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Prolonging the Life of your Below-Grade Parking Structure

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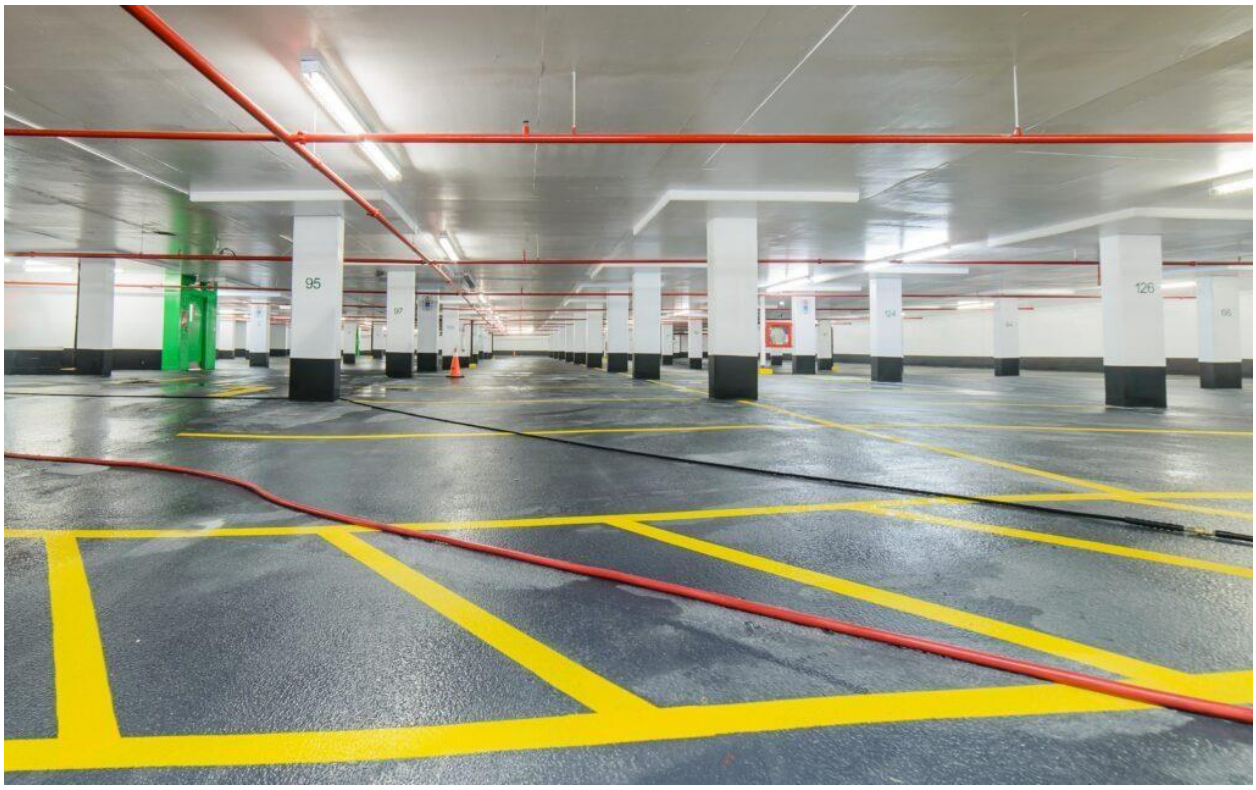
When cracks appear in the concrete foundation walls of your below-grade parking structure, the sight can be disconcerting. But the reality is, it happens in every facility at some point in its lifecycle and there are trusted methods to prevent them from worsening. According to Nigel Parker, Principal, Building Science and Restoration at RJC Engineers (pictured above), the first step is to assess the cracks for severity and take prompt action to ensure the structural integrity of the parking garage isn't compromised.

“Cracks in concrete foundation walls can result from various factors such as settlement, flexural movement, temperature changes, and water infiltration,” he says. “Regardless of the immediate threat, timely intervention is critical to preventing further deterioration.”

Area vs. traditional crack injection

Currently there are two principal methods to address cracking in concrete foundation walls, and each has its own advantages. Traditional crack injection is a tried and true, short- to medium-term repair solution to address localized leaking, while area injection addresses a much larger swath of the wall. Given water often migrates to the next crack, creating a new leak location in the same vicinity, the area injection method prevents potential leaks and eliminates the need for adjacent repairs. Area injection is recommended over traditional crack injection when the localized repairs are longer effective or when there is extensive water infiltration.



RJC’s work at The Boulevard in North York, Toronto, involved wholesale waterproofing replacement, replacement of all parking garage and podium deck drains, localized slab-on-grade repairs and localized structural concrete repairs.

"We also recommend it when the foundation wall is adjacent to critical infrastructure such as electrical equipment, or when excavation and replacement of exterior foundation wall waterproofing system is not practical or cost effective," Parker adds.

Unlike traditional crack injection that fills the length of a leaking crack, area injection is performed in a grid pattern both horizontally and vertically around a much larger wall area, which may include the entire wall.

"The area injection method results in the resin forming a new waterproofing barrier on the backside of the foundation wall and not just along a single crack," Parker explains. "Since water tends to find the path of least resistance, wholesale injection of the foundation wall provides additional protection over the localized crack injection approach limiting the number of pathways moisture may flow through the foundation wall."

As more injection ports are required and more resin is injected with the intent to create a new waterproofing layer, area injection does take longer to implement and require a qualified, trained professional to ensure a successful result—in other words, yes, it is more costly. But Parker points out that the advantages include a ten-year warranty from manufacturers and installers, less disruption at the site, and time and cost savings associated with the waterproofing. Area injection is also more versatile and can be undertaken on surfaces that would not accommodate traditional crack injection, such as stone rubble foundation walls.

Maintenance best practices

To limit cracks and prolong the life of your below-grade parking structure, regular maintenance is the best preventative measure, and this includes addressing leaks at the earliest opportunity.

"Ongoing water infiltration leads to corrosion-related structural deterioration, and if left uncheck, this will result in safety concerns and costly structural repairs," he says. "Furthermore, from a customer point of view, a leaking foundation wall crack is indicative that the parking facility is not kept in a state of good repair."

For more information on prolonging the life of your below-grade parking structure, please visit www.rjc.ca or contact Nigel Parker directly.