AIRCURRENTS

"HOW WOULD YOUR CLAIM OPERATION FARE IN A MEGA-DISASTER?—PART I"

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EDITOR'S NOTE: This article begins a two-part discussion on the potential impact of a major catastrophe on the claim operation of an insurance company. AIR Actuarial Consultant Dennis Fasking and Risk Analyst Chris Cocuzzo explore how advanced preparation using catastrophe models can optimize claims handling plans. In next month's AIR Current, the authors will discuss options for improving real-time response in the aftermath of a catastrophe.

By Dennis Fasking, FCAS, MAAA, and Chris Cocuzzo

Is your claim operation prepared to handle the next mega-disaster? Perhaps it will be a magnitude 7.8 earthquake on the Hayward Fault near San Francisco, or a magnitude 7.5 on the Puente Hills fault beneath Los Angeles. It could be a Category 5 storm similar to Hurricane Andrew, but this time making a direct hit on Miami. It could even be an event like the 1938 New England Hurricane, bringing devastating winds and storm surge to coasts of the Northeast. The sheer number and potential complexity of claims resulting from these types of events could overwhelm the claim operation of any insurance company.

While it is impossible to predict when and where the next major disaster will strike, every region in the United States is susceptible to catastrophe risk, so it is essential to be prepared for a full range of high impact scenarios everywhere your company has significant concentrations of exposure. Integrating catastrophe modeling into the advanced planning processes of a claim operation allows for fast and efficient response during an actual disaster and will help you answer questions like:

- Is my organization aware of the scope and consequences of all plausible catastrophe scenarios that could affect our portfolio?
- Does our claims leadership have the right plans and resources in place to effectively handle a high volume of claims in the aftermath of a catastrophe?
- Have we adequately stress tested our existing response procedures and claim processes?

WHAT CAN A CATASTROPHE MODEL'S STOCHASTIC CATALOG DO FOR YOU TODAY?

Traditionally, claim departments approach advanced planning for potential catastrophes by reviewing data on past losses. However, considering the relative infrequency of catastrophe events (particularly extreme ones), historical

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claims data forms a very incomplete picture of the potential consequences. For example, according to a recent study released by the US Geological Survey, the chance of a M7.5 or greater earthquake in California in the next 30 years is 46%. However, the last comparable event was the M7.8 1906 "Great San Francisco Earthquake"—more than 100 years ago when the demographics were very different from what they are today. How many claims could a similar event generate today?

Considering the ever evolving and expanding landscape of exposures in the United States, this is not an easy question to answer. The best tools for tackling these types of questions combine sophisticated, high spatial resolution knowledge of the hazard with a thorough understanding of structural engineering and complex insurance conditions. Here, the benefits of catastrophe modeling come into focus.

A catastrophe model's stochastic catalog contains tens of thousands of events that run the gamut of possible scenarios for the coming year, each of which is assigned an attendant probability of occurrence based on rigorous scientific analysis.

Your claim operation can select high impact events from the catalogs for each peril to model expected damage patterns and claim distributions for at-risk portfolios. Alternatively (or better yet, in addition), you can leverage the entire catalog to approach risk management probabilistically. This will allow you to address the inherent uncertainty in the occurrence and location of the next major disaster to create the highest level of catastrophe risk transparency.

MODELING SELECT SCENARIOS

Simulating a wide set of high intensity events for each peril that can affect your organization's high-density exposure concentrations will permit a broad awareness of the type of response strategies that the events will demand. Consider a hypothetical company, Insurety Property Insurance Company (IPIC), a relatively new player to the country-wide insurance market. The company is a multiline primary carrier with exposure concentrations in many highly exposed states. Suppose IPIC wants to explore how their portfolio in California would be affected by a strong earthquake on the Southern San Andreas Fault. They select a M8.0 event from the catalog that closely resembles the parameters of the Great Southern California ShakeOut drill (visit http://www.shakeout.org/ for more information).

IPIC simulates this event with AIR's CLASIC/2 catastrophe modeling system, which uses detailed exposure data on individual structures along with location-specific geographical and geological information. Figure 1 represents the severity of ground-up losses by ZIP Code in the Los Angeles area. This provides IPIC with a pattern of expected damage, highlighting areas with relatively greater damage as potential targets for priority during deployment or that may require special expertise.

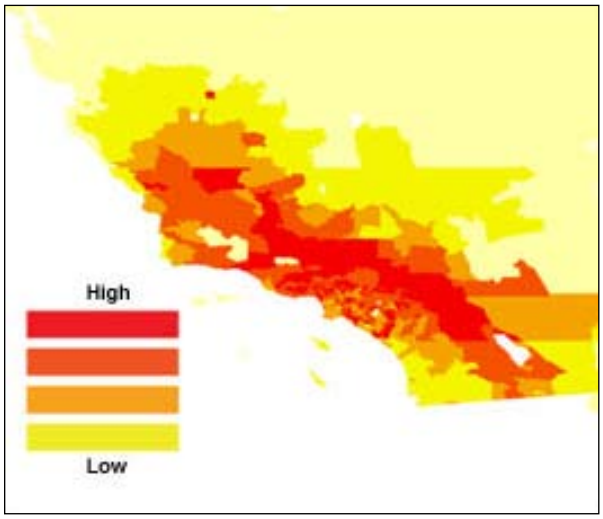

Figure 1. Average Severity of Ground-up Losses by ZIP Code

Delving deeper, IPIC also uses CLASIC/2 to output the number of claims in each ZIP Code, which is represented in Figure 2. Identifying ZIP Codes with relatively larger numbers of expected claims and combining this with the previous loss severity analysis makes it possible to define a suitable claims triage process to prioritize areas most likely to require the fastest and most informed response. This also allows IPIC to plan for more effective use of fast-track claims procedures, call center resources, and contracts for external adjusters and engineers.

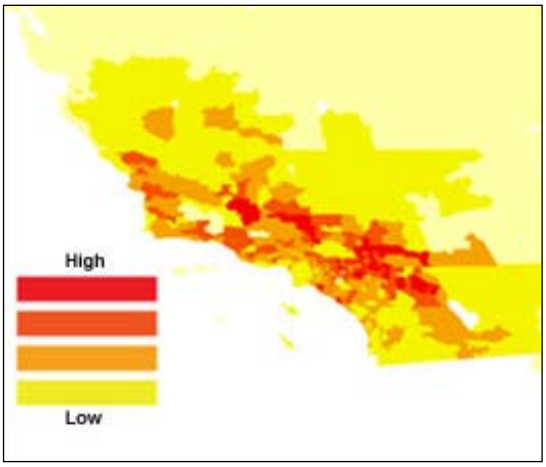

Figure 2. Number of Claims by ZIP Code

The goal in modeling deterministic scenarios such as this one is not to generate precise loss estimates or to draft plans for specific events, which will never occur exactly as simulated. Rather, it helps to identify relative claim patterns from highly plausible catastrophe scenarios to help guide claim operation planning, execution, and internal and external communication. Once a sound general plan is in place, it can be adjusted dynamically in the event of an actual catastrophe.

ADDRESSING UNCERTAINTY WITH A PROBABILISTIC APPROACH

While deterministic scenarios are useful for highlighting the different types of events your claim department should be prepared to handle, the underlying uncertainty in where and when the next disaster will occur is best addressed by probabilistic modeling. Using the full set of events from the stochastic catalog will provide a better sense of the likelihood of severe claim counts in a region for a given year.

Revisiting our hypothetical insurer, suppose now that IPIC is a high-value commercial carrier underwriting complex facilities. They want to assess the probability of different levels of claims counts from hurricane risk for two regions where they have concentrations of exposure: Southeastern/Gulf States and Northeastern States. Using CLASIC/2, IPIC outputs the exceedance probability of claims counts for each region, as represented in Figure 3.

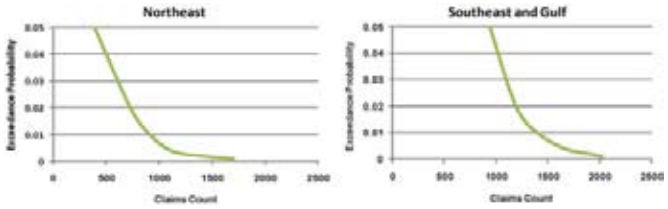

Figure 3. Exceedance Probability of Claim Counts

Claim managers can use this type of information in conjunction with loss exceedance probabilities to develop region-specific resource allocation and claim handling plans that consider the relative probability of claim levels. A reasonable comparison can be made with a company's purchase of reinsurance. Looking at IPIC's 0.4% exceedance probability level (250-year loss stipulated by Solvency II in the reinsurance analogy), the claims count for the Southwestern/Gulf states is roughly 1,650, while the count for the Northeastern states is lower at around 1,000. Given limited resources and the complexity of the likely claims, IPIC could create unique regional claims handling plans that reflect an awareness of these probabilities.

The use of probabilistic modeling can also highlight distinct regional planning requirements. For example, while a Category 4 hurricane making landfall in New England would incur a potentially catastrophic number and severity of claims, the likelihood of one occurring is low, making it less prudent to allocate valuable and scarce resources in planning for such an event. On the other hand, a moderate intensity hurricane making landfall in New England may deserve some special attention. Hurricanes that reach higher latitudes typically move faster than those in Southeast, allowing people less time to prepare in advance. In addition, they grow in size as they transition to extratropical storms, so damage may penetrate further inland and produce a larger damage footprint, resulting in a larger number of claims.

RESOURCE PLANNING AND STRESS TESTING

Deterministic and stochastic modeling can be used to design better advance plans for handling claims from large catastrophe events. In particular, it can help plan resource allocation needs to ensure timely and appropriate use of internal and external personnel. Based on modeled damage ratios, the number and severity of claims, and claims exceedance probabilities, claim managers can gauge potential outsourcing needs and plan claims triage processes and deployment of internal and outsourced claim

adjusters. For example, resources should be allocated such that the most experienced adjusters and engineers can quickly and efficiently be sent to areas that suffer the most severe and complex claims.

Catastrophe modeling can also help anticipate issues that may require special expertise. For hurricane risk, for example, advanced modeling can highlight areas with both storm surge and wind damage potential, which would fall under the federal flood program's single adjuster rule. In addition, claims distribution patterns and likely damage can draw attention to situations that represent litigation potential or may need special legal or engineering expertise. This can help guide preparation and training on consistent adjusting and engineering protocols and legal defense actions.

Stress testing for catastrophic events is becoming the norm as part of preparations for annual meetings with rating agencies and as part of the company's own integrated enterprise risk management activities. Modeling results should be incorporated into periodic stress testing of the claim operation, perhaps in conjunction with the anniversary of a major historical event in each population concentration area. By conducting dry run claims exercises using the latest exposures with a set of plausible large catastrophe scenarios, the claim organization can evaluate the effectiveness of its operational plan and resource allocation and identify potential vulnerabilities. Modeling large disasters can also guide the planning process for events that may require special cash flow.

CONCLUSION

With the continuing increase in the number and values of insured properties, the next mega-disaster can produce a greater number of claims than your organization has ever experienced previously. Catastrophe models can help you prepare in advance of an actual event by highlight a set of potential catastrophe scenarios for each peril and each high density exposure concentration location your organization should be prepared to handle. By identifying expectable damage, claim metrics, and number and severity of insured losses for these events, your claim organization can demonstrate its readiness to handle the claims from a full range of plausible extreme impact scenarios.

For companies that need to quantify and manage risk under uncertainty, catastrophe models have performed a critical function where traditional analysis methods have fallen short. The benefit, however, is not limited to financial risk management. To achieve the highest level of catastrophe risk transparency, claim departments can use catastrophe modeling to streamline processes, allocate resources, and formulate the most effective claim strategies.

ABOUT AIR WORLDWIDE CORPORATION

AIR Worldwide Corporation (AIR) is the scientific leader and most respected provider of risk modeling software and consulting services. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism in more than 50 countries. More than 400 insurance, reinsurance, financial, corporate and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, site-specific seismic engineering analysis, and property replacement cost valuation. AIR is a member of the ISO family of companies and is headquartered in Boston with additional offices in North America, Europe and Asia. For more information, please visit www. air-worldwide.com.