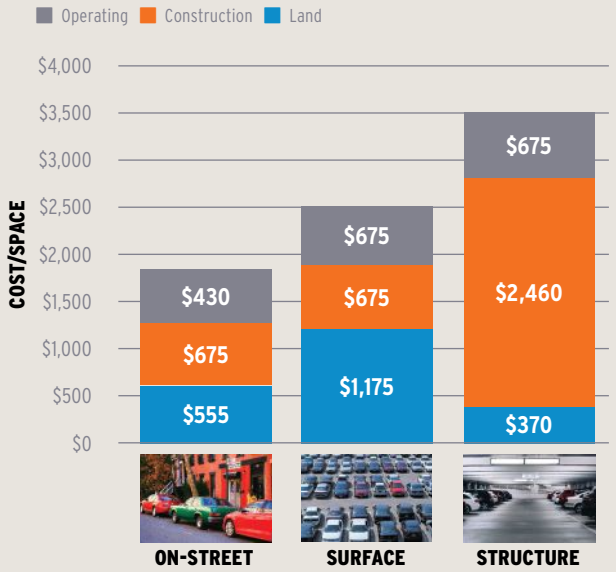
The Truth About Parking Structure MAINTENANCE

MOST PEOPLE SEE THE RUGGED LOOK OF A PARKING STRUCTURE AND ASSUME THEY DON'T REQUIRE MUCH MAINTENANCE. UNFORTUNATELY, NOTHING COULD BE FURTHER FROM THE TRUTH.

PHOTOS COURTESY OF INNOVATIVE ENGINEERING INC.

FIGURE 1
Typical Parking Annualized Costs Per Space



COMMON PARKING COST COMPARISON, IMAGE BY EVP DESIGN
SOURCE: VICTORIA TRANSPORT POLICY INSTITUTE

When performed at the optimum time, parking structure maintenance can provide a return on investment that far exceeds other maintenance activities. Reviewing a life-cycle cost comparison — specifically, the cost of different parking and structure types — reveals the importance of routine maintenance activities.

When Deterioration Starts

Parking structures are completely exposed to the elements. These include wind, rain, snow, de-icing salts, thermal expansion and contraction, ultraviolet light, carbon dioxide, as well as moving dynamic vehicle loads.

Therefore, deterioration starts even before the structure is put into service and continues at an accelerated rate. Proactive maintenance keeps maintenance costs low and protects the market value of the facility.

On the other hand, reactive deferred maintenance has little immediate impact but increases repair costs exponentially over time. Deferred maintenance impacts the first and last impression of a guest, tenant, or buyer, as well as negatively impacts the sale of the facility.

The Cost of Structured Parking

The cost of structured parking is significantly more than the other common forms of parking. Structured parking requires less land per space, but construction cost of the superstructure is significantly more than the cost of pavement, curb, and gutter for on-street and surface lots.

The costs in Figure 1 from the Victoria Transport Institute have been adjusted for inflation and show order of magnitude costs to demonstrate the relative costs of the different types of common parking.

Structural System Selection and Cost

The structural system for a new parking structure makes up two-thirds of the cost of construction and most of the maintenance budget.

The three most common structural systems — cast-in-place concrete (CIP), precast concrete, and structural steel — are shown in Figure 2. There are also hybrid combinations of these.

Order of magnitude annualized life-cycle costs for each of the structural systems are shown. These values (source: International Parking Consultant Kirk Taylor, AIA) include initial investment and scheduled maintenance costs for a 500-space parking facility amortized over a 30-year highest and best-use life.

Operating costs are assumed to be the same for each of the systems and are not included for clarity.

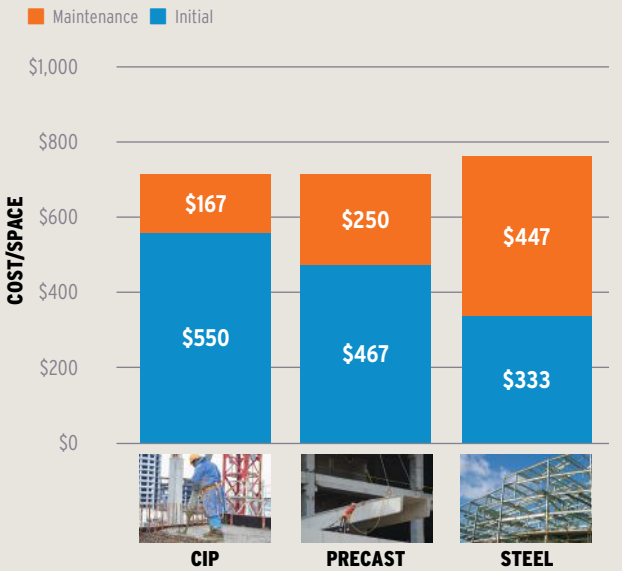
As seen from the chart, the CIP system has the highest initial investment but lowest maintenance costs. This makes these systems more appealing to long-term institutional owners.

The total life-cycle cost of a precast system is similar to CIP concrete, but with a lower initial cost and a higher maintenance cost. By contrast, the structural steel system has the lowest initial cost but the highest maintenance costs, resulting in the highest total life-cycle cost.

Importance of Routine Maintenance

The maintenance costs in Figure 2 assume a maintenance plan and budget is in place and followed from the time the parking structure opens. Failing to do so could quadruple the maintenance costs shown.

FIGURE 2
Typical Annual Life Cycle Costs Per Space



STRUCTURAL SYSTEM COST COMPARISON, IMAGE BY EVP DESIGN
SOURCE: KIRK TAYLOR, AIA, LEED AP WITH PARC

Chloride ion and carbonation testing

Considerations that affect the maintenance activities and schedule include structural system type, geographic location, use of the facility (frequency of traffic), and how the facility is operated.

The most important component of a maintenance program is an annual wash down (particularly on the top level), as well as more in-depth condition assessments every five years.

While water is the No. 1 ingredient for a healthy landscape, it is also the No. 1 cause of parking structure degradation. Therefore, remove rain, snow, and ice from the parking structure quickly and efficiently.

The Cost of Doing Nothing

Parking structures start to deteriorate before they are operational and continue to do so at an accelerated rate after only a few years. Figure 3 shows a graph of deterioration and repair costs as a function of time for both a parking structure as well as the enclosed building served by it.

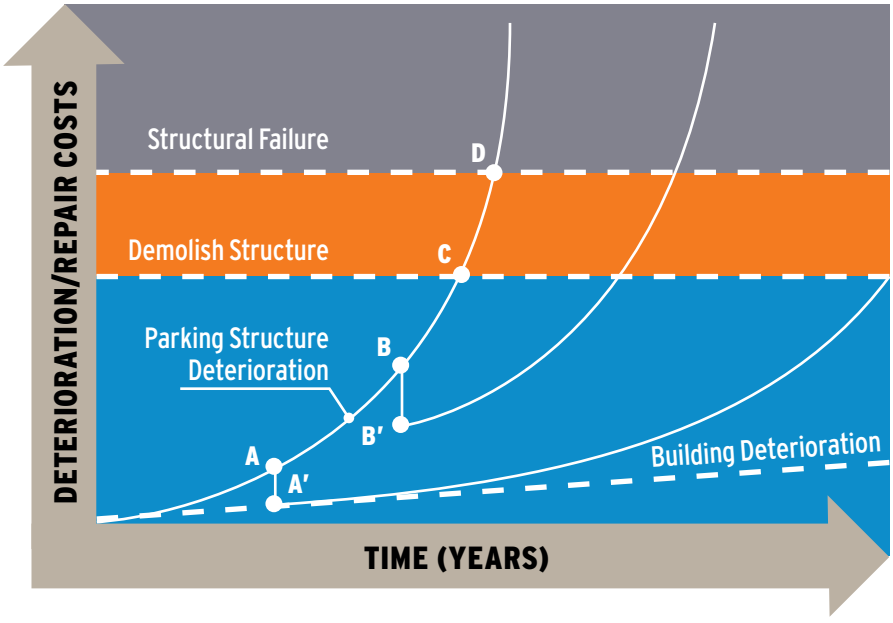
The relatively flat line represents deterioration of the enclosed building structure. By contrast, the deterioration and repair cost of an exposed parking structure is gradual at first but accelerates over time.

When deterioration is repaired at the optimum time designated by Point A on the graph, the condition of the parking structure is partially reset, and the service life will reach that of the building served.

However, if needed repairs are deferred as designated by Point B, not only are the repairs more expensive and disruptive, but reaching the expected service life of the parking structure is in jeopardy.

The cost of doing nothing is represented by Point C, requiring reconstruction of the structure much sooner than originally planned. Point D represents a structural failure or collapse due to inadequate maintenance.

FIGURE 3
Deterioration and Repair Costs as a Function of Time



What to Do

1. Select a parking structure restoration engineer based on technical qualifications, not the fee. Beware of low fees that represent the need to cut corners.
2. Schedule a walk through. An experienced engineer can determine the structure's general condition and locate hidden problems.

Next steps may include future inspections, evaluating the maintenance plan, performing an in-depth condition assessment, and generating restoration design documents.

Act Early

Given the harsh environment in which parking structures exist and the accelerated rate of deterioration compared to other buildings, maintenance and repairs done early are ultimately less expensive.

Deferred maintenance in parking structures can lead to serious and expensive structural deficiencies.

A parking structure restoration engineer can help determine the current condition of your parking facility, plan and budget for maintenance and repairs, and assist with funding ideas. ■

Scott L Weiland, PE, is a principal with Innovative Engineering Inc. and a member of NPA's Parking Consultants Council. Email him at **sweiland@ieiusa.com.**

Trey Thomas, PE, is an associate with Innovative Engineering Inc. Email him at **tthomas@ieiusa.com.**