



CASE STUDY

FRENCHMAN'S REEF

Owner: DiamondRock Hospitality Company Bethesda, MD

Project Engineer/Designer: Tadjer Cohen Edelson Associates Silver Spring, MD

Repair Contractor: Performance Construction LLC St. Thomas, U.S. Virgin Islands

Material Supplier/Manufacturer: Sika Corporation, Lyndhurst, NJ



ICRI Award Winner
Award of Merit
Historic Category

BUILDING TRUST



Background

The Marriott Frenchman's Reef Resort provides spectacular water views in three directions of the Caribbean Sea and back over the harbor into St. Thomas' major city, Charlotte Amalie. The property was constructed in 1972 and includes the Palm Court, Ocean Tower, Sea Cliff Wing, Sunset Wing, Total Energy (TE) plant, restaurants, and parking garages. The property was renovated in 1997 and 1998 as the Marriott Frenchman's Reef after damages from Hurricane Marilyn. The continuing demands of operating the property had discouraged ownership from performing needed repairs in previous years until 2004 when the product of poor original workmanship and lack of quality control, exacerbated by harsh tropical climate, could no longer be ignored. During the original construction of the structure, the sand used was dredged from the beaches and was placed directly into the concrete allowing the presence of chlorides from the very beginning. This caused large spalls of concrete from the undersides of balconies to fall onto balconies below or down to ground-level patios, posing serious safety hazards to guests and resort employees. The ownership reacted by engaging the services of a nationally-recognized restoration structural engineering firm to prepare a comprehensive repair strategy. Based on the investigation and forensic evaluation, the prime reasons concrete deteriorations were unwashed sea sand used in the concrete production, exposure to water and salt laden sea spray, design cover of ¾" concrete over rebar yet often closer to the surface, and lack of waterproofing.



A structure needing repair

The Sika Solution

Plywood was installed on the undersides of balconies to prevent injury from falling concrete. Sika® Armatec® 110 was applied to exposed and treated rebar for corrosion inhibition and improved bonding to the repair mortars. The repair mortars, SikaTop® 122 Plus and 123 Plus, contain a corrosion inhibitor, Sika® FerroGard® 901 for further protection. A breathable, water resistant coating, SikaTop® Seal 107, was applied on the underside of the balconies and on the topside of the balconies underneath tile. Stud and anchor damage on the exterior walls was prevalent due to severe weather and new studs and anchors were installed. On one side of the hotel, the balconies form a portion of the roof over the ballroom and restaurant.

For additional protection an asphaltic modified urethane waterproofing was utilized to waterproof both the concrete and the flashing since the flashing was in serviceable condition. The leaks from the 100,000 gallon grey water cistern and the 150,000 gallon freshwater cistern made of 12" thick concrete were seen in parts of the Sea Cliff Building contiguous with the cisterns. For both cisterns, leaking was caused by failure of the waterproof liners. All spalling concrete was repaired before the installation of a new PVC liner for the cisterns. Impressed current was used on the Sea Cliff Tower but because of the budget constraints the engineer had to use a surface applied inhibitor, Sika® FerroGard® 903 for the Ocean Tower.



Plywood protection for rain water damage



Repaired Cistern

Sika® FerroGard® 903 - as a dual action corrosion inhibitor, will reduce corrosion currents by penetrating through the concrete and forming a protective coating on the embedded steel bars.

Sika® Armatec® 110 EpoCem® - protects rebar in areas of inadequate cover.

Sikaflex®-1a - One part polyurethane, elastomeric sealant/adhesive good for small joints and fillets in vertical, horizontal or submerged conditions.

SikaTop® Seal 107 - a polymer-modified waterproofing and surface sealing mortar for tanks and reservoirs. Used on the inside of the tank walls it prevents water-loss (seepage) and prevents surface erosion. Used on exterior walls it protects water quality by preventing infiltration.

SikaTop® PLUS mortars - two-component, polymer-modified repair mortars containing Sika FerroGard 901 corrosioninhibiting admixture.

Sikagard® 550W Elastocolor and 670W - protect concrete facades from the damaging effects of carbon dioxide (carbonation), water and pollutants. Either crack-bridging (550W) or rigid (670W), both are high-performance protection coatings, available in a variety of decorative colors.

Sikadur® - epoxy resins help restore structural integrity by injection into cracks and voids. The most comprehensive range of epoxy products for structural bonding and grouting.