

A Parameter Study of Losses by Hurricane Landfalling Along Texas Coast Line

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Abstract

This project uses FEMA software-HAZUS to study the effects of hurricane parameters on property damage when hurricanes make landfalls in the major counties along Texas coastline. Preliminary study shows that the loss in the property damage increases exponentially in each county when hurricane intense increases from category I hurricane to category V hurricane. The maximum loss occurs when a category V hurricane makes landfall in Galveston County. The estimated results from HAZUS will be compared with the results from the post-hurricane assessment to determine the accuracy of the HAZUS models.

1.Introduction

Tropical storms and hurricanes are some of the costliest natural disasters in the United States. The Texas coast is highly vulnerable to catastrophic strikes by landfalling hurricanes. During the past century, over 36 hurricanes had made landfalls along the Texas coast. About 30% of these were major hurricanes of category 3 or above according to the Saffir-Simpson intensity scale. Due to extensive damage caused by hurricanes along the Texas coastline, an efficient method of predicting storm damage is needed in order to accelerate post-hurricane recovery. It is often very time consuming to identify the exact amount of structural and nonstructural damages to each affected coastal structure in the event of a major storm. Prompt action is of utmost important. HAZUS software is developed by FEMA to estimate potential damage by natural disasters, such as earthquake, hurricane, flood and tornados. Systematically studying the effects of hurricane parameters can allow us to identify vulnerable areas; assess level of readiness and preparedness, estimate potential losses before and after hurricanes.

2.Objective

The objective of this study is using FEMA software HAZUS to study the effects of hurricane parameters, such as sustain wind speed, translational wind speed, radius of maximum speed and center pressure, on the potential property damages when hurricanes landfall in major counties along Texas coastline. Compare the estimated values and actual damage assessments from historic data to verify the accuracy of the FEMA models.

3.Preliminary Results and Discussions

There are total of sixteen counties along the Texas coastline. The parameter study in the project includes nine of the major counties. The populations (in 2006) and the locations of the nine major counties along the Texas coastline are shown Table 1 and Figure 1 respectively.

The hurricane parameters, such as sustain wind speed, translational wind speed, the radius of maximum wind and hurricane center pressure, will affect the extent of the property damage. Hence, parameter studies in the HAZUS model can allow us to better understand how each parameter affects the property damage during hurricane landfalls.

Table 1 Major Counties and Populations along Texas Coastline

No.	County	City	Population (2006)
1	Cameron	Brownsville	387,717
2	Kenedy		402
3	Nueces	Corpus Christi	321,457
4	Aransas		24,831
5	Calhoun	Port O'Connor	20,705
6	Matagorda		37,824
7	Brazoria		287,898
8	Galveston	Galveston	283,551
9	Jefferson	Port Arthur, Beaumont	243,914

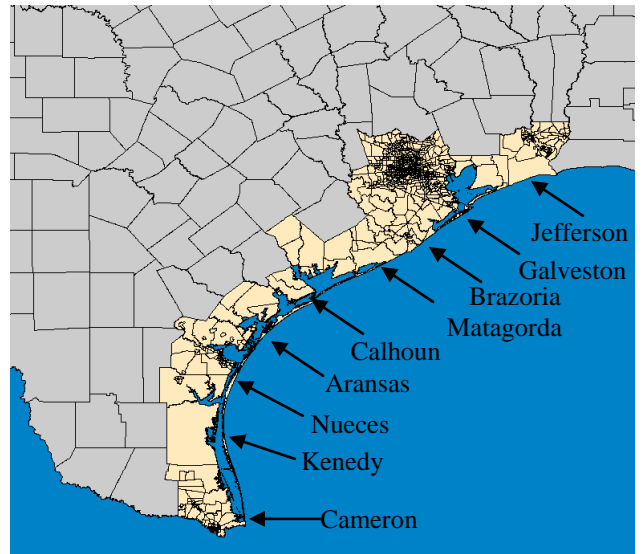


Figure 1 The Locations of the Major Counties along Texas Coastline

Figure 2 shows the estimated total losses if a hurricane landfalls in the coastline counties when hurricane winds increase from Category I to Category V. The hurricane parameters used in the estimation are: translational wind speed is 15 mph and radius of maximum wind is 20 miles.

From the estimation, the losses increase dramatically if hurricane winds increase from Category III to Category V. The most losses will occur when a Category V hurricane landfalls in Galveston County and Brazoria County. The losses will be more than more than 400 billions in Galveston County and 250 billions in Brazoria County respectively.

4.Conclusions

Systematically studying hurricane parameters using FEMA HAZUS software can allow us to better understand the importance of each parameter on the coastline damage. It can also allow us to identify vulnerable areas, prepare and estimate potential loss before hurricanes, allocate resources for most effective and efficient response and recovery.

5.Acknowledgement

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6.References:

1. <http://www.fema.gov/hazus/index.shtm>
2. <http://www.hazus.org>

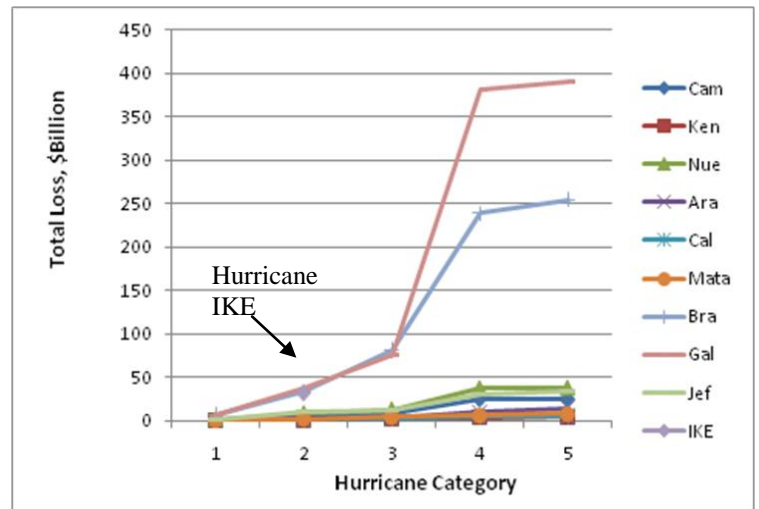


Figure 2 Estimated Losses If Hurricane Landfalls in the Coastal Counties Using HAZUS