

Mitigation best practices



FEMA

1907 elevation saved Galveston church from flooding

Workers raised 3,000-ton structure by hand after 1900 storm



St. Patrick Church, one of the oldest churches on Galveston Island, was elevated by 5 feet, by hand, in 1907.

At a Glance

Galveston's St. Patrick Catholic Church survived Hurricane Ike's storm surge without any inside flooding, thanks to the forefathers who elevated the church by hand following the killer 1900 hurricane. Plastic shields also protected the church's stained-glass windows. Other buildings in the area flooded, but inside the elevated sanctuary it was as if there had been no storm.

GALVESTON, Texas – The year was 1907 and Galveston was recovering from one of the nation's worst natural disasters. The hurricane of 1900 had killed 6,000 people in a terrifying surge of wind, water and debris.

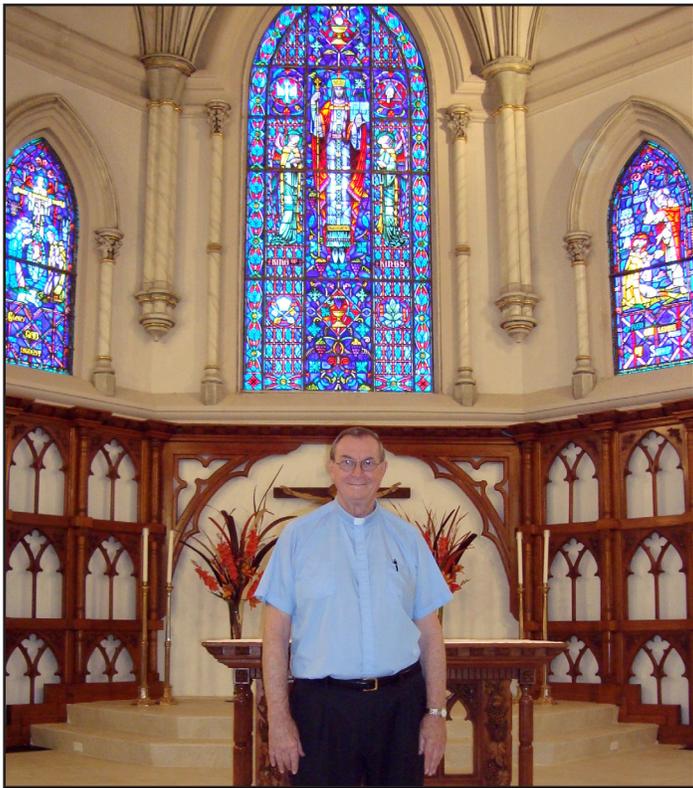
A somber drumbeat echoed across the wretched landscape around one of the largest churches on Galveston Island, St. Patrick Catholic Church. At each beat, a hundred men groaned in unison, bent to the task of turning 700 screw jacks by hand.

It seemed impossible, but the 3,000-ton masonry church was rising off the ground, a meager half-inch at a time, until it seemed to be floating on air. It was a feat of sheer manpower, faith and human will.

A hundred years later, a tidal wave pushed by Hurricane Ike washed ashore over Galveston, damaging at least 75 percent of the island's buildings. In the church complex, buildings that were not elevated — the school and the priests' house — flooded along with many others across the island. Underneath the church, in the crawl space left open by the elevation, floodwaters damaged ductwork as well.

Inside St. Patrick, however, it was as if Ike never happened.

"When they elevated this church by 5 feet, they saved it," said the Rev. John Bok, parish priest. "Without their work, we would have had terrible damage inside our church, not only in Hurricane Ike but in other storms, too."



The Rev. John Bok is delighted that his church interior did not flood in Hurricane Ike because the building was elevated and plastic shields successfully protected all the stained-glass windows.

Bok pointed to the debris line left by floodwaters on the church's foundation, about 5 feet above today's street level. Had the church not been elevated, water would have risen 4 to 5 feet high inside the sanctuary.

"We had just replaced the floors, carpeting and tile throughout the church," said Bok. "It is a beautiful church and it would have been a tragedy if it had flooded."

Also contributing to St. Patrick's survival were the plastic storm windows the congregation had installed in 1991 to protect the ornate windows from wind-driven rain and debris, Bok said. "One plastic sheet was broken during Hurricane Ike, but the covering did its job, and there was no damage to any of the stained-glass windows," he said.

The 'First Object Visible'

Founded shortly after the Civil War, St. Patrick opened its doors as a two-room frame box elevated on high brick pillars. In the 1870s, parishioners launched a massive project to erect

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a Gothic masterpiece. The new church was to have grand arches, vaulted ceilings, stained-glass windows imported from France and finely carved woodwork throughout. Its apex was to be a bell tower topped by a soaring spire.

The final touch, a massive gilded cross illuminated by electricity, was to be "the first and last object visible to mariners or travelers

approaching Galveston Island from the deep blue waters of the Gulf of Mexico," according to church records.

It took the congregation more than 30 years to build it all. It took the 1900 storm a single afternoon to wreck it.

At 6:30 p.m. on Saturday, Sept. 8, 1900, the bell tower crashed down into the church, killing those who had sought sanctuary from the storm. It was all ruined – the walls, the roof, the ceiling, the bell tower, the pews, the pipe organ, and the stained glass windows, all tangled together in a massive, sodden heap.

Although the parish lost 200 members that day, the very next morning a priest celebrated Sunday Mass "with the blue sky for a canopy... as the winds of heaven whistled around the altar."

A Fateful Decision

By 1902, parishioners had rebuilt their church. The new structure was even grander than the original, though the bell tower was only half the height of the original.

Shortly after the church's reopening, Galveston County made a fateful decision. It would build a 17-foot-high concrete seawall stretching for miles along the Gulf of Mexico. In an even more audacious move, the town of Galveston decided to raise the land, starting high behind the seawall and sloping down toward the bay for drainage. Overall, officials proposed to raise the ground an average of 8 feet.

To accomplish its goal, townspeople jacked up houses on pilings, erected wooden walkways high in the air, dredged out a ship channel and piped the slurry sand across the town and beneath the lifted buildings. Then they topped the sand with mainland soil.

Elevating St. Patrick Church, the largest of the 2,156 buildings that were raised, presented an engineering challenge because of its size, its weight, and its many pillars and arches. To prevent cracking, its weight had to be evenly distributed throughout the process. The townsmen accomplished the job, by hand, in scarcely more than a month.

"What they did was an incredible engineering feat," said Bok.

By 1910, the seawall stretched along five miles, and much of the grade raising was complete. In 1915, the island was hit by another hurricane, said to be the equivalent of the 1900 storm. Due to the mitigation work, Galveston was protected from total devastation.

Bok is thankful that St. Patrick's forefathers had the foresight to elevate the church. "We owe them such a great debt of gratitude that we were not flooded in Hurricane Ike, he said. "I tell them, 'Thank you and God bless you.'"

Story and Photos by Ann Patton - FEMA