Storage Tank Vulnerability

The Houston Ship Channel (HSC) is one of the busiest shipping lanes in the U.S. and home to the world's second largest petrochemical complex, housing more than 4,500 aboveground storage tanks (ASTs). The SSPEED Center aims to evaluate the vulnerability of infrastructure, such as ASTs, to severe storms in the HSC.

Padgett Research Group

SSPEED

Severe Storm Prediction, Education, and Evacuation from Disasters Center

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Storm Impacts on ASTs:

Damage by a hurricane or a severe storm to the Houston Ship Channel (HSC) could impact the regional and national economy. Aboveground Storage Tanks (ASTs) have suffered major damage in past storm events, including:

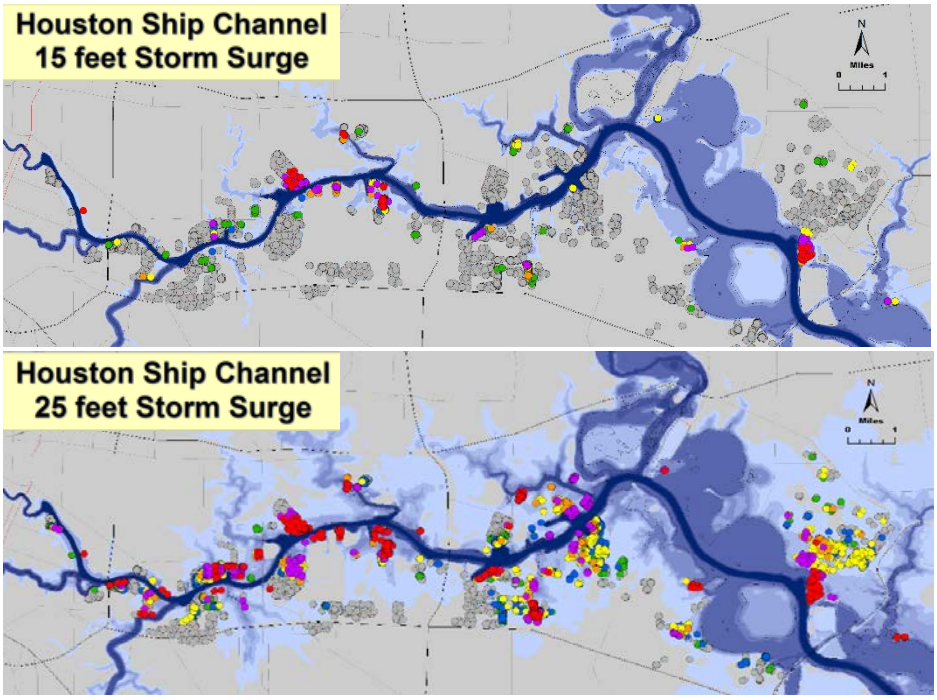
- *More than 7 million gallons of hazardous materials were spilled due to AST failures during Hurricane Katrina and Rita.*
- *During hurricane Katrina, damage to ASTs and others oil infrastructures reduced by 50% the U.S. daily production of oil.*
- *The U.S. Coast Guard and the Environmental Protection Agency spent between $150-$200 million to clean Hurricane Katrina and Rita spills.*
- *During Hurricane Katrina, 1 million gallons of crude oil was released from a single tank failure, affecting nearly 1,700 homes and forcing the relocation of many families.*

SSPEED Center Research:

The SSPEED Center has developed a comprehensive database of ASTs enabling unprecedented evaluation of tank spill risks. Our team has the first models to evaluate the probability of failure of ASTs. The data include:

- Location and historical data of approximately 4,500 ASTs in the HSC
- Diameter, roof types, height, ground elevation, and containment berm elevation of each tank
- Contents stored in the tanks
- Indicators of social vulnerability of the communities located near ASTs in the HSC
- Probability of failure and expected spill volumes of the ASTs in the HSC for different hurricane and surge scenarios

Aboveground storage tanks have increased in number, storage capacity and vulnerability to surge impact. Scenarios show that since 1965 the expected risk of spills has doubled for a large storm event, with a significant upward trajectory in the last 10 years due to the replacement, addition, and siting of large ASTs in surge prone areas.



Probability of failure of storage tanks along the Houston Ship Channel for 15 and 25 feet storm surges. (Red indicates a greater than 50% probability of failure.)