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The healing capability of asphalt pavements: A state of the art review

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Abstract:

In recent decades, several studies have demonstrated the healing capability of bituminous materials, and this property is recognized as an important asset for the development of sustainable road pavements. This paper presents a comprehensive summary of various studies concerning healing capability of bituminous materials in order to arrange the relevant topics, evaluation of their results and finding the essential fields for further investigations as a step toward designing sustainable infrastructures. Additionally, there is an attempt to highlight the differences between the real healing and other recoverable phenomena in viscoelastic materials which has been ignored in many studies. In this regard, the mechanism of healing phenomenon, influencing factors (type of bitumen and asphalt mixture, presence of rest periods, temperature and so on.) and the studying methods have been evaluated. Furthermore, the suitability of induction heating technology for enhancing the healing capability as a preventive maintenance approach was discussed. Regarding this subject, the paper proposes a set of recommendations for future studies such as differentiating between the real healing and other recoverable responses of bituminous materials, studying the application of healing in pavement design based on in-depth field experiments, analyzing the effects of additives on the healing capability by considering the chemical monitoring of bitumen, developing a unified laboratory protocol to quantify the healing capability of asphalt mixtures and assessing the applicability of induction heating technology according to long-term impacts.

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