Cat Modeling Pioneer: Don't Rely Too Much on Cat Models

By Meg Green, senior associate editor, BestWeek:

OLDWICK, NJ August 10 (BestWire) — Karen Clark, a pioneer in the catastrophe-modeling field and president of Karen Clark & Co., said insurers rely too heavily on catastrophe models and often put too much weight on the probable maximum loss.

"Before there were catastrophe models, most insurance companies used simple formulas to assess risk, such as multiplying statewide premiums by factors and adding the numbers up. Even the first hurricane model I developed in the mid-1980s showed that these formulas were likely underestimating losses from hurricanes by a factor of 10, and few people believed this until after Hurricane Andrew," Clark told BestWeek.

"Of course, the catastrophe models are far superior tools...but the models are still approximations. They are subject to significant uncertainties, and they provide estimates, not answers," Clark said. "Despite this, many companies use the numbers directly out of the models without adjusting them, or even vetting the quality of numbers against other information."

Clark said companies know they should not rely too much on catastrophe models, but have had very little guidance on what else to do.

"It's very challenging to implement a framework," Clark said. "Frankly, it's oftentimes just easier to go with what the models say, even when the model is giving results that are obviously off."

Clark said she's not saying that companies should not use cat models at all. "The models are the best tool you have, but you have to use them intelligently," she said.

Clark said companies should examine the detailed model output to see if it makes sense for their specific book of business, for individual geographic regions and even for specific policies. Then companies should select a range of loss scenarios for risk management, rather than use a specific point estimate such as the probable maximum loss.

"Point estimates are subject to a high degree of volatility and can change dramatically between model updates," Clark said. "The fact is, no one knows what the actual PML is on an actual book of business, so relying on point estimates is one way bad business decisions are made."

She said the reason the models are uncertain is because of the limitations in scientific data and knowledge. Scientists simply do not know things such as the exact probability of a category 4 or even a category 3 hurricane in the Northeast or for example, the largest likely magnitude of a New Madrid earthquake." Even in Florida, where we have the most data and the least uncertainty, the factor of uncertainty is 50%," Clark said.

In other words, a company with a 1% market share in Florida might have a PML range of $700 million to $1 billion. "But you can't really narrow that range much more than that," Clark said. For other perils and regions, the range of PML is even larger.

"Using a range, rather than a point estimate, is very important," Clark said. "The models give good guidance as to what a good range is, but trying to pinpoint a number within that range is a fruitless exercise, and in fact, what leads to a lot of the bad business decisions, because every time that number changes — which they always do, when your exposures change or the models change — you have to radically change your business decision, and that just doesn't make sense."

"A lot of times the model updates are just moving that PML around within the band of uncertainty. It may be scary, but it's a fact, and that's really what companies have to get used to. They have to get used to managing risk with the uncertainty, looking at the ranges of large losses rather than expecting a scientist or model will give them the answer, or the number. That is not possible," she said.

Last December, Clark said the three major cat modelers — AIR Worldwide, Eqecat and Risk Management Solutions — had created near-term cat models for 2006 to 2010 that greatly overestimated losses from the 2006 to 2008 hurricane season. Those models had predicted activity would be up 40%. If 2009 is a below-average hurricane season, those short-term models will have been wrong three out of four years.

"Uncertainty is inherent in the long-term models. The short-term models add more uncertainty...by trying to predict what is going to happen in a short time period," Clark said. "Hurricanes are random events. Our climate system is very complex and while scientists know most of the factors that influence hurricane activity, these factors are very complicated."

Clark said the models were based on the prediction that sea temperatures would be above average, which turned out not to be the case.

"It would be great if we could assess the hurricane risk over a short time period, everyone would like to do that, but this is currently beyond the capabilities of the models," Clark said.

Karen Clark & Co. recently formed a strategic partnership with reinsurance broker TigerRisk (BestWire July 21, 2009).