

# AIR Worldwide

Prepared for Florida Commission Professional Team



# Paragraph in Question – 2011 ROA, Page 42

## PROCESS FOR DETERMINING THE ACCEPTABILITY OF A COMPUTER SIMULATION MODEL

This section specifies the Commission's process for the determination of acceptability of a computer simulation model (model). The Commission has determined that prior to November 1 of every odd year, it will adopt new standards, revise existing standards, and if necessary, revise this process. The effective date of new or revised standards will be November 1 unless otherwise specified by the Commission. The standards and procedures will be published in the *Report of Activities as of December 31, 2011*, and will not be scheduled for change until 2013.

The Commission has determined that “significant changes” to the standards or to the model are those that either change or have potential to change the loss costs or probable maximum loss levels. On the other hand, any minor revisions, changes to the standards, or any changes to the model by the modeling organization that do not result in changes to loss costs or probable maximum loss levels are not considered significant. The Commission may determine in its judgment whether a change is significant.

# Review Structure Handles Variety of Changes in a Catastrophe Model

| Reason for Submission                         | Likely to Affect FCHLPM Loss Costs & PMLs | Likely Magnitude of Impact to FCHLPM Loss Costs & PMLs | Current ROA Provision for Submitting Update | Frequency of Occurrence of Update |                   |            | Current Timing Allowed for Submitting Update |               |
|---|---|--|---|-----------------------------------|-------------------|------------|--|---------------|
|   |   |  |   | Infrequent or Unforeseen          | At Least Annually | Biannually | Spring/Fall of Even Years                    | As They Occur |
| <i>Update to U.S. Hurricane Model</i>         |   |  |   |                                   |                   |            |  |               |
| ROA Compliance                                | Y   | Varies   | Section II.A. or C.                         |                                   |                   | X          | X  |               |
| Additional Updated Science or Data            | Y   | Varies   | Section II.A. or C.                         | X                                 |                   |            | X  |               |
| Model Fixes Affecting Loss Costs              | Y   | Varies   | Section VI.E.                               | X                                 |                   |            |  | X             |
| Model Fixes Not Affecting Loss Costs          | N   | 0%   | Section VI.E.                               | X                                 |                   |            |  | X             |
| <i>Update to Software Platform</i>            |   |  |   |                                   |                   |            |  |               |
| Non-U.S. Model Updates                        | N   | 0%   | Section II.G.                               |                                   | X                 |            |  | X             |
| ZIP Code Definitions                          | Y   | Usually Small:<br>+/- 2%                               | Section II.A. or C.                         |                                   | X                 |            | X  |               |
| Updated Industry Exposures                    | Y   | Usually Small:<br>+/- 2%                               | Section II.A. or C.                         |                                   | X                 |            | X  |               |
| Geocoding Algorithms                          | N   | 0%   | Section II.A. or C.                         | X                                 |                   |            | X  |               |
| Software Updates Not Affecting U.S. Hurricane | N   | 0%   | Section II.G.                               | X                                 |                   |            |  | X             |
| Platform Upgrade                              | Y   | de minimis   | Section II.A., C. or G.                     | X                                 |                   |            |  | X             |

# Commission Tasked With Ensuring Models are Accurate and Reliable

Null Hypothesis: The Model is Accurate and Reliable

Alternate Hypothesis: The Model is Inaccurate or Unreliable

Type I Error: Determine the model is inaccurate or unreliable when it is accurate and reliable

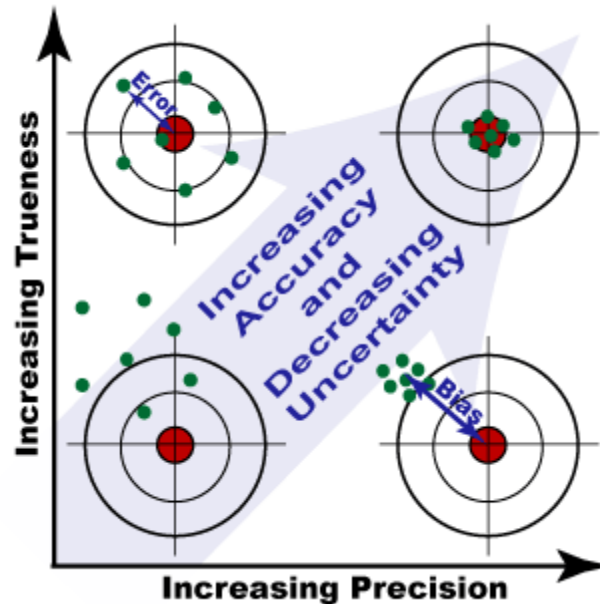
Type II Error: Determine the model is accurate and reliable when it is inaccurate or unreliable

# Commission Review Adds Significant Value but Does Not Prevent All Type II Errors

- The Commission review of a catastrophe model is an audit, not an exhaustive review of every single detail of the model.
- The Commission provides a level of protection for consumers against Type II errors
- Catastrophe models being complex, and software being software, it would be unfeasible for the Commission to prevent all Type II errors
- The process also provides many other benefits such as:
  - Transparency
  - Reams of public documentation, much of which, though prepared for Florida, applies to other states
  - Public forum to understand and explore ancillary catastrophe modeling issues such as storm surge and mitigation

# Null Hypothesis: The Model is Accurate and Reliable

- When statisticians approach problems like this, they do not try to absolutely prove the null hypothesis. Instead they look at the data to see if there is evidence to reject it with a level of certainty
- The more uncertainty there is in the raw data, the less certainty in preventing Type II errors



Source: National Science Foundation Funded Website, [www.ndt-ed.org](http://www.ndt-ed.org)

# There is a Wide Dispersion in Industry Model Answers

## All Florida Models

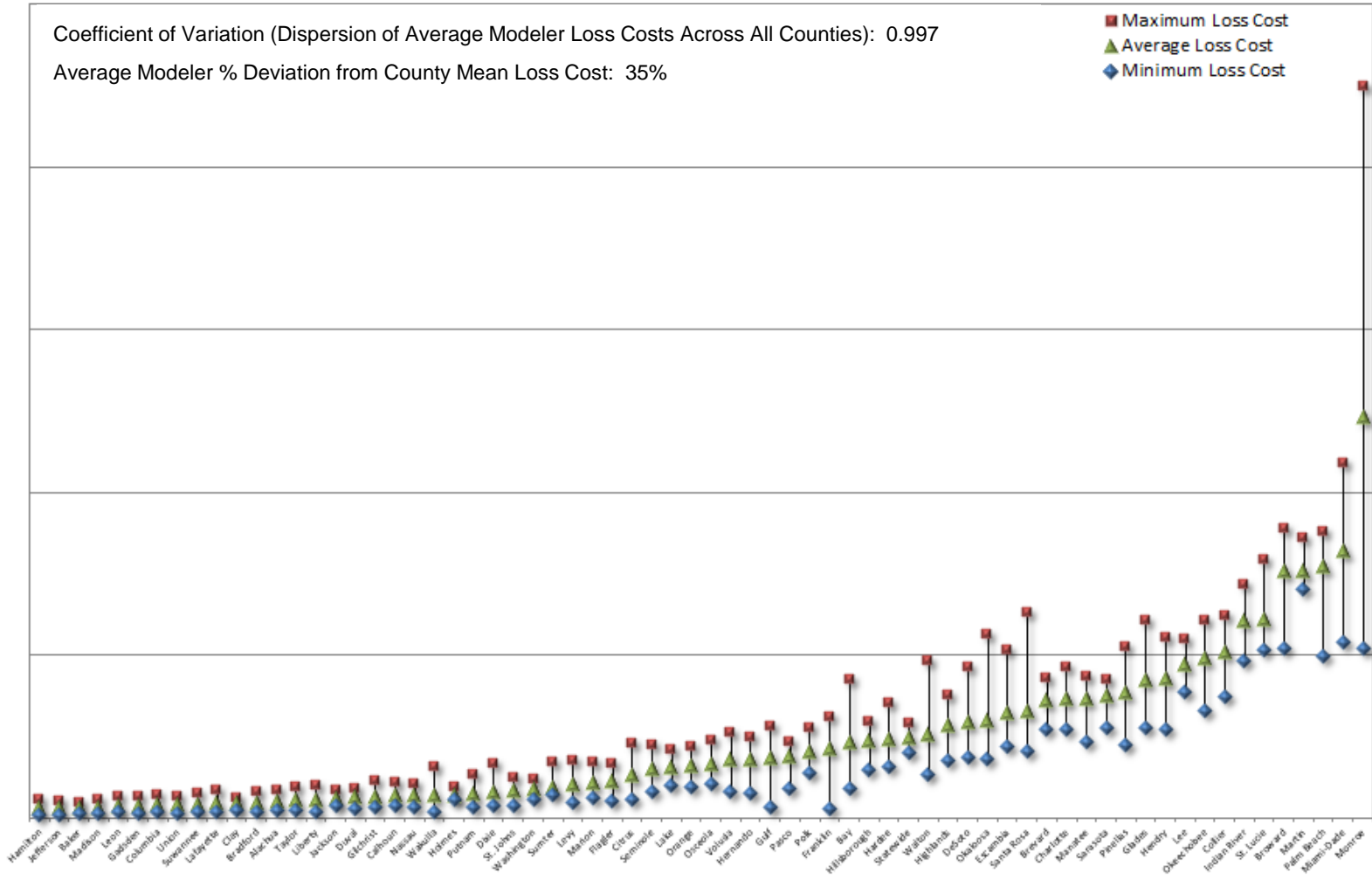
Loss Cost Type: Average

Policy Type: Frame Owners

Coefficient of Variation (Dispersion of Average Modeler Loss Costs Across All Counties): 0.997

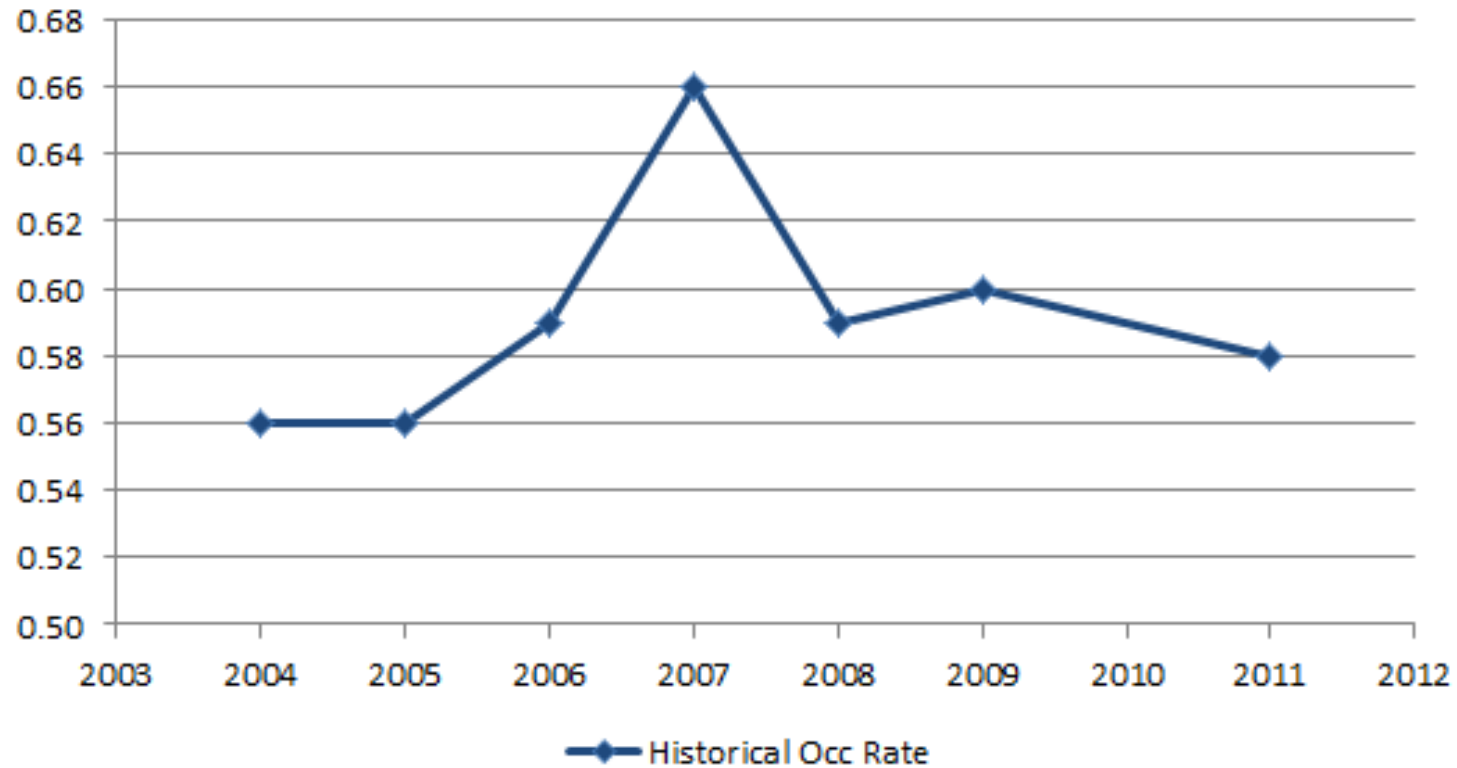
Average Modeler % Deviation from County Mean Loss Cost: 35%

- Maximum Loss Cost
- ▲ Average Loss Cost
- ◆ Minimum Loss Cost



# Changes in Underlying Data and Assumptions Change Model Answers

## Comparison of Historical Annual Occurrence Rates





# Summary

- The catastrophe models show a large variance across models
- A single model's results contain uncertainty due to the nature of the estimation process
- Given the uncertainty, does it make much sense to say that a significant change in the model is one which causes 0.000000% change in loss costs?
- There is a category of model change, such as the ZIP Code updates, which should happen regularly but can't because it will cause changes in the loss costs.
- There is good reason to regulate the models, but there is room to vary the level of review based on the type and impact of the change