The Coastal Barrier System: Providing Comprehensive Protection From Surge

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On September 13, 2008, Hurricane Ike came ashore near the east end of Galveston Island in Texas. Ike's strong Category 2 winds and near Category 5 equivalent storm surge, created sufficient devastation to be ranked as the third costliest hurricane to make landfall in the United States. Two storm surge barriers that mitigated damage and loss of life in Galveston and were the existing Seawall constructed after the 1900 Galveston storm and the Texas City Barrier constructed after Hurricane Carla. Unlike Hurricane Katrina, when the media and the power of political process focused on the difficulties in New Orleans, the impact of Ike on the Houston/Galveston region was quickly forgotten as attention turned to the US presidential race and the worldwide financial meltdown.

Despite the initial lack of attention, hurricane Ike may well be a watershed storm. It has already changed how NOAA will classify hurricanes by giving more credence to surge potential. Moreover, the devastation caused by Ike clearly pointed out the vulnerability of the Houston/Galveston area to hurricane storm surge and triggered ideas on regional approaches to suppressing surge for this urbanized region.

One such approach is the "Ike Dike", a coastal barrier that would protect the Houston-Galveston region including Galveston Bay from hurricane storm surge. The project would extend the protection afforded by the existing Galveston Seawall along the rest of Galveston Island and along the Bolivar Peninsula, with a 17ft high revetment near the beach or by raising the coastal highways. The addition of flood gates at Bolivar Roads, the entrance to the Houston, Texas City, and Galveston ship channels, and at San Luis pass on the west end of Galveston Island would complete a coastal spine. At 17ft heights, the Ike Dike approach could provide a barrier against hurricane surges into the Bay for a storm expected to occur every 10,000 years. The coastal spine could be built using existing, proven technology such as the gates and barriers now in use in the Netherlands and in recently completed New Orleans Barrier. Greater New Orleans is now protected by a 133 mile parameter of levees, flood walls and gated barriers. The total cost of Greater New Orleans Hurricane and Storm Risk Reduction System so far is 14.5 billion dollars. The strategy is to keep massive surges from entering the system by shortening the outer protection needed by using 4 gated passages. The System was started in 2008 and achieved 100-yr surge event protection in June 2011. When compared to New Orleans Barrier, the Ike Dike is a much simpler and less costly project yet would protect a much larger industrial base and population. The Dutch Deltaworks, the New Orleans Barrier and the Ike Dike share the proven Dutch strategy in that they shorten the perimeter as much as possible, keep the surge out of internal waters, and use gates to accomplish this. However, because the areas needing protection in the Houston Galveston region are above Sea Level, less robust technologies will be needed to achieve the desired protection.

Texas A&M University at Galveston is leading a research effort examining the feasibility and justification for the Ike Dike concept. Texas A&M University at Galveston's research partners includes Delft Technical University, Jackson State University, University of Houston, Engineering Research and Development Center of The United States Army Corps of Engineers and Texas A&M University – College Station. Texas A&M University at Galveston has also formed Strategic Partnerships with the Bay Area Houston Economic Partnership and the Bay Area Coastal Protection Alliance to foster research and public outreach. So far the Ike Dike concept has been endorsed by 25 cities and economic development organizations in the Galveston Bay region.