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Improving durability of asphalt pavement by means of Hydronic Pavement

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ABSTRACT:

The asphalt pavement lifetime is strongly influenced by the variation of material temperatures; during the summer, the surface of asphalt layers could reach up to 70°C [1], which causes the formation of ruts in the surface while in winter, at low temperatures, thermal cracking takes place. These distresses lead to decrease service life of the asphalt pavement and, as a consequence, increase the cost for maintenance, because of early replacement. There are different possibilities to keep material temperatures oscillating in a specific temperature span, and as a consequence, the formation of rutting and thermal craking can be significantly reduced and, therefore, the durability of the asphalt pavement is enhanced [2] [3]. Studies focusing on temperature control through Hydronic Pavements by means of a network of embedded pipes within the layer structure, found that desired material properties are contrarious. Since the materials are responsible for the transport of energy, their thermal properties need to be taken into account [2]. The aim of this contribution is to propose a concept for Hydronic Pavement that can enhance the durability of asphalt pavement with a suitable mix design that provides an appropiate balance between the thermal conductivity and absorptive capacity of the asphalt material.

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