UNIVERSITY of HOUSTON

CULLEN COLLEGE of ENGINEERING

Department of Civil & Environmental Engineering

CIVE 6111 Graduate Seminar

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Hurricane Harvey: Lessons Learned and the New Norm

Friday, October 20, 2017
2:45PM-3:45PM
Classroom Business Building (CBB) Room 122

Abstract

Harvey was the largest rainfall and most damaging flood event in US history. By all measures it's widespread impact was a devastating blow to the Houston area, Harris County and surrounding counties. It dropped between 36 and 52 inches along the Texas coast over 5 days, exceeding all rainfall records, with up to 20 inches in a day. However, two earlier events from 2015 and 2016 also brought widespread flooding to many parts of Houston, especially Brays Bayou, Greens Bayou, and Cypress Creek. Most bayous during Harvey were over bank by as much as 10 ft, and flooded an estimated 136000 homes in Harris county alone, greatly exceeding the TS Allison impact of 2001.

While the area deals with a significant recovery effort, there is a massive call to action on the part of politicians, governmental agencies, and thousands affected by this event. There is concern with the statistical basis of rainfalls and floodplain mapping in Houston. There is a concern about the number and frequency of large floods. Development patterns and styles have come into question, as homes have been either built in 100 yr floodplains or taken into those floodplains over time. Estimates say over 47 % of homes flooded in Allison in 2001 were outside the floodplain. Many homes were built within and behind Addicks/Barker reservoirs, many with no knowledge that they were in harms way (over 8000 were flooded there alone), and flooded as water reached record setting levels.

New technologies have allowed the measurement and prediction of floods to make great strides since the mid 1990s, (Radar, LiDAR, GIS, hydrologic models, floodplain updates) and the Houston area has benefitted from some of these efforts, but clearly we need to do a better job of educating and warning the public about the inherent risks they face along the Gulf coast. With such a low slope area, watershed models need to be regionalized to represent overland flow more accurately and to address over flow areas.

While the plan forward is daunting, there are a number of positive steps that are occurring and should lead to improved conditions for the future. The community as a whole is having frank discussions about policy changes on storage and detention requirements, green space, needed infrastructure improvements, and perhaps a third regional reservoir above Addicks. There are calls for better floodplain mapping and perhaps a higher risk standard. Also there is a renewed interest in flood warning systems to better inform the public about risk within specific watersheds. There is still a great deal of suffering out there after Harvey, but the three big floods we have just seen should cause a change in the way Houston expands in the future. The concern is that we not forget about Harvey's impact as time goes by, as was the case for Allison in 2001, and that the region begins to do a better job of living with the flood threat.

About the Speaker:

Dr. Philip B. Bedient is the Herman Brown Professor of Engineering in the Department of Civil and Environmental Engineering at Rice University. He teaches and performs research in surface water hydrology and flood prediction systems, and radar based flood alert. He has directed 60 research projects over the past 42 years, has written over 200 articles in journals and conference proceedings. He has worked on hydrologic problems including major floodplain studies, water quality assessments, and hydrologic modeling for a number of watersheds in Texas, Florida, and Louisiana. He has been actively involved in the area of hydrologic analysis for flood prediction and warning, and has developed a real-time flood alert system for the Texas Medical Center, based on the use of NEXRAD radar data. Dr. Bedient directs the SSPEED Center at Rice for Severe Storm Prediction, consisting of several universities in the Gulf Coast area, which has funding to address the impacts of Hurricane Ike in the Houston area. Both storm surge prediction, inland flooding, and long-term mitigation strategies are being studied with funding from the Houston Endowment. Dr. Bedient also evaluating the impacts of Harvey as it relates to rainfall, land use change, and drainage patterns across the City.