Hurricane Katrina US&R Deployment

Aerial view of Marine Life Oceanarium, Gulfport, MS

Main tank to left with Aqua Stadium cover in background, remains of gift shop in foreground

Photos courtesy of Washington State Task Force-1

Greg Varney, a structural engineering Principal at KPFF Consulting Engineers in Seattle, Washington, was deployed with Washington State Task Force-1 (WA-TF1) to Gulfport, Mississippi, to participate in the post-Katrina search and rescue operations. WA-TF1 deployed as a Type III task force with 28 personnel capable of 12-hour shifts each day and to be self-sustaining for 72 hours. The team drove in a caravan from Seattle to Gulfport in 64 hours, plus a mandatory rehabilitation stop enroute, in Dallas, Texas. WA-TF1 was tasked with searching commercial and residential areas in downtown Gulfport. These missions provided valuable data to the local jurisdiction as they planned their immediate response and long-term recovery efforts. The role of the Structural Specialist on such missions is to assess the condition of the debris and advise the team leader if there are any safety concerns. During our mission, we encountered few structures with safety issues and were able to conduct our mission without any injuries to our team.

We searched areas where houses were decimated, down to foundations or concrete slab, and the superstructure of the house was found 50 to 100 yards inland, intermingled with the remains of other houses. The residential areas we searched had intact, partially collapsed and totally collapsed residences. In one region west of Gulfport, we searched debris fields where the contents and lighter elements of houses were found nearly ¼ mile away. To relieve stress, we remarked that while earthquakes have the common decency to destroy a structure and leave it on the property, the storm surge destroyed houses and dumped them several blocks inland.

The photographs show damage done to the Marine Life Oceanarium located on the Gulfport waterfront. The multiple roof structures over the main tank and the Aqua Stadium were destroyed by wind and waves. The ground level view shows the twisted roof framing as well as the remains of the gift shop in the foreground. After assessing the ground-level and overhead hazards, the author had the opportunity to step back and consider the cause of such damage. It appeared, given the brief study here as well as other locations, that a significant wave came ashore in addition to the storm surge. One example of this was the concrete bleachers at the Aqua Stadium, which were dislodged from their supports.

The impact of the water on the shoreline structures is an interesting engineering issue. There were anecdotal stories that a wave over 10 meters tall struck the shore line in Mississippi. Perhaps such a wave struck the Oceanarium, resulting in the complete destruction of the roof framing. The Naval Research Laboratory reported in August 2005 that a wave 80 feet above the ocean's surface was recorded during Hurricane Ivan in September 2004. This raises the possibility that Hurricanes can generate large waves in addition to the storm surge and high winds. Engineers designing hurricane-resistant structures along shore lines may need to consider, in addition to the wind loads, the impact of large waves on buildings.▪

Flood damaged Chalmette neighborhood of New Orleans, LA