

Storm Damage Model

Model Calibration

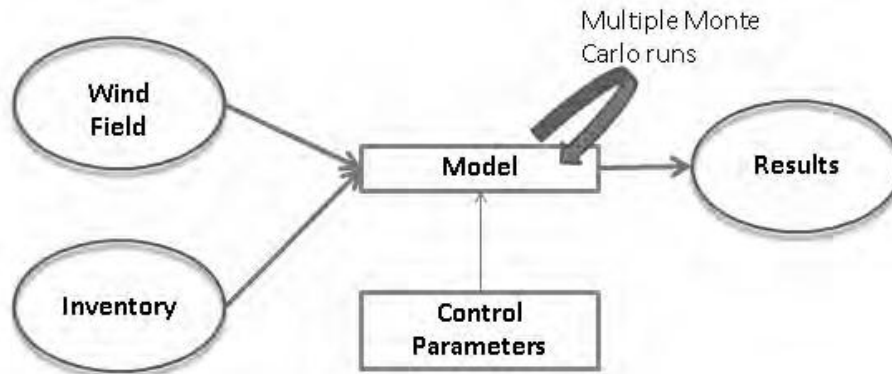
Process

The V7 hurricane damage model has 135 adjustable factors and many assumptions that control the estimation of damage expected with a storm. While most of these factors are based on other published studies it is nevertheless important that when taken together they produce reliable estimates of damage. The process of calibration is the final adjustment of these factors to re-produce the losses experienced in past storms.

Essentially the model is very simple, wind and assets are evaluated to produce damage. In the case of previous storms, that implies previous assets must be used to produce previous damage. Since each subsequent storm of the 2004 and 2005 hurricane season significantly changed the asset base for the next storm we have to create a new inventory for each storm. Nowhere is the clearer than for hurricane Jeanne which was stronger than the previous hurricane Frances but produced less damage. Most models ignore the system changes produced by Frances but the reality was that Frances removed the weak poles, trees and buildings before Jeanne had a chance to knock them down.

Conceptual Model Design

The model design combines wind and inventory data to produce damage result information. This allows wind fields and inventories to be switched and compared easily. Model parameters are provided so that minor tweaks to the system can be made without re-programming the core system. Automatic processes are built-in to allow inventories to be updated without too much effort. This also allows for the development of hypothetical inventories to test new ideas and alternate realities.



Multiple Monte-Carlo runs are used by the model to combine known failure mechanisms without double counting the damage produced. Failure mechanisms included are:

- Contact with vegetation that causes electrical and minor structural damage based on:
 - Gust wind speed
 - Vegetation density
 - Trimming dates
 - Storm date
- Tree Blow down inside and outside of the normal line clearing zone based on:
 - Gust wind speed
 - Tree type and height
 - De-leaving and tree loss from previous events
 - The duration of winds greater than 39 mph
- Wind load on a pole based on:
 - Gust wind speed
 - Pole design including conductor size and height, pole class and shape
 - Inspection data including ground line circumference and remaining strength
 - Wind bourn debris from nearby damaged structures that impact or add loading to the pole
 - Soil conditions and the duration of winds greater than 39 mph in so far as leaning
- Storm surge flooding based on:
 - NOAA SLOSH model data
 - Equipment elevation and NFIP velocity zones