

Self Healing of Asphalt Mixes

Ideas from mimicking nature

SUBJECT

Bituminous materials are believed to heal themselves but the capacity decreases sharply with ageing of the bitumen. Inspired from mimicking nature, several chemical treatments can be used to upgrade the self healing capacity of asphalt mixtures.

GOALS

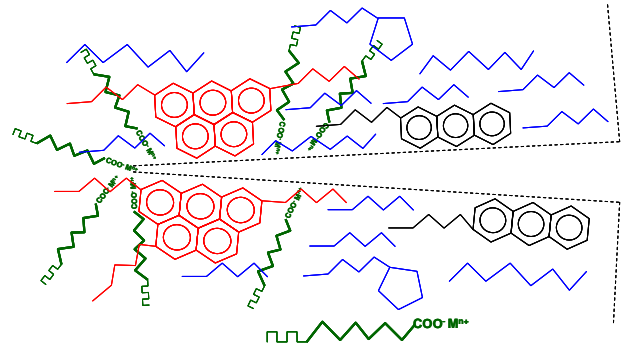
To achieve a new type of asphalt mix can really heal itself and prolong the lifespan.

EXPECTED RESULTS

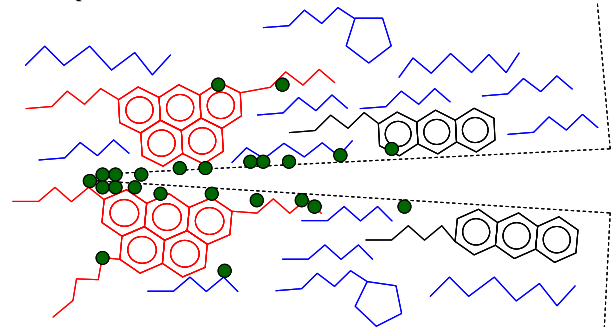
Explore the self healing properties of bitumen using several possibilities from mimicking nature.



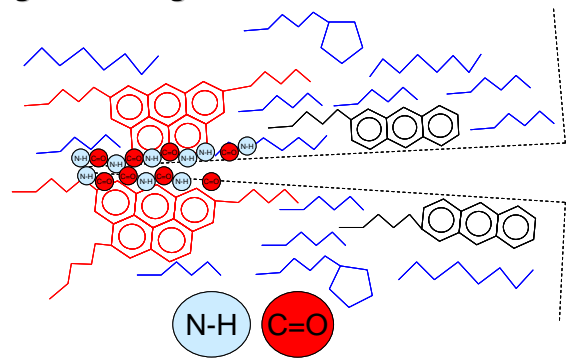
Ionic bonding reversible



Nanoparticles



Hydrogen bonding reversible



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Jian Qiu¹, A.A.A. Molenaar², M.F.C. Van de ven²

¹PhD researcher, j.qiu@tudelft.nl

²Supervisor, a.a.a.molenaar@tudelft.nl, m.f.c.vandeven@tudelft.nl



Delft University of Technology, Faculty of Civil Engineering and Geoscience, Road and Railway Engineering, Delft, the Netherlands

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. Inspired from mimicking nature, several 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 build up 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

Found out the possibilities of the application of the existed self healing systems on asphalt mixes by intensive literature review. And then develop screening tests to select the right components who can upgrade the self healing capacity of asphalt mixes. Verify the self healing capacity in quantitatively, and to 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. Upgrading the self healing capacity of asphalt mixtures. Unpublished.

Research Period

4 years (Nov 2007 – Nov 2011)