Conférence Européenne des Directeurs des Routes
Conference of European Directors of Roads

CoRePaSoL
Characterisation of Advanced **Co**ld-**Re**cycled Bitumen Stabilised **P**avement **Sol**utions

Research project funded under the CEDR Transnational Road Research Programme
CEDR Call 2012: Recycling - Road construction in a post-fossil fuel society

CEDR Call 2012: Recycling is a Transnational Road Research Programme organised by CEDR (Conference of European Directors of Roads). The funding partners for this programme are Denmark, Finland, Germany, Ireland, Netherlands and Norway.

Details

Acronym:	CoRePaSoL
Start:	January 2013
End:	December 2014
Budget:	€349.0k
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Partners:	University of Kassel, Germany University College Dublin, Ireland Laboratório Nacional de Engenharia Civil, Portugal Wirtgen, Germany
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Project summary
Expected yearly worldwide demand for road rehabilitation works concerns about 1.7 million km of roads. This creates a large need for natural resources used, but on the other hand bears significant potential for reuse of existing pavement materials. As asphalt pavements are in theory 100% recyclable, suitable techniques should be continuously developed and supported. Cold recycling can be seen as a technology where several benefits and added-value are linked - natural resources can be reduced, energy consumption decreased, road infrastructure protected from excessive construction-related transport and rehabilitation works can be shortened. The potential for multiple recycling is a significant benefit - the only question is the activation of the old binder. If proper mix design is applied and suitable binders used including activating the bituminous binder in reclaimed material new structure will lead to increased bearing capacity and improved pavement durability. Despite this, no more than 35 % of reclaimed asphalt is reused in cold recycling.

This project focuses mainly on harmonising mix design of cold-recycled bitumen stabilised materials following the existing scientific and engineering experience and approaches. The key objective is to develop and recommend comprehensive mix design and characterisation by studying compaction methods, curing procedures and performance tests. The output should be applicable to all variants of cold-recycled mixtures containing bituminous binders or combination with other binders or alternative fines. Aspects considerable for defining durability of cold-recycled mixtures will be evaluated and specified as well. Existing practice

focuses only on water immersion and stiffness. Both characteristics are not a standard part in all mix designs known in Europe. Nevertheless to vindicate and promote cold recycling as an equivalent solution for hot mix asphalt the durability must be predictable. For this reason the project focuses on assessing stiffness, fatigue behaviour, resistance to cracking and on long-term moisture effects. Different test procedures will be evaluated and most suitable approach recommended including proposed threshold limits. This will make performance-based mix design possible. Further gained results will be used for formulating preferable inclusion of cold-recycled mixture in existing pavement design manuals. It is primarily not expected to modify the

mechanistic calculation of pavement design, more important seems to be the definition of typical structures where cold-recycled bitumen stabilised materials are used for base or binder courses and critical parameters are defined. This should allow to road administrators and designer to use cold-recycled mixtures as a standard component of a pavement structure.

Multiple recycling should present one of the key advantages of cold recycling techniques. The activation of reclaimed asphalt, impact of material ageing and range of applicability (for cold-recycled mixtures and for the partial substitute of aggregates in hot mix asphalts) will be specified and the most suitable practice recommended. The final part of the project focuses on environmental stability/compatibility which becomes an integral part of building materials' use and modern civil engineering. Leaching of cold-recycled mixtures will be specified with recommendations for threshold limits. At the same time some hazardous or problematic materials in existing pavements will be assessed in relation to their immobilisation and most suitable reuse by cold recycling (tar, asbestos, crumb-rubber modified asphalt). Part of this environmental assessment will be devoted to technically correct assessment of cold-recycled mixtures with respect to their carbon footprint. It is believed, that in the near future, such energy equivalent will be considered in decision about most appropriate technical solutions in pavement construction or rehabilitation and energy savings achievable by recycling should be considered as a benefit.

The project bundles the capabilities of science, public interests and industrial knowledge to overcome the described problem and to offer an appropriate solution.