

This topic is “practice ready.” Yes No

Effect of Deicing Chemicals on the Performance of Nano-Technology Based Super Water-Repellent Concrete

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Abstract

Deicing chemicals have been widely utilized for melting ice and snow on the surface of pavements in cold climatic regions such as North America. These chemicals, with all their benefits and drawbacks, might influence the water repellency of pavements made with superhydrophobic (super water-repellent) Portland cement concrete (PCC). There are different approaches for producing hydrophobic concrete among which using nano coating techniques have recently received an increasing attention. It has been proved that superhydrophobic nano-coated concrete is able to successfully repel water; however, there is a need to study the performance efficiency of this type of concrete when contaminated by deicing chemicals. The objective of this study was to study the water-repellency of nano-coated PCC,

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contaminated by calcium chloride – a well-known and efficient deicing chemical. To this end, PCC specimens were coated by polymeric materials, and the liquid-repellency of the prepared surfaces were characterized by liquid contact angle (LCA) measurements. Two types of liquids were used: distilled water and calcium chloride solution. According to the performed data analyses, it was revealed that calcium chloride contaminations enhances the degree of hydrophobicity (water-repellency) of nano-coated PCC.

Keywords: Superhydrophobic—nano-coating—concrete—winter maintenance—deicing chemicals