

### Parking Garage Deicing

With the upcoming winter season it is important to note that corrosion of reinforcing steel and other embedded metals such as embedded conduit is the leading cause of deterioration in concrete structures. The main causes of corrosion of the embedded metals is chloride contamination of concrete due to deicers deposited on concrete slabs during the winter season.



*Photo 1. Typical corrosion induced spall at a reinforced concrete slab due to chloride infiltration.*

When steel corrodes, the resulting rust occupies a greater volume than the original steel. The steel expansion creates tensile stresses in the concrete, which can cause cracking, delamination, and spalling. Unprotected concrete surfaces are porous and cracks create an easy path for water and chloride infiltration which speeds up the corrosion process.



*Photo 2 and 3. Example of Delamination of Concrete Surface and Soffit of Structural Slab Due to Chloride Contamination*

Per the Precast/Prestressed Concrete Institute Maintenance Manual, deicing chemicals are recommended to not be used until the parking structure is at least one year old. The use of deicers on newly poured concrete including unprotected repair areas would have the same exposure. The manual also recommends that calcium chloride (rock salt) deicers not be used, in general. The rock salt, which is typically used, is relatively inexpensive, but is much more harmful to the structure than other deicers, such as Ureas or Calcium Magnesium Acetate. Ice melt products, especially rock salt, are also harmful to masonry and concrete pavers if used excessively or over long periods of time as deicer salts can contribute to surface scaling. Concrete surfaces exposed to freezing and thawing in the presence of moisture and deicing salts are more susceptible to scaling.



*Photo 4. Example of Concrete Surface Scaling*

The best way to protect concrete from the deicing chemicals is to apply a sealer or waterproofing membrane to limit the infiltration of the chemicals into the substrate along with scheduled maintenance, such as cleaning. In addition to surface protection, application of corrosion inhibitor treatment will provide protection to reinforced concrete slabs. A power washing of the deck surfaces and clearing clogged drains is recommended directly after the winter season. Even when deicers are not applied directly, a wash-down is recommended due to deicers deposited by vehicles utilizing the parking structure.

For more information please contact:  
Michael Tabassi, PE  
Principal

TCE & Associates  
1109 Spring Street  
Silver Spring, MD 20910  
(O) 301-587-1820  
(C) 301-254-8884