

Underwriting

Taking the Next Step In Hurricane Modeling

Sharing the data and findings behind new hurricane-modeling tools will not only inform the public, it will help reduce insurers' catastrophic exposures.

by Martin M. Simons



The seeds were planted in 1989 following Hurricane Hugo. Actuaries began to ask why traditional ratemaking methods for property insurance fell short of the mark in predicting losses from hurricanes and other natural catastrophes. Not much was done, however, to change the way property insurance rates were calculated. Hugo, after all, was the most devastat-

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tating storm in the history of American insurance.

Actuaries and other rate makers felt that it would be a long time before another event of such magnitude would occur. Internally, insurers sought better ways to manage their property insurance exposures but ratemaking remained the way it had been for decades.

Three years later, U.S. insurers were visited by hurricanes Andrew and Iniki, making it obvious that the traditional ratemaking methods fell short in their ability to predict the future

impact of hurricanes on the property insurance industry. The adverse financial impact of these events made it imperative that better forecasting and ratemaking methods be found.

Hurricane modeling techniques had been used by reinsurers and by some of the more astute direct insurers in determining coastal exposures and in allocating capacity. These models, although better at predicting hurricane exposures than the actuarial methods, still fell short in assessing potential hurricane damage and the associated insurance losses. The thought of such a hurricane striking a major metropolitan area like Miami or Honolulu left insurance executives and regulators awake at night. Their fear is that such an event may be inevitable, given a long enough period of time. The impact on companies would be devastating.

Enter the hurricane model. Organizations that specialized in providing techniques to predict the effects of future hurricanes appeared almost out of the blue. In reality, these organizations had been providing hurricane loss estimates to a moderately small group of entities. Like the actuarial methods, criteria used by these models provided information that was less than perfect in its hurricane loss predicting capabilities. Unlike traditional ratemaking methods, the hurricane models could be analyzed and improved to provide more meaningful hurricane damage forecasts.

Hurricane models are now used extensively as insurers attempt to plan distribution of property insurance in coastal states. Discussions between insurers and reinsurers regarding the price of catastrophic reinsurance focus on predictions from the output of a hurricane model deemed superior over the criteria used in the past. Insurance ratings organizations, through the analysis of models, are more keenly aware of insurers' loss potential in hurricane-prone areas and have modified their rating techniques accordingly.

Public Veil

Property insurance rate filings in coastal states include hurricane models to derive the territorial distribution of rates, as well as the perceived overall rate level needs of the insurer. Regulators are presented with a less-than-

complete description of the model and the underlying criteria and techniques that have been used to produce the rates that are proposed for the future.

When pressed by the regulator for details, the modeler cites "trade secrets" as a reason for less-than-full disclosure. Many states have freedom of information statutes that make public any information submitted in a rate filing and used to support the indicated rates. Since hurricane modeling has become a competitive industry, it is understandable that these entities are reluctant to expose underlying data and methodologies to competitors.

Regulatory Review

The regulator, however, must insure the statutes within the state are adhered to. Each state requires that rates shall not be excessive, inadequate or unfairly discriminatory. Without full disclosure from the filing insurance company (and hence the modeler) the regulator is at a disadvantage in determining that the particular model produces rates that meet the statutory criteria. As these issues are still being resolved, traditional ratemaking methods, with their proven shortcomings, are still being used in many areas. Eventually, parties to this process will come up with a solution; hopefully one that will improve upon the property insurance pricing system.

Lost in the discussions are ways to benefit from the hurricane modeling process. From the regulator's perspective, it may appear the insurance industry is utilizing a hurricane model solely to increase rates for coastal property insurance coverage. This is expected, since traditional ratemaking techniques have fallen short in predicting losses from hurricanes. The overall pricing and distribution of property insurance rates is a good starting point for the use of hurricane modeling techniques, but the true benefits to be derived from the process have been only peripherally explored.

Each hurricane model in use today can provide a wealth of information relating to potential vulnerability of properties. The underlying data within each model includes:

- Historical frequency;
- Historical severity;
- Building construction characteristics;

Top 5 Hurricanes

In Billions

Year	Event	Est.
1992	Hurricane Andrew	\$15.5
1989	Hurricane Hugo	4.2
1995	Hurricane Opal	2.1
1992	Hurricane Iniki	1.6
1996	Hurricane Fran	1.6

Source: Property Claim Services.

- Building codes; and
- Enforcement of building codes.

Within each of these are a great number of individual models, estimates, variables and assumptions that are used in combination to produce the end result: either the basis for an insurer's coastal marketing strategies or the derivation of rates to be filed in a specific state.

One benefit of hurricane modeling has been all but ignored in the desire to produce a "more adequate" prediction of rate level needs. Hurricane models contain information that can help educate the public and improve techniques and procedures to mitigate future losses. Insurers need to step back from the process and determine uses for the models that will produce long-range benefits to society and the industry. The impact of hazard mitigation on current and future building construction can significantly reduce losses from future hurricanes.

Early Steps

There has been some activity by the insurance industry to become actively involved in hazard mitigation. The new Building Code Effectiveness Grading Program developed by the Insurance Services Office provides a step toward education and finding ways to prevent future losses. Unfortunately, this is an exception to the rule of inaction by the majority of property insurers.

While hazard mitigation will probably produce few immediate results, in the long run it will reduce losses to lives and property through improved building criteria. It will increase the public's awareness as to what can be done to protect their property from hurricanes.

Information incorporated in the modeling process and openly disseminated to the public will substantially affect future losses. Criteria that can

reduce losses, as well as an estimate of the effect of such criteria, will take the modeling process from a strictly financial purpose to one that will benefit all of society.

While many of these criteria are included in the models' underlying databases, regulators and the public receive little information about what can be done to mitigate losses and what the results of such mitigation may produce. This would include studying and reporting the effects of:

- Storm shutters;
- Roof tie-downs;
- Window protection devices;
- Improved construction criteria;
- Improved building codes;
- Improved enforcement of building codes; and
- Better housing development design criteria.

Society has a direct influence over items on this list. Consumers and the public may not be aware of the benefits of adding specific forms of protection to their properties. While the direct benefits—such as credit on property insurance premiums—may not always offset costs, it is essential to increase awareness.

New Construction

Perhaps the benefits derived will have the most significant impact on new construction. Consumers should have the benefit of knowledge as they make decisions relative to protecting their present homes and businesses.

The property insurance industry, through the use of the models currently in their possession, is in a prime position to educate the consumer and to increase public awareness of hazard mitigation and the resulting benefits to all of society. It is interesting to note that a prime beneficiary of such a program will be the insurance industry itself, as potential and actual catastrophic losses are mitigated.

Despite these facts, the insurance industry has elected to generally limit the use of hurricane models and instead has chosen to protect its short-term financial interests through increasing rates and reducing exposures in hurricane-prone areas. It's time to take the next step and use these models and vast information within them to produce long-term mitigation of losses. **BR**