

Even though the buildings were standing, there was no way they could withstand even another minor event, much less another hurricane. The engineers came up with a plan to remove just enough debris by hand to construct new below-grade walls that would brace the too-tall columns from all four directions. To make matters worse, no heavy equipment could be moved into the structure until these walls were completed. The remaining debris was used as rip rap along the gulf side perimeter along with the addition of a turned down beam on the outer edge of the new concrete slab to protect these buildings from future hurricanes.

The next big surprise came just as the final preparation for pouring the new slab-on-ground was completed. As the backhoe was being backed out of the excavation, the operator accidentally hit one of the concrete columns, shattering the concrete and revealing that the column had no reinforcing steel, just a shoring jack. Further investigation found several other columns with just shoring jacks for support. The engineers found evidence that the original contractor had mislocated these columns as they were preparing to pour the second floor, and they used the shoring jacks to hold their forms while new column locations were prepared. After finding the mislocation was not a serious problem, it was either too late or too costly to install the reinforcing, so they simply formed around the jacks and poured the columns.

Fixing this problem involved a lot of shoring and jackhammering to finally bring the too-tall columns back to be structural components the way the original designer intended.

The third major surprise happened as workmen cleaned debris from around the pile caps on the 12-story structure, where they noticed fully exposed steel reinforcing rods along the bottom of the shear walls where they intersected the pile caps. A close inspection determined these rods had never been encapsulated in concrete of any kind. It was obvious that sand had been allowed to accumulate in the bottom of the forms and not cleaned out prior to pouring the shear walls. Structurally, this meant these bars were serving as small steel columns supporting at least a portion of the shear walls. The sand accumulation had left reinforcing exposed back approximately 12 to 16 in. on the ends of each wall.

Unfortunately, further investigation on the opposite side of the building found the same anomaly. With the relatively narrow profile, the design at the base of the building and the extended cantilever starting at the second floor made any loss of contact with the pile caps critical. To repair this condition, the corrosion on the exposed reinforcing bars was removed and sectional measurements were taken before repairs were made. The repairs



Figure 3: After Hurricane Georges, the turned down beams on the edge of the first floor slabs closed the gap between pile caps and saved the slabs on grade from collapsing



Figure 4: Completed project

consisted of heavy coats of zinc-rich primer and high-strength grouts placed to fill the void and protect the embedded steel.

Original Repair

The original repairs were to include selected demolition and repairs including slab edge repairs, full-depth repairs and complete balcony replacement, and concrete wall and column repairs. Cement stucco repairs included modification to the window details that would allow proper backer rod sealant applications in an effort to stop the chronic leak problems around openings. Additional stucco repairs included the removal of 4,000 mechanical