

Hallmark Condominiums Balcony Repair

Alexandria, Virginia

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Fig. 1: Repair work done in 1991 has held up very well for 15 years



Fig. 2: Phase II work completed in 1991

Hallmark Condominiums, built in 1971, sit in a park-like setting in a Washington, D.C., suburb in Virginia. The property attracts educated upper-middle-class people from a variety of industries in the area. Whereas not extravagant, the residents have added personal touches to the building and surrounding plaza. This is clearly their home, not a transitional place to stay before moving on to a real home.

Phase I

In the late 1980s, the 16-story brick-clad building with 15 tiers of balconies was experiencing common failures of the balconies. Almost all of the failures were balcony concrete edge repairs. Typical cantilevered concrete slabs extending from the 8 in.

(20 cm) floor slab, they tapered to 6 in. (15 cm) edges to allow for proper drainage. The aluminum railings were imbedded and were a major source of failure from dissimilar metal corrosion. There were also areas of deterioration where the original hook bars were placed against the edge form for the balcony during original construction.

In 1988, the condominium owners hired a local engineering firm headed by an engineer with 25 years of experience, who had been an expert witness on numerous concrete repair failures in the 1980s. He was constantly analyzing repair procedures and was dissatisfied with the options in 1989. He was very concerned about the liability to all involved entering a large repair project on these condominiums.

Because of this concern, he recommended that the condominium owners hire a contractor to perform repairs to two tiers as part of a prototype, as Phase I of the project. These were to be full-scale repairs on two complete tiers, for a total of 30 balconies. An experienced contractor was hired and the two tiers were completed in 1988, using suggestions from material suppliers, the contractor, and the engineer. As part of the research the engineer performed during this time, he superficially interacted with several of



Fig. 3: Phase II work being performed



Fig. 4: Phase II work showing swing stage

the future founders of the International Concrete Repair Institute (ICRI, known in 1988 as the International Association of Concrete Repair Specialists [IACRS]). The feedback he received indicated that the new trowel grade polymer materials should be used in combination with a non-shrink grout for the post pockets. No repair standards were offered by any of the people he spoke with in 1988.

In late 1989, he was called back out to the condominiums for the 12-month inspection. To everyone's surprise, the majority of the work on the two prototype tiers was experiencing hairline cracking and failures. Because the cracks were small and the level of inspection was higher than normal, his first thought was that they were being too critical. They therefore agreed to reinspect the work the following spring.

As he continued his research, he again interacted with several future founders of ICRI and exchanged more detailed experiences with several of them. As a part of these discussions, he learned of the movement to establish a new concrete repair organization. He embraced the idea; and in the late winter of 1990, he was a critical part of establishing the Baltimore-Washington Chapter of IACRS (later ICRI) and served as the first President for that chapter in 1990.

The follow-up inspection took place in the spring of 1990, and the engineer was aghast at the condition of the repairs. After 12 months, what had been hairline cracks were now complete delaminations; and in the worst cases, patch material was already falling to the ground. For the third time, the engineer sought the "experts" in this new field of concrete repair on balconies with imbedded railing mounts. He wanted to find someone with answers who could offer more

advanced procedures for repair; but at the end of his research, he realized he knew as much as the experts and that wasn't much. His various discussions led him to believe there was a growing consensus that chipping firmly bonded concrete away from reinforcing steel to expose corrosion, sandblasting all of the exposed steel to substantially remove all rust and moisture, and using the form-and-pour method for the majority of patches were three prudent upgrades to his specifications. This was less than 2 years from the first call for information; but in that short time, the answers were changing rapidly.

The condominium owners had a large liability with concrete falling 16 floors, but little confidence in concrete repair contractors. It would have been easy to put off the work for a year or two, using the fear of failure as justification. They did the opposite by asking the engineer to make the changes he would recommend to the specifications and to solicit bids quickly. He provided specifications that reflected the original three ICRI Technical Guidelines (No. 03730, 03731, and 03733), which would not be published for several years. Once the bids were in, they interviewed the two low bidders with the engineer in the room. Once a contractor was selected, a second meeting was arranged and all parties spoke openly about various options. The contractor shared his experiences, positive and negative, and made various suggestions. The engineer also offered his comments and suggestions. As a result of this, the condominium owners agreed



Fig. 5: Hallmark Condominiums 15 years later



Fig. 6: Another shot of the balconies 15 years later

to accept both the more expensive option—to modify the railing anchorage to surface mount—and the urethane coating. The repair “team” had bonded—a must on successful projects.

Phase II

The contractor started on this new work, Phase II, in the spring of 1991, and finished the project on schedule by Thanksgiving. Concrete overruns were approximately 4% of the contract. The two prototype tiers were completely redone. The actual field work was performed in an organized professional manner. There were 15 tiers, so the contractor set up five swing stages, and the repair project was divided into three phases. One challenge for the repair contractor was the field welding of aluminum, not a simple procedure in windy field conditions. The second challenge was monitoring quality assurance among the various crews. This project had new procedures, and there were no experienced balcony repair technicians available in the Washington, D.C., area that had performed work to these specifications. Tool box meetings were held frequently, and a foreman was assigned the task of spot checking the work during lunch and other downtimes for the swing stages.

What is noteworthy about this project is that after experiencing almost total failure on the prototypes within 18 months, the condominium repairs have experienced almost no failures for the following 15 years. The condominium has spent less than

\$15,000 over the last 15 years maintaining these same balconies. In many ways, this is because of ICRI and the procedures and standards that were subsequently published. This project illustrates just how important ICRI and the initial guidelines are to a successful concrete repair project.

The restoration team had high expectations in 1991—they wanted the repairs to last for 5 years until the next planned balcony repair project. All of the project team partners are proud that we were wrong—we should have done the cost/benefit analysis on a 20-year life cycle.

Hallmark Condominiums

Owner

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Project Engineer/Designer

Thomas Downey, Ltd.
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