

## **Literature Review**

As discussed at our October 17, 2014 MCC Research Committee meeting, a literature review was performed on previous studies that have been done on sealers and scaling. A summary of this review is given below.

De-icer and anti-icer chemicals (de-icing and anti-icing salts) such as NaCl, CaCl<sub>2</sub>, and MgCl<sub>2</sub> are regularly used on exterior flatwork to maintain safe driving conditions during the winter weather. Other chemicals such as calcium magnesium acetate and urea are also used as de-icers or anti-icers to a lesser degree. Darwin, et al., (2008), and Sutter, et al., (2008) reported that CaCl<sub>2</sub> and MgCl<sub>2</sub> can cause severe scaling, which not only damages the concrete surface, but also accelerates the ingress of deleterious agents (chlorides, sulphates, etc.) and increases the degree of saturation. As Safiuddin, et al., (2011) reports, "Chlorides can penetrate the concrete cover more rapidly and carbon dioxide can more easily diffuse from the atmosphere, thus contributing to additional saturation and freeze-thaw degradation."

As determined at our October 17 meeting, the research committee would like to explore the resistance of scaling through the use of penetrating sealers. The two chosen sealers are: 8% siloxane and 40% silane. As Safiuddin, et al., (2011) reports, "These sealers achieve a nominal penetration (typically 1 to 3 mm) into the concrete substrate. By lining, but not blocking capillary pores, they produce hydrophobic reactions, which repel water and provide a high degree of breath-ability."

The value of our study is that it is specific to late season placement and addresses the effectiveness of sealers with limited curing time.

## **References**

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