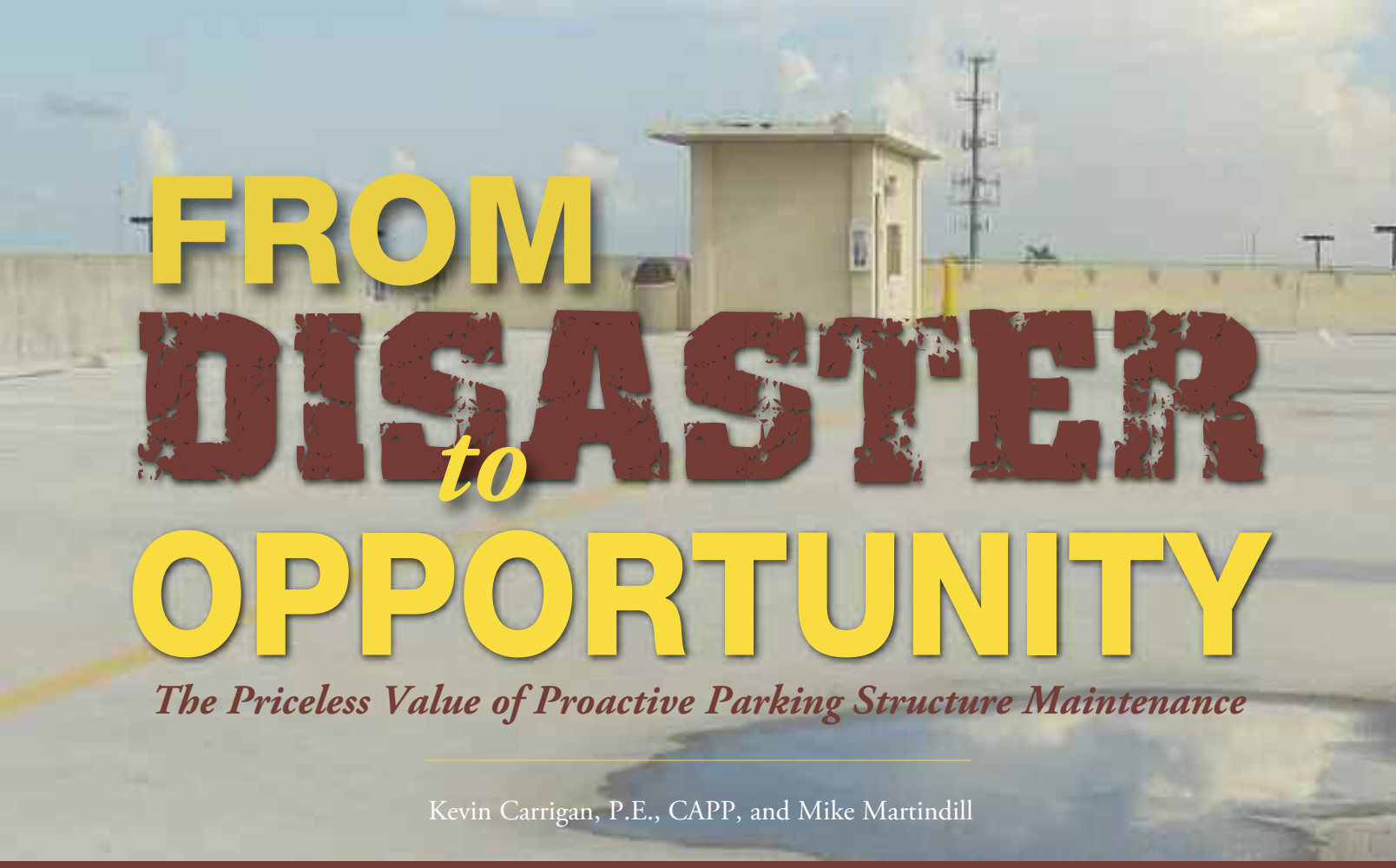

FROM DISASTER *to* OPPORTUNITY

The Priceless Value of Proactive Parking Structure Maintenance

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Sometimes tragedy serves as a very painful reminder of the importance of routine maintenance, inspections and a proactive approach to protecting our infrastructure and building assets. For example, in 2007 when the I-35W Bridge collapsed in Minneapolis, the State of Minnesota immediately embarked on a comprehensive, statewide inspection of all of its bridges. This comprehensive measure was exactly what the community needed to see happen to ensure that the infrastructure was safe. Similar actions were taken in states across the summary.

Our infrastructure needs as a country are well documented. Many of the major systems that support our nation's people and economy are in urgent need of repair, upgrade, replacement and significant capital investment. These include our roads and bridges, our sewer and water systems, dams and levees, and the electrical grid. On a smaller scale, the parking structures we use for work, home and play are essential infrastructure elements that also require our attention and investment.

Unfortunately, a parking structure recently collapsed in Midtown Atlanta. A terrible disaster and, fortunately, no one was injured. But this incident, like in Minnesota, prompted owners and operators across the state to inspect their parking structures to ensure that they are safe.

The reaction to both the Atlanta and Minneapolis events reinforces the importance of regular inspections and the proper maintenance of parking structures. Even though they are constructed of highly durable and long-lasting concrete, parking structures expand and contract, and are exposed to the elements – just like bridges. Therefore, owners and operators must implement a truly proactive approach to ensure their continued safe use and long-term durability.

The best course of action for any owner to take is to engage a professional engineer to perform an assessment or "Condition Appraisal" of their parking structure or concrete building (for example, a stadium). The benefits and value of appointing an engineer to perform an assessment include: identifying immediate areas of concern and addressing them promptly; developing a capital budget for a repair program; developing a maintenance program for extending the useful life of the asset and, in general, providing an expert opinion on the safety of the parking facility.

Utilizing a structural engineer who specializes in parking structure design is the most effective approach to facilitating a Condition Appraisal. Parking structures are unique and, therefore, require a specialized analysis. Unlike buildings where the structural frame is typically enclosed, parking structures are exposed to weather, salt and harsh conditions that have a detrimental impact on all exposed elements, including the structural frame, stairs and elevators. Since parking decks experience more severe and harsh conditions than most other structures, someone experienced in parking design, construction and restoration, fully understands why problems occur and, most importantly, what needs to be done to correct the problems in a cost-effective manner.

Some of the more important elements to assess during a Condition Appraisal include:

Drainage – Standing water is one of the most destructive (and common) problems within parking structures. Without effective and adequate drainage, standing water can lead to slipping hazards, corrosion and even compromising the structural integrity of the garage. In the north, where salts are used, the impact of poor drainage is intensified.

Joint and Cove Sealants – Parking structure joints help to control the location of concrete cracking. They are grooves, which are located between floors, double tees and vertical elements such as walls, spandrels and expansion joints. These areas need to remain sealed at all times in order to prevent deterioration.

Unexpected Movement, Deflections or Cracking – These may be signs of structural inadequacies. Owners or operators should consult a qualified professional to review these issues as soon as they notice any unusual changes in the structural appearance.

Exposed Connections – In most cases, especially in precast structures, attention should be paid to structural connections exposed to the harsh environment to ensure that structural intent is not breached. Corroded and otherwise damaged connections could potentially affect load-carrying ability, which could result in structural failure, in turn, endangering the public.

Expansion Joints – The purpose of expansion joints is to allow movements and relieve internal stresses within parking structures that are caused by thermal expansion/contraction, concrete shrinkage and seismic/wind forces. An engineer will recognize failed or failing expansion joints that should be repaired or replaced in order to prevent water leakage and deterioration.

Lighting – Lighting is a major priority for establishing parking structure safety and higher light intensities help to provide an increased feeling of safety and security. A parking structure engineer has extensive knowledge of the requirements and recommendations for light intensities in the specific areas of a parking structure, including drive aisles, lobbies and stair/elevator towers.

A thorough parking structure Condition Appraisal, from visual observations and delamination survey to concrete testing, will help to identify areas of concrete distress, weakness or concern, as well as establish an order of magnitude cost of repairs. It is critical to detect these issues as soon as possible so that they can be repaired in a timely manner. As we have learned, the longer problems go unresolved, the greater the impact is on repair costs, garage operations and patron safety. Catching problems early can save an owner hundreds of thousands of dollars in repair costs, let alone any liability that might be associated with spalling concrete or trip hazards from failed expansion joints and floor spalls.

Along with conducting regular Condition Appraisals, the most effective approach to maintaining the quality and safety of a parking structure is to establish a thorough maintenance program. Ideally, the owner would establish this program as soon as the facility is constructed, or even during the design. This is obviously not always feasible, as many parking structures today have already been in operation for years. However, creating this guideline as soon as possible will prove to be a valuable and effective strategy, whenever it is implemented.

Identifying issues such as water ponding, concrete corrosion and rusting early can help to avoid more expensive and serious problems later on.

A maintenance program can be broken down into two key categories of maintenance: routine/preventive maintenance and repair/replacement maintenance.

Routine/Preventive Maintenance tasks help to ensure the safety and proper operation of the facility. Daily tasks including sweeping, trash removal, washdowns and removal of ponded water will help to maintain the appearance and cleanliness of the facility, as well as help to prevent deterioration. For example, ponded water and high concentrations of chlorides (road salts) can result in the corrosion of embedded reinforcement and other steel components that can be prevented through routine maintenance.

In addition to these daily tasks, owners should also plan for the regular assessment of a number of vital areas throughout the facility. The consistent inspection of joints, doors, mechanical systems and countless other components will help to stay ahead of any potential issues, as well as guarantee that any problems are resolved in a timely manner.

Repair/replacement maintenance items are those that a structural engineer would assess during a Condition Appraisal. Even with the performance of regular maintenance tasks, elements throughout the structure will become damaged or deteriorated, or they will reach the end of their useful service life. Most of these include structural and waterproofing issues or major system components such as lighting, drainage or fire protection.

The implementation of each of these tasks, from development of a maintenance program to performing regular Condition Appraisals, is an extremely effective strategy in asset preservation. Although it may be complicated and time-consuming to develop, the benefits that will result are worth the effort. These approaches will not only help to maintain an attractive, structurally sound and operational facility, but they will also help to prevent (or at least alleviate) the headaches that would no doubt come if these strategies were not in place.

Performing routine and regular maintenance, and having a professional engineer assess a parking structure's condition, will help ensure early identification and prompt resolution of problems. Being proactive will help maintain the quality of your asset and control unnecessary capital investment, while providing safe, attractive and convenient parking for years to come. ■

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