

## Longevity Category

# Pinnacle Port Restoration

Panama City Beach, Florida

Submitted by Building Technology Consultants, Inc.

The Pinnacle Port Condominium Complex consists of six 7-story buildings and one 12-story building constructed on a barrier island off the Gulf Coast. The original construction was completed in 1976, and the restoration project was completed in January 1996.

All the buildings were constructed with cast-in-place concrete columns, beams, shear walls, and slabs. The six 7-story buildings are typical beachfront condominium design with continuous open walkways on each floor for access to elevators, stairs, and entry doors. The beach sides of the buildings have extended balconies separated by privacy walls that in some locations serve as shear walls. Relatively small columns are placed within the divider walls between units to support the floors above.

A history of the original construction reads like a Hollywood story with contractor and subcontractor failures, bankruptcies, lawsuits, and the contractor's suicide. In addition, records indicated that the concrete was batched on site, which immediately signaled to the design engineers to initiate extensive core testing, petrographic analysis, and dust samples to determine the extent of chloride contamination. Once the data was collected, construction documents were developed, bids were taken, and contracts were awarded for what should have been a rather routine concrete restoration project.

Just a month after the restoration work started, the complex was hit by a hurricane, and just 60 days later a second hurricane hit, turning a simple \$1.5 million project into a \$9 million adventure.

## Hurricane Damage

Shortly after the repair contractor had completed mobilization on the initial repair project, Hurricane Erin hit, causing additional damage on each of the seven buildings within the complex, including destruction of the contractor's stages. Rains saturated the open areas of concrete with chloride-laden sand and seawater. Sixty days later, just as the concrete restoration got back into full swing, Hurricane Opal made landfall, with a record tidal surge that caused the ground floor slabs to collapse



Figure 1: One of the "too tall" columns after Hurricane Opal and the remains of the first floor slab

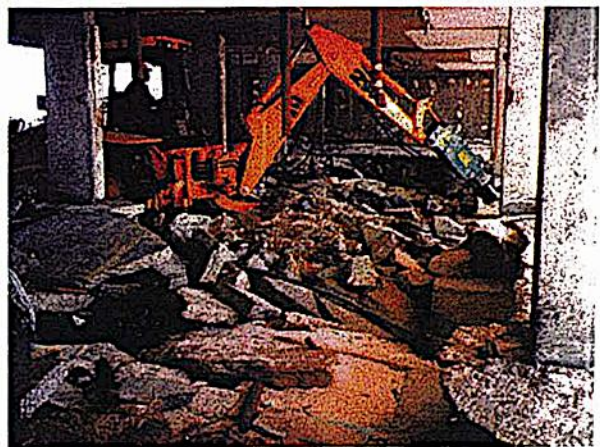


Figure 2

and destroy a majority of the first-floor condominium units.

As much of a surprise as these hurricanes were, bigger surprises were yet to come. This routine concrete repair job turned into an engineering and construction nightmare. The first big surprise came while investigating the collapsed ground floor slabs, when it became obvious that many of these small 8 x 16 in. concrete columns, originally designed to be only 8 ft high, were actually 12 to 15 ft high with no lateral support. After measuring and analyzing the as-built conditions, the engineers indicated there was no logical reason why the building was still standing.