement structure in a life cycle

perspective while considering the pavement performance in different climatic conditions, shedding in this way light on one of the key aspects to adopt the innovation. To do so, numerical simulation with an advanced pavement performance analysis tool and a model scaled accelerated pavement test will be performed.
The recyclability potential of the mixtures as well as the potential positive effect of fibres on asphalt mixtures with high RAP content will be also analyse at lab scale.
Furthermore, the technology will be up-scaled by the manufacturing of asphalt mixtures at real asphalt plants. Two different pilot roads have been proposed, one in the Netherlands and another in Norway in order to be able to validate the technology when different Standards, and weather conditions are considered, enabling in this way a wider adoption.
Finally, the LCA and LCCA methodology will serve to validate the technology from an environmental and economic point of view, where potentially toxic and hazardous pollutants measured during the project will be considered.
The achievement of this challenging project will be possible thanks to a unique combination of research knowledge and industrial expertise at international level, where 5 research institutions and 2 industries from 6 different countries will carry out all the necessary activities to rise the TRL level of the technology from 5 to 7.

Projektkoordinator

- University of Cantabria

Projektpartner

- Veidekke Industri AS
- Empa, Swiss Federal Laboratories of Materials Science and Technology
- SINTEF AS
- Technische Universität Braunschweig
- BAM Infra bv