

Self Healing of Asphalt Mixes

From idea to reality

SUBJECT

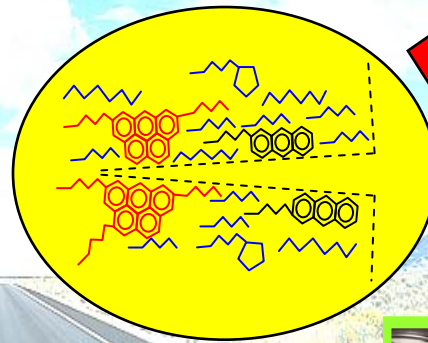
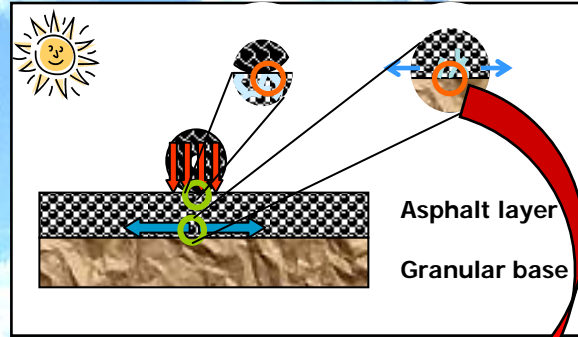
Bituminous materials are believed to heal themselves but the capacity decreases sharply with ageing of the bitumen. Several chemical treatments can be used to upgrade the self healing capacity of asphalt mixes.

GOALS

To investigate cohesive healing and self healing mechanisms of asphalt mixes. To develop a new type of asphalt mix based on self healing theory, which can heal itself and prolong the lifespan.

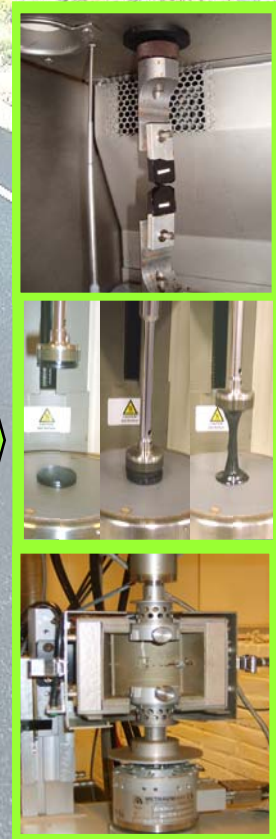
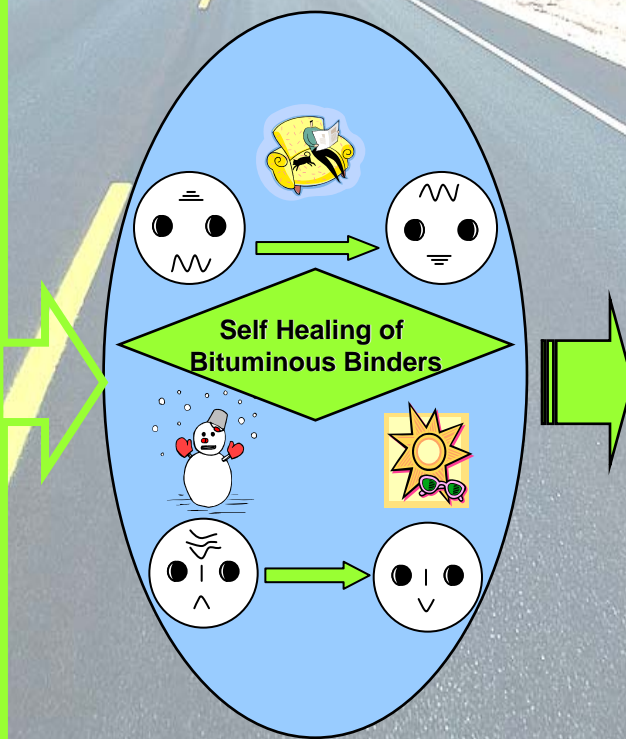
EXPECTED RESULTS

A simple test method to detect healing and self healing of bituminous binders. A new bituminous binders with self healing capacity based on reversible hydrogen bonding, ionomers and nanoparticles self healing ideas.



heating
cooling

multiplet
amorphous "melt"



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Subject

In the Netherlands the ravelling of Porous Asphalt reduces the service life of the layer considerably. Bituminous materials are believed to heal themselves and to extend the service life, although the capacity sharply decreases with ageing of the bitumen. For this reason, research in upgrading the self-healing capability of the bitumen in time is of major importance. Certain chemical treatments can be used to improve the self healing capacity of asphalt mixtures after the binder is aged to certain degree, or after micro cracks have developed.

Goals

To understand the healing nature of asphalt mixes, and to develop a self healing asphalt mixes system using certain ideas from mimicking nature

Research Question

Select the possible self healing mechanisms for asphalt mixes from the successful self healing systems available from mimicking nature. Measure the self healing capacity of asphalt mixes. Further application methods of self healing asphalt mixture on the road.

Strategy

First, find out the possibilities of applying self healing systems on asphalt mixes by intensive literature review. Second, develop self healing system using selected chemical components. Third, develop simple tests to investigate the self healing properties of bituminous binders. Finally, verify the self healing capacity in quantitatively, and investigate the full scale application methods.

Expected Results

A possible self healing component from mimicking nature can be used as new modifier for bituminous materials with better self healing property, hence to prolong the lifespan of asphalt mixes.

Preferred Partners Applications / Sponsors

Not yet.

Prime Publication / Prototyping

J. Qiu. Self healing of asphalt mixes: literature review. Report 7-08-183-1, Delft University of Technology, September 2008.

J. Qiu, M.F.C. Van de ven, S. Wu, J. Yu, A.A.A. Molenaar. Investigating the self healing capability of bituminous binders. 3rd International Asphalt Conference, AUG 06-07, 2009, Qingdao, China. ROAD MATERIALS AND PAVEMENT DESIGN 10(SI) :81-94, 2009.

J. Qiu, M.F.C. Van de ven, S. Wu, J. Yu, A.A.A. Molenaar. Upgrading the self Healing capability of bituminous binders using reversible bonding mechanisms. AES – ATEMA' 2009, Montreal, Canada: July 06 -10, 2009

Research Period

November 2007 – November 2011