

Marriott Frenchman's Reef and Morningstar Beach Resort Balcony Repairs

St. Thomas, U.S. Virgin Islands

Submitted by C.A. Lindman, Inc.

The business of structural repair and restoration is, by its nature, very challenging, due to so many unknown and hidden conditions that are part of nearly every project. The complications are multiplied at a resort hotel, where property owners press for abbreviated schedules to minimize loss of revenue and hotel management and guests insist on limited work hours and stringent control of noise, staging areas, and clean up of debris. All of these challenges are magnified when the location of the project is a Caribbean island 1200 miles (1931 km) remote from the contractor's office, its labor force, and established sources of supply. These restoration challenges were successfully handled during large and complex balcony repair projects at the Marriott Frenchman's Reef and Morningstar Beach Resort complex on St. Thomas in the U.S. Virgin Islands.

The Frenchman's Reef Resort complex consists of over a dozen buildings for guest rooms, restaurants, parking garages, and other ancillary service buildings. The continuing demands of operating the property had discouraged ownership from performing needed repairs in previous years, but by 2004, the poor original workmanship and lack of quality control, exacerbated by harsh tropical climate, had taken its toll. Large spalls of concrete on the Sea Cliff building had fallen from the undersides of balconies onto balconies below or down to ground-level patios, posing serious safety hazards to guests and resort employees. The ownership reacted by engaging the evaluation and design services of a restoration structural engineering firm to prepare a comprehensive balcony repair project.

The Sea Cliff building is a five-story structure, 17 guest rooms wide, set into the rock cliff. The engineer's investigation of the Sea Cliff balconies identified alarming quantities of failed concrete. Sample demolitions had discovered whole sea shells in the existing concrete matrix, apparently due to use of beach sand in the original concrete pours. The ultra-high



Marriott's Frenchman's Reef Resort complex

salinity of the concrete had caused accelerated rusting of reinforcing steel and resulted in the large spalls and delaminations that were then evident. The engineer's plan to address the problem involved not only removal and replacement of failed concrete in accordance with ICRI repair guidelines, but also installation of an active suppression cathodic protection system to inhibit any further deterioration of original concrete that had not yet failed.

The owner and engineer strategized about various repair scenarios, from small crews working on limited work areas for a prolonged period to large crews "blitzing" the work to be in and out of the project in the shortest time possible. The owner eventually directed that the entire Sea Cliff building would be closed to guests for 10 weeks.

In July 2004, several U.S.-based restoration contractors were invited, along with any interested local contractors, to attend a prebid meeting on site. Project scope and goals and local material purchase and local labor participation obligations that are imposed on the property by the Government of the Virgin Islands were discussed. The very aggressive window in which to perform the work, the local

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participation requirements, the complications of travel and overseas shipping, local housing, material suppliers, and the \$10,000 per day liquidated damages penalty caused several prebid attendees to drop out. On bid day, however, several respondents did submit proposals for the work. One proposal offered several value engineering suggestions that both saved money and reduced risk of schedule complications. After some negotiation, the contract

was awarded and the project mobilization was planned for mid-September 2004, with requirements to be off the job before Thanksgiving.

Unique Challenges

One of the first challenges the contractor faced before mobilizing to St. Thomas for the job was assembly of the work force. To make the required schedule, the contractor anticipated working 6-day weeks, but recognized the crews would quickly burn out with only 1 day off per week. Therefore the crew size was overmanned, with some portion of the crew rotating off each day to provide a full 2 days off work each week, while still manning the project 6 days a week, 10 to 12 hours each day. Expecting to require about 40 men for the job, the contractor planned to send 25 to 30 repair technicians to St. Thomas and to hire local labor to comply with the local participation requirement and to round out the crew.

Because there were very limited sources of construction equipment and tools on the island, most tools and equipment had to be shipped from the U.S. Sea containers were delivered to the contractor's office and swing stages, stage motors, beams and weights, chipping hammers, grinders, and debris wagons were collected, all to be shipped to St. Thomas.

A new and modern concrete ready mix plant operated on the island, but no on-island sources of supply were found for other materials such as reinforcing steel coating and urethane balcony coating. Those needed materials were likewise collected in the U.S. and shipped to the job site. The planning had to take into account not only the shipping time at sea, but the extra week or so for each shipment to clear through U.S. Customs on St. Thomas. Unlike typical jobs in a contractor's home territory, no one could just run to the local supply store and pick up the needed tool or product—it would have to be shipped in and clear Customs.

For housing the crew, because the building being repaired was being totally shut down during the project, the workforce could stay in those rooms. During execution of the project, demolition of concrete on the balconies frequently caused weak and failed concrete within rooms to drop, requiring unanticipated interior concrete repairs. Those caused the men to have to relocate from room to room through the course of the project, but in general, the arrangement worked well.

Creative Repair

The most challenging aspect of the very compressed schedule was getting all the failed concrete demolished and removed, and all new concrete placed and finished within sufficient time to then allow the new concrete to cure sufficiently before application of the urethane coating. Where, in most typical balcony repair projects, every other balcony



Deterioration on the balconies



Sea Cliff balcony repairs underway



Balconies being readied for new concrete



Repairing balconies



Ocean Tower building with full scaffolding in place

in a vertical alignment is repaired, with forms for the repairs shored down to the intact balconies below, the schedule for the Sea Cliff job did not allow two work cycles at each tier of balconies. The contractor developed a very creative system of joists hung under each balcony to support forms, so all balconies in a tier could be demolished at the same time, and all new concrete could be placed back in one pour date. This process was the key to making the finish schedule, and worked exactly as planned.

When each balcony demolition had taken place, continuity of reinforcing steel was checked, and if found incomplete, bar was tied to complete contact. Anode and cathode connections were made at each balcony to allow grouping of cathodic protection wiring, so that as soon as new concrete was placed back, the individual balconies could be tied together into circuits and runs pulled back to the power supply and control system.

With the end date in sight, the contractor scrambled to apply urethane protective cover over balconies and to finish the balconies with tile cover per the owner's requirements. The entire scope of the balcony repairs was substantially completed and the Sea Cliff building returned to for public use by mid-November, despite the addition of substantial quantities of additional interior concrete repair added by necessity during the course of the project.

Additional Project Awarded

The Marriott Frenchman's Reef Resort management and ownership were so pleased with the Sea Cliff balcony repair project that in 2006 they hired the same contractor for balcony repairs on the Ocean Tower building. The major deviation in scope from the Sea Cliff to Ocean Tower was the method of access to the work areas. While on Sea Cliff the contractor could work from swing stages suspended from the rooftop plaza, the sloped roof of the Ocean Tower dictated use

of ground-based scaffolding to access the balconies.

The contractor engaged a specialty scaffold subcontractor from near their mid-Atlantic headquarters, who transported two containers full of system scaffolding that, when erected, covered fully half of the façade area of the Ocean Tower building. The owner again had a schedule complication, this time requiring full demobilization and shut down of the project for a 1 week period in the middle of the job, to conform to the Resort's contractual requirement with a national mortgage company who rented the entire resort for the full week. As with the Sea Cliff building, strong advance planning allowed smooth performance of the work during the two mobilizations of the Ocean Tower Balconies job, with project completion in November 2006 on time and within budget.

Marriott Frenchman's Reef and Morningstar Beach Resort

Owner

Diamond Rock Frenchman's Owners, Inc.
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Project Engineer/Designer

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Repair Contractor

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Material Suppliers/Manufacturers

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Beachwood, Ohio

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