

An Inventory and Assessment of Models Used to Predict Characteristics of Emergency Evacuation

Principal Investigators: Carol Lewis and Sharon Adams Boxill

Texas Southern University
Houston, Texas 77004

Evacuations from Hurricanes Katrina, Rita and Wilma in 2005 illuminated the issues with clearing large numbers of residents via urban areas roadways and public transportation systems. Problems arose from people not observing the designated evacuation zones and protocol. This was particularly acute in the Houston area when residents of that city in large numbers failed to wait the exiting of people from Galveston Island and other coastal communities. Consequently, the roadways were clogged inland and residents in extremely high risk areas were not able to leave. Of note during Hurricane Katrina, was the number of individuals without automobile availability, who had no transportation to evacuate once warnings were issued. Texas' Governor, Rick Perry, initiated a Task Force in the fall of 2005 to evaluate the occurrences of the Hurricane Rita experiences and make recommendations. The four focal areas were: 1) Command, Communication and Control, 2) Fuel Availability, 3) Traffic and Transportation and 4) People with Special Needs (anyone who can not self-evacuate). Much work has occurred to improve evacuation times and experiences when the need to evacuate occurs again. Unanswered questions remain, however, including how long will it take to evaluate "x" number of individuals under a given set of circumstances. A number of models exist that purport to forecast evacuation volumes under a variety of scenarios. A review of these models and their potential application would benefit a number of communities still making decisions about the best methods and routes for evacuation.

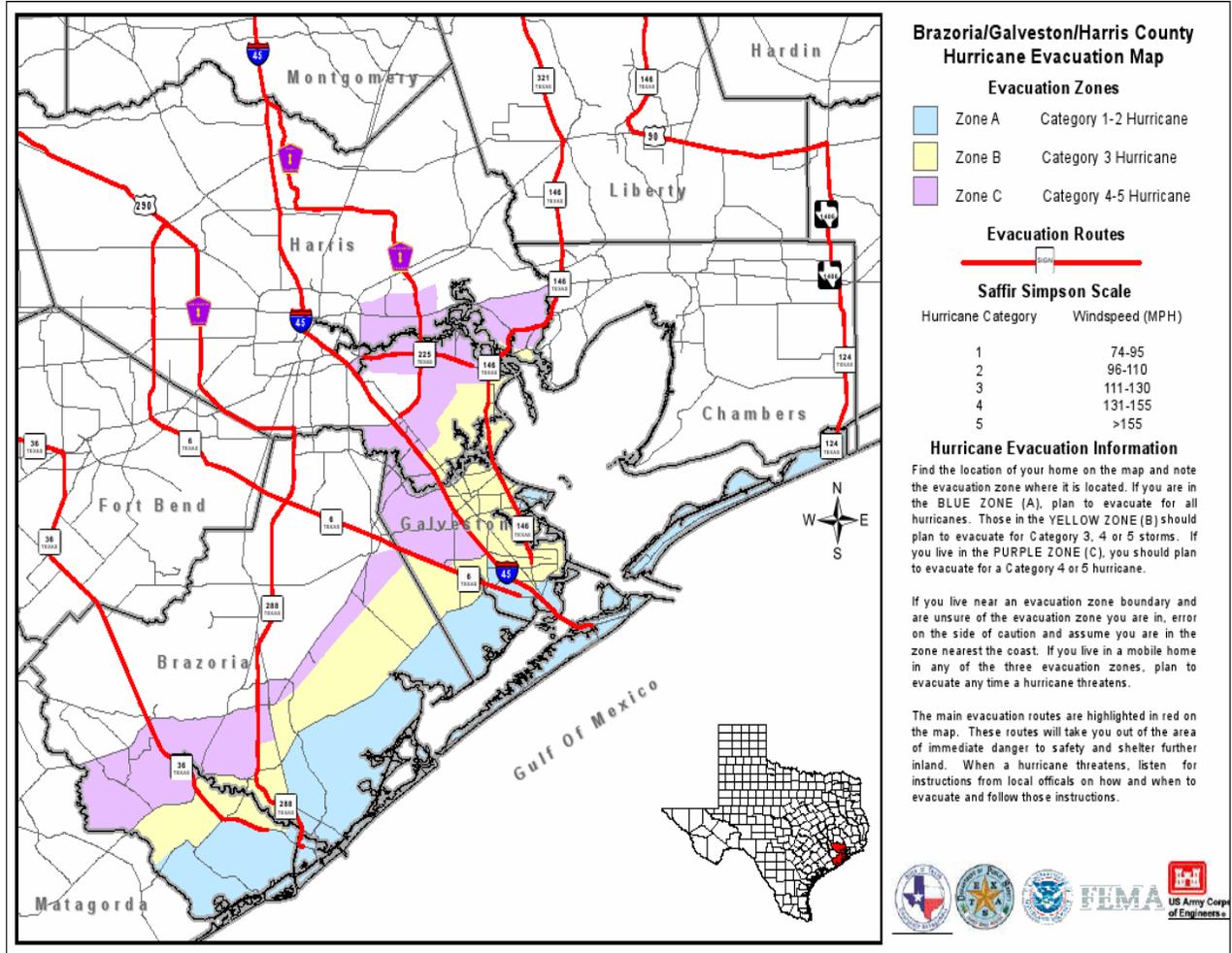
Newly developed software for transportation planning and traffic simulation is making a big impact on the way transportation professionals work. Rapid developments in computer power, mobile phone technology and data transfer speeds, plus radical improvements in software are transforming the way information can be linked to government and city officials as well as to the public. A major use of computer models by transportation professionals is future forecast of proposed scenarios based on changes in local economies, demographics and/or operating characteristics. Still reeling from the 9/11 disaster response problems and the recent hurricane impacts, there is a new drive to better understand and predict the characteristics of evacuations with the use of simulation models.

Some of the data that should be available in conducting evacuation time estimation studies using available commercial and public domain software include:

- determining feasibility of evacuation without detailed route planning,
- identifying bottlenecks that would constrain the flow of traffic,
- assessing the effectiveness of alternative traffic control strategies,
- assessing the effectiveness of different evacuation strategies,
- estimating traffic speed on specific roads or portions of the network,
- estimating queuing times at traffic lights or bottlenecks, and

- estimating clearance times for the network or portions of the network

All models identified through this inventory and assessment should as a minimum have these capabilities. However, this is intended to be an exhaustive search and other perhaps equally crucial abilities will come to the forefront along with gaps in the technology that need to be addressed.



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