

CRABforOERE - Cold Recycled Asphalt Bases for Optimised Energy & Resource Efficient Pavements

CEDR Programme: Call 2017 New Materials and Techniques

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As an alternative for hot recycling, the use of reclaimed asphalt (RA) in cold recycling materials (CRM) is applied internationally with success. Also, in Europe (especially Italy and the UK) significant proportions of incurred RA are already cold recycled by application of foamed bitumen, bitumen emulsion and/or mineral binders. Good experience regarding mechanical properties and durability was further made with CRM for recycling of tar-contaminated pavements, for example in Germany. Generally, RA contents $\geq 75\%$ are reached within CRM. In France, annually $\sim 1,5$ mil. tons of cold asphalt mixtures based on natural aggregates and bitumen emulsion are applied since decades in base layers. Due to the mix preparation at ambient temperature, CRM demand for comparably less energy. Therefore, Cold recycled asphalt bases (CRAB) can be considered as pavement of optimal energy and resource efficiency (OERE).

Recently, harmonised test procedures and material requirements were proposed for cold asphalt mixtures with bitumen emulsion within CEN 336/WG1 (prEN 13108-31, prEN 12697- 53 to -56). However, for the wider use especially in countries with less experience in cold recycling, some aspects of these road materials need to be assessed. The short-term performance which is highly dependent on the development of moisture within the CRM layer - and therefore of climatic conditions - is not fully understood so far and therefore cannot be properly adopted during mix design properly. Furthermore, durability as well as failure modes needs to be examined in order to introduce sustainable pavement design procedures. Within CRABforOERE project, the experienced long-term performance of CRAB structures is assessed for various climatic conditions via Europe. From the results, mix and pavement design procedures are validated. Further the RA will be assessed as the aggregate part of the CRAB materials by concentrating on the relevant properties rather than for its application in hot asphalt. The CRAB structures will be assessed in terms of sustainability. Finally, the Construction of three test pavements will be scientifically accompanied. On these structures, short-term curing performance will be assessed by monitoring the water content. Further, these structures will allow for follow-up assessment of long-term performance.

Within CRABforOERE, the following steps further for establishing harmonised and applicable standards for cold recycling technologies will be achieved:

1. Assessment of long-term performance of existing cold recycling and/or cold asphalt pavement structures,
2. Validation and - if necessary - adaption of existing test methods and qualification procedures for RA aggregates,
3. Validation of laboratory curing and performance assessment procedures for cold re-cycled materials,
4. Demonstration of harmonised mix design procedures considering prEN 12697-53ff and prEN 13108-31,
5. Demonstration of pavement design procedures for pavements with structural layers composed of cold recycling materials,

6. Scientific supervision of new test pavements with optimised energy efficiency allowing the application of sensors and monitoring of short-term performance,
7. LCA- and Risk analysis for assessment of environmental and economic benefits by using cold recycled materials and evaluate applications risks (e. g. weather during construction, RA variability).