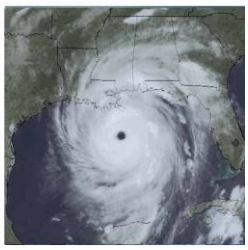

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Basics of Catastrophe (CAT) Modeling

With the release of RMS version 11 last year, the subject of CAT Modeling has received a fair amount of attention in the world of Property Insurance. The following discussion provides a better understanding of what CAT Modeling. For those already familiar with the subject, hopefully you will be able to learn at least one additional fact about modeling or at a minimum gain a refresher on the subject.

In 1987 the first CAT modeling firm, AIR, was founded by Karen Clark in Boston. Two other firms, RMS and EQE, were founded in 1988 and 1994. The original models were computerized simulations of the potential impact and risk of natural disasters. These models have gone through many updates since they were first launched, with the goal to further reduce the uncertainty from the previous version's modeling results. Modern models are now able to educate users on the physical and financial implications of catastrophes. The most commonly used models predict loss due to *Hurricanes* and *Earthquakes*.

Models were originally developed as a tool for insurance companies to manage their exposures from an aggregation of risks in a catastrophic event. Today this "tool" has now become a necessity and is now utilized by nearly every carrier. It is important to recognize that models are only one tool an insurer uses to evaluate risk, albeit a very important one. Some of the larger model users are:

- **Primary Insurers** – Assisting with loss estimates for both a portfolio and individual account basis, managing aggregate accumulations, setting appropriate risk appetite, establishing adequate reserves and adequate underwriting terms including pricing, capacity and deductible.
- **Reinsurers** – Similar to Primary Insurers. Reinsurers were early users of models
- **Insurance Buyers** – Assisting with the decision of how much CAT limits to purchase, a tool at looking at the probability of a loss actually happening, and a critical tool in marketing negotiations, pricing, and deductible impact.
- **Rating Agencies** – Monitor CAT loss potentials vs. reserves to assure capital adequacy. Insurers must be able to demonstrate a solid game plan to avoid potential rating downgrade.
- **Brokers** – Tool for marketing, premium negotiation, CAT sublimit adequacy; Tool to help buyers make purchasing decisions

CAT perils typically modeled are as follows:

- *Earth Movement* – California, New Madrid region, Pacific Northwest, other global high hazard areas such as Japan, South America, etc.

- *Windstorm / Storm Surge* – Coastal areas of Texas up to Maine as well as other coastal areas around the globe subject to windstorm events (Europe, Asia, Australia, etc)
- *Winter Storms*
- *Severe Convection Storms* - including thunderstorm, tornado and hail
- *Wildfires*
- *Terrorism*

At this point there are no universally accepted models for Flood, although several are currently under study and are expected to come to market in the next few years.

Understanding the basics of modeling will help lead to better Property renewal results, particularly if there is involvement of any of the CAT perils noted above. It is very interesting that what was once meant as a useful tool, now actually drives a large portion of the renewal results for most underwriters. From a brokerage perspective, it is a major topic on almost every renewal.

As previously mentioned, there are primarily three CAT Modeling companies used in the market:

AIR – Used heavily by Reinsurers, Insurance Services Office (ISO) and Homeland Security

RMS – Used heavily by retail front end insurance companies

EQE – Mixed use

Some insurance companies use a blend of the above or perhaps their own proprietary model that has some AIR/RMS characteristics. It is important to understand that every modeling company periodically updates their models, which can result in drastic changes to the output for certain risks. This is generally done after an event, such as a major hurricane or earthquake and is based upon observations of actual losses measured against what the model had predicted.

Both AIR and RMS released updates in 2010 and 2011. AIR's 2010 update had little impact on the market. RMS released a new version 11 (2011) of their model in February of 2011 that featured some significant changes. The market generally accepts that RMS and AIR are now closer in the similarity of their results. Since a fair portion of the retail (direct) Property carriers utilize RMS in some fashion, it is critical to understand the U.S. impact of the version 11 RMS model changes to help manage renewal expectations.

Here are some of the findings from the RMS version 11 release:

- Florida loss projections from wind increase further inland, with a slight potential for loss projection decrease on the coast.
- Texas wind increases more significantly for inland risks based on lessons learned from Ike. One conclusion was that less stringent building codes than what might be seen in Florida leads to larger loss prediction.
- Storm surge increased significantly from Texas to Maine
- Gulf / Southeast states may see slight coastal decrease with larger increases for inland locations
- Northeast and Mid-Atlantic states will likely see more significant increases as prior models really did not address these exposures to any great extent.

The following is a good visual indication of the impact of RMS version 10 versus the new version 11. Note the growth of red and yellow areas inland along the coast.

Having an understanding of the above model changes will help to minimize renewal surprises. In closing, here are a few tips on how to prepare for a renewal that may incur change due to the model update.

1. Start the renewal EARLY

2. Prepare COMPLETE Statement of Values in model friendly excel template (use full accurate addresses). Spend the time/effort to get this right. A good statement of values makes an underwriter's job much easier and gives them the ability to provide their best option. Underwriters cannot give credit (or will likely surcharge) business with poor or unreliable values.

3. Include full COPE information. There are five major data points that should be provided for all locations: Building Construction, Occupancy type, Protection (sprinklers?), Exposure, Number of Stories, and Square Footage. This info should be provided on a per building basis for best results.

4. Secondary characteristics are more detailed descriptions of certain protection features and can significantly improve modeling results for large CAT locations. Don't bother with this step unless the primary COPE data is solid. Secondary characteristics can be very helpful in reducing modeling results, but will not be accepted by insurers unless full COPE is provided. In many cases, an engineering report can help underwriters identify secondary characteristics. Even if this is done on just the few largest locations with the most critical exposure it can have a material impact on the results.

5. Plan on marketing the renewal unless the incumbent market can give an early acceptable quote 6 to 8 weeks prior to renewal.

6. All underwriters are looking much more closely at CAT risk and looking to deploy their capacity for what they perceive is best in class business. Create specs that will stay at the TOP of underwriter's pile and help to differentiate your account from others that may be on that particular underwriter's desk.

Sources: Risk Management Solutions, Inc. (RMS), AIR Worldwide, Advisen, Guy Carpenter, Chartis Insurance, Munich Re, Insurance Information Institute, Swiss Re.

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