Waterproofing: A Parking

BY KEVIN CARRIGAN

THERE IS A LOT OF talk these days about the importance of parking structure maintenance and quality. Technologies have improved significantly in recent years, giving operators and owners more control over the protection and preservation of their facilities, and encouraging more proactive and successful maintenance strategies. Further, as a result of the recent economic downturn, many owners are looking for opportunities to protect and maintain the parking assets they have, rather than building new facilities.

The two main categories of parking structure maintenance are routine/preventive and repair/replacement.

The first is performed on a regular basis to ensure the continued quality and safety of the structure. These include sweeping, trash removal, wash-downs, and periodic inspection of joints, doors, mechanical systems and other components. Any facility operator or staff member can perform these tasks, and a thorough maintenance program will help to implement a consistent and regular maintenance schedule.

On the other hand, a qualified structural engineer should perform repair/replacement maintenance tasks, often during a thorough condition appraisal. Routine maintenance will help to maintain the quality of a parking structure, as well as to increase the service life of the facility. Certain issues, however, require the attention of a professional. These include structural deficiencies, as well as problems with lighting, drainage and mechanical components.

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But water intrusion is one of the most detrimental issues to parking structures, typically leading to premature structural deterioration.

Concrete is the primary material used in the construction of parking facilities, so the damage that water and deicing salts can cause is severe. Water damage also is often difficult to identify until it is too late, when the negative impacts on the concrete, as well as the costs to correct, are already high.

Parking facilities also are vulnerable to a number of issues due to exposure to harsh weather extremes, as well as impacts from vehicles. It is extremely important to regularly seal and waterproof all of the susceptible areas of the parking structure to avoid the problems caused by water.

In addition, garage floors must include appropriate positive drainage slopes so that the water can properly flow to the drainage areas and out of the structure.

The areas of the parking structure most commonly in need of maintenance are supported entrance and exit lanes, helices, turn lanes, and floor slabs. These areas are most commonly at risk to cracking, leaking, leaching and spalling from water damage.

Cracks in the concrete are often what first lead to water damage in parking structures. They can allow concrete to absorb water and chlorides, leading to the deterioration of larger areas, as well as more serious leaking, if not immediately or properly fixed.

If cracks and the resulting leaks are ignored or left unrepaired, that can lead to concrete leaching, which occurs when water passes through concrete and begins to dissolve it from within. At this point, the damage is extensive, and significant time and money will be required to repair the damage. Floor cracks also may lead to ceiling deterioration in lower levels, caus-

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ing the overhead concrete to spall, creating potential safety hazards and structural deficiencies.

Also, water ponding within a parking structure can occur as a result of clogged or improperly installed drains, as well as a lack of positive drainage slopes. Ponding on concrete floors can lead to slipping hazards, particularly during winter months due to freezing. It also may lead to the significant deterioration of the concrete.

Although water infiltration and ponding will lead to significant deterioration if not properly prevented, it is simple to avoid them. For example, the application of a traffic deck coating will prevent the penetration of water and chloride ions.

Coatings and sealers used to preserve the concrete in parking structures should be effective at reducing water absorption, protecting from chloride penetration, and resisting ultraviolet exposure.

In general, coatings reduce water absorption more effectively than sealers. Therefore, it is extremely important to utilize coatings on parking floors particularly if they are located above offices or commercial space. In addition, in the event these coatings are damaged, they must be repaired immediately to prevent leaking and contamination. If not, the integrity of the systems, as well as the concrete, will be in jeopardy.

Regardless of which product is appropriate, the owners should make sure it is reapplied a minimum of every three to five years for sealers and five to seven years for coatings. This will help to maintain the quality of the facility, while helping to avoid serious and potentially dangerous issues in the future.

Another area which is extremely important to protect from water infiltration within a parking structure is the expansion joints. These components cut through the structures, and allow for movements as a result of concrete expansion and contraction, due to temperature fluctuations. Unless these joints are properly designed, installed and observed on a regular basis, leaking can develop and accelerate the deterioration of the structure.

Owners should reseal expansion joints every seven to 10 years, depending on their structural design, geographic location, and typical wear and tear. However, it is important to monitor these areas consistently, as localized repairs are commonly

required before their replacement, to prevent water infiltration and deterioration.

Although a qualified structural engineer is the best person to identify these issues at the repair/replacement stage, owners and staff have the greatest responsibility to monitor the structure throughout routine/preventive maintenance.

The life of any parking structure is dependent upon the care it receives from its very beginning. From visual inspections during wash-downs or rainfalls to identify leaks, to a monthly review of all joints, a proactive commitment to establishing a maintenance program is the best way to ensure the long and useful life of these important assets.

Kevin Carrigan, P.E., CAPP, is Director of Engineering for Timothy Haahs & Associates. Contact him at kcarrigan@timhaahs.com.

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