

# Catastrophe Modeling—Any Room Left for Underwriting?

## *One Underwriting Professional's Perspective*

by Robert Medeiros, CPCU, ARe, ASLI

**Robert Medeiros, CPCU, ARe, ASLI**, is an independent property underwriting consultant serving the domestic and offshore (re)insurance market. He founded Lighthouse Consulting, LLC, in 2007, after thirty years of experience in property underwriting and brokerage. Medeiros has held positions in property product line management at Arch Insurance Group and Royal and SunAlliance Insurance Company. He is also a licensed property-casualty insurance agent in North Carolina.

“Catastrophe models are just tools to help underwriters.” This comment has found its way into nearly every article or conversation about catastrophe modeling in the past year. It is likely a reaction to “model misses” (where the actual losses from a catastrophe event differ from the modeled loss) or to the significant changes in modeled loss from new versions. The comment is a warning and a disclaimer of sorts, but also a good reminder for underwriters at all levels. And, as an attorney once said of my testimony, it has the added virtue of being true. The problem comes when a catastrophe model moves from being just a tool to being the only tool used to underwrite an individual account.

An insurer’s senior management team is responsible for setting corporate targets for catastrophe exposures. Typically, multiple metrics, and now multiple models, are used to evaluate the price adequacy, probable maximum loss (PML), gross limits by landfall area, and so forth. The models are important tools at this level, as they organize and analyze large amounts of information. Management then distills this analysis into one or two target metrics that are easily obtainable at the account level, such as premium to average annual loss (AAL) or PML to premium. These metrics should align with the corporate targets to produce an adequately priced portfolio within the PML targets. It is in this transition to the account level where the model transitions from a tool to the tool. When the rapid pace of the business is considered, especially in the Excess and Surplus lines market, the model can easily become the only tool.

My involvement with catastrophe management predates modeling, going back to a time when companies used landfall areas and set PMLs based on construction and occupancy (some have suggested that a return to this type of deterministic approach may be better than the current probabilistic methodology). In a previous corporate role, I set PML and pricing metrics and developed underwriting workstations to process modeling analysis. In my current role as an independent property underwriting auditor, I review files from many different companies in most market segments, which gives me a unique opportunity to see how the target metrics affect account selection and pricing. Too often, I see comments such as “models well” to justify a quote. I’m concerned that catastrophe underwriting at the account level has largely become a matter of hitting the numbers, and I’ll suggest some alternatives that take into consideration underwriting factors.

In a perfect world, underwriters would carefully review all available information about a risk, including modeled results, and set a PML and premium based on sound underwriting judgment. The account PML could then roll up to the corporate PML for accumulation management. However, it is not possible to make a manual adjustment or override a modeled PML and have it carry through to the portfolio level, so the focus of this article will be on pricing. The question to be answered is, what risk and coverage conditions are likely to result in an actual loss that is higher than the model and, therefore, require a higher price than the target pricing metric?

First, it is important to recognize some limitations in catastrophe models. For example, the type of insurance policy is not a consideration in the model. Thus, the modeled loss on an account written on a narrow ISO form would be the same if that account were written on a broad broker manuscript form. In addition, the model cannot account for terms and conditions that would affect the attachment point in a layered property program. Finally, modelers have stressed the importance of good data quality by reducing the amount of “unknown” entries, but good data elements aren’t necessarily accurate data, especially with regard to secondary modifiers.

With these limitations in mind, these factors should be considered when evaluating the adequacy of the targeted pricing metrics:

- **Type of policy assumed by the model**—Large companies with multiple underwriting units may use several different policies. Some companies allow their underwriters to write “follow form” over another company’s policy or write broad broker policies. The insurer’s management should define which type of policy is assumed to be used in the model. The targeted price metric is based on that policy. Use of a broader policy than that assumed by the model should result in a surcharge to the modeled price.

- **Coverage extensions and limits assumed by the model**—Similarly, the insurer’s management should define which coverage extensions, limits, and sub-limits in its policy are assumed by the model. Extra Expense, for example, is a non-modeled coverage, but it can play a significant role in an actual loss. If, say, a sublimit of \$250,000 is built into the policy, surcharges for higher limits would apply if the risk conditions warranted them. Other coverages, such as Contingent Business Income, Civil Authority, and Off Premises Power, frequently come into play in a catastrophe loss but are not modeled. By defining which coverages and limits are assumed by the model, the underwriter can surcharge for higher limits.

- **Unique occupancies**—I audited a zoo account, and the underwriter wrote, “Models well.” Compared with what? Zoos are a unique occupancy and, by virtue of fewer numbers, will have less actual loss experience on which to base damageability ratios. In addition, the model groups specific occupancies into larger, more general categories for analysis. A sports stadium is different from a zoo, but they are in the same category for modeling. The insurer’s management should identify those occupancies that are unique. The underwriters should spend some time understanding the actual exposure and price it accordingly.

- **Erosion of underlying limits from non-modeled perils**—As discussed, the model cannot account for the erosion of the underlying limit on a layered program from losses by non-modeled perils in the primary or underlying layers. The peril of flood on a wind exposed account is the best example. An account with potential for underlying erosion can be priced by re-running the wind model at different attachment points. Insurance to Value (ITV): Adequate ITV is foundational to property underwriting. Normally a schedule of locations is modeled “as is,” without any correction for low ITV’s. Policy restrictions such as coinsurance and margin clauses provide protection in a

large loss but don't help with price adequacy. Low ITV's on a schedule should be grossed up to adequate levels.

- **Calculate the rates**—The modeled output includes AALs by location, and it is a simple matter to convert these to traditional rates. Minimum rates can be set to avoid underpricing risks that could result from modeling aberrations and to ensure a reasonable premium for smaller accounts.

- **International exposures**—Modelers offer a wide variety of country, regional, and peril models. Some insurers license all available models, while others do not. To ensure that international exposures are properly priced, the insurer should identify the un-modeled catastrophe territories and perils and provide guideline rates. The additional premium needs to be included in the quote.

- **Catastrophe data quality metrics**— Typically, an insurer has a corporate data quality standard that measures geocoding levels and the amount of unknowns in primary characteristics. Insurers should evaluate an individual account using the same standards. Accounts with poor data quality can be surcharged, recognizing that the model also makes assumptions for unknown data that can affect results.

- **Catastrophe data validation**—The data may be complete, but are they accurate? An underwriting submission can include loss control reports at key locations, and insurers use third-party software to validate some key features. An insurer should set a guideline regarding how much exposed Total Insured Value needs to be validated at the time of the submission. Unfortunately, secondary modifiers are normally used without validation, and their impact on the modeled loss can make a significant difference. To minimize the effect of secondary modifiers that have not been validated, the model can be run both with and without the modifiers and the results compared. Management can limit the amount of premium credit they give for un-validated modifiers. Validation should always be done if the account is bound.

- **Optimization lists**—Nearly every company produces a list of accounts with the poorest metrics in their portfolio, and the corresponding underwriter is usually required to take some action at renewal to improve the risk pricing. Reviewing accounts against the factors listed above may rearrange the order of the list and present options for improvements in terms and conditions that modify the need for large rate increases.

In conclusion, I believe there is room for underwriting in a model-driven environment if insurers define the types of risks and coverages assumed to be in the model and increase the pricing for those conditions that would lead to larger losses. Model misses will still occur, but careful and deliberate underwriting, we should be able to better price for the uncertainty associated with models. •