

The Big Three

The top parking structure maintenance considerations

By Joseph L. White

Building a parking garage requires a considerable resource commitment. However, when a parking structure is maintained on a regular basis, it's possible to get a significant, long-term return from that initial investment.

People want to park in facilities that look clean and groomed, and they simply expect items like structural, mechanical and life safety systems to be in top working order at all times.

Following is advice on maintaining these three important parking facility assets.

1. Structural systems

A parking garage's structural systems includes the following elements:

- **Floors.** Special attention should be paid to cracks, expansion joints, delaminating concrete, unevenness across cracks or shifting in the floor surfaces of a parking garage. Be sure to keep an eye out for unusual cracking, particularly on the underside of floor surfaces or directly over support points, as this could be a sign of structural distress or potential localized failure. Also inspect drain locations and places where water collects, as these are often spots where problems begin. Floors should be inspected every three months.
- **Framing components.** The frame of a parking structure is comprised of the building's columns, beams and spandrel panels.

These components are most often made of steel, concrete, or steel encased in concrete. When examining the frame of a parking structure, look for places where concrete has cracked or spalled, reinforcing materials have become exposed or corrosion has set in. Pay special attention to the condition of steel components. Any signs of cracking, deflection or twisting in the steelwork are signs of trouble. As a rule of thumb, if corrosion loss compromises more than 10 percent of the steel framing components in a parking garage, an experienced structural engineer should be called immediately. The first and roof levels of most parking structures are the most susceptible to corrosion damage.



Column beam spalling.

In precast parking garages, pay close attention to concrete bearing ledges and haunches. These areas are responsible for supporting the components above them, and any signs of cracking or movement are indicators of a structural problem. The framing components of a parking structure should be inspected every three months.

- **Walls and towers.** Walls and towers of a parking structure should be plumb. If cracking appears on wall surfaces, stair treads become misaligned or expansion joints open up, chances are good that the parking structure has experienced settlement or movement of the framing members. Walls and towers should be inspected quarterly.
- **Connections.** Places where structural system components are bolted, welded or grouted into place should be carefully examined for corrosion, cracking, spalling or distress. A high percentage of structural failures occur in the connections, rather than in the structural members themselves. Connections should be inspected on a quarterly basis.

2. Mechanical, electrical and plumbing systems.

Among a structure's MEP elements are the following:

- **Elevators.** Problems with elevators are often due to water infiltration through a cold joint or a roof leak on the elevator tower. Be sure to check the walls, roof and every doorway of the elevator tower. In addition, make sure the elevator has a valid inspection certificate. Elevator operation should be checked daily.
- **Emergency generators.** Emergency generators power emergency lighting and fire protection systems. Make sure the generator is in working order, has an updated evaluation certificate and that all circuits connected to the generator operate correctly. The operation of emergency generators should be checked once a week.
- **HVAC.** Heating and cooling systems are most often found in the office and booth areas of parking garages. Make sure the HVAC equipment is in working order, filters are installed and clean, and that all ductwork is unobstructed and undamaged. HVAC systems should be checked on a weekly basis.



Floor demolition spall.

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A corroded connection.

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- **Exhaust systems.** In below-grade parking garages, exhaust systems remove toxic carbon monoxide and replace it with fresh air. Regularly inspect the ductwork of these systems and look for signs of damage or corrosion—particularly in places where the ductwork is mounted against a concrete surface. Also, have a HVAC contractor regularly conduct metering on the air handling system to ensure safe operation. The operation of exhaust systems should be checked daily
- **Light fixtures.** Note where and how often lights are burning out. In places where large numbers of lights are functioning intermittently or not at all, it's advisable to examine wiring conduits for water infiltration or corrosion. If water or corrosion is found in the conduits, consider having new conduits run externally through the parking structure by a qualified electrical contractor. Check the function of lighting systems once a week.
- **Parking control systems.** To operate efficiently, the gates controlling entrance into and exit from the parking garage must always be in working order. Their operation should be checked daily. If malfunctions are detected, call a technician immediately.
- **Drains.** Floor drains create major maintenance issues for parking garages. If allowed to fill with debris, oil, dirt and melting agents, receivers and traps can quickly become plugged and allow water to pond. Floor drains should be inspected weekly, and cleaned as soon as any ponding or slow drainage is noticed.
- **Drain piping.** Over time, debris accumulation and freeze-thaw cycles can take their toll on drain piping. Special attention should be focused on elbows and traps to ensure they are clean. In addition, damaged or cracked pipes should be replaced immediately. Drain piping should be inspected quarterly.

3. Life safety systems.

A parking structure's life safety systems includes the following:

- **Doorways.** Doors are an important part of a parking garage's fire protection system. Damaged or rusted doors must be replaced to ensure the parking garage is code compliant. In addition, doors must operate smoothly and have a working lockset that allows people to get out of the stairwell quickly and easily in the event of an emergency. Security doors must be equipped with panic hardware. Doors should be inspected on a daily basis.
- **Hand railings.** Subject to heavy usage that can loosen fittings, handrails tend to break off or become unstable at the corners of stair landings. Handrails should be inspected for damage, cracks or rough areas on a daily basis.
- **Wall-mounted emergency alarms.** A major part of any parking garage's life safety system, wall-mounted emergency alarms should be tested on a daily basis during non-peak hours of operation.
- **Emergency lighting packs.** Emergency lighting packs are frequently found in stairwells and areas of high pedestrian traffic. Critically important in the event of a fire or power failure, the operation of each pack should be checked daily.
- **Signage and graphics.** To maintain safe and efficient traffic flow in a parking garage, it is essential to have clear, easy-to-read signage. Damaged signs, or those obscured by dirt and graffiti, should be quickly replaced. Worn traffic striping and damaged curb paint must also be refreshed on a regular basis. Signage and graphics should be inspected on a monthly basis.
- **Tripping hazards.** As soon as they arise, tripping hazards in parking garages must be marked, isolated and rectified. Ice should be removed with approved melting agents, oil and grease must be power washed from floor surfaces and high spots created by settling must be leveled. A parking garage should be evaluated for tripping hazards on a daily basis.
- **Painting.** Fresh paint can significantly improve the appeal and safety of a parking garage. Lighting systems work better when they can reflect off of clean wall and ceiling surfaces. In addition, recently painted surfaces can streamline daily clean-up operations. Wall and ceiling paint should be inspected and touched up on a quarterly basis.
- **Landscaping.** Trees, shrubs and grass should be kept neatly trimmed to keep sightlines clear at parking garage entrances and exits, and to improve the overall curb appeal of the facility. Dead or overgrown landscaping materials must be quickly removed. Precautions should be taken to ensure that materials like mulch or crushed stone do not obscure or clog foundation drainage.
- **General cleaning.** On a daily basis, trash cans should be emptied, restrooms must be cleaned and cashier booths, elevators stairwells and lobby areas swept. Once a week, parking areas and curbs should be swept and lobby windows washed. On a quarterly basis, the entire parking surface of the garage should be washed down to remove accumulations of dirt, oils, grease and melting agents.

Of all the things that can be done to maintain a parking structure, washing down the decks is the most essential. Doing so lets you see problems like cracks, clogged drains, worn or peeling paint, spalling and corrosion.

More important than ever

With budgets for new construction being severely cut or eliminated, parking garage maintenance and restoration is becoming more important than ever. Parking garage restoration and maintenance can significantly extend the lifespan of the garage.

The smart choice is to pay a reasonable amount on an annual basis for parking garage maintenance and repairs, rather than a very large amount later to reconstruct the garage.

Joseph L. White is vice president of Carl Walker Construction, Pittsburgh. He is responsible for all of Carl Walker Construction's parking garage restoration, maintenance, carbon fiber, waterproofing, expansion joints between joint sealants and waterproofing systems, as well as specialty projects. He can be reached at jwhite@carlwalkerconstruction.com