

Exploring new frontiers

Sal Zaffino considers the developments made in risk modelling and imagines what the future might hold for this area.



Sal Zaffino is chief executive of global reinsurance intermediary Guy Carpenter.

It was not long ago that modelling risk was achieved by actuaries working with basic exposure data. Over the years, technology has changed, our understanding and appreciation for data has changed and our collective approach to modelling risk has evolved. As techniques evolve, so too does the need for risk managers to keep pace with these tools, and utilise them appropriately. The need for reinsurance brokers to invest in modelling so we may help our clients in the better management of their risks is also growing.

Modelling evolves

The use of modelling to manage insurance risk first emerged as a standard industry practice in the 1990s. While modelling had been developed in prior decades, it was primarily for hurricane exposures, and not in widespread use.

A key catalyst in changing insurer views on the use of models was Hurricane *Andrew* in 1992. Traditional risk assessment practices using prior losses to estimate potential future exposures were found to be wanting, often underestimating potential losses that (re)insurers faced from mega-catastrophes.

Throughout the 1990s, work in modelling progressed quickly, particularly in regard to key perils with mega-catastrophic potential — namely, tropical storms and earthquakes. As science evolved, and information regarding weather patterns and seismic activity improved, models were enhanced to translate this information into risk assessment tools. This prompted increased investment in development by the modelling firms and brokers. Some large brokers have invested heavily in advancing modelling techniques, working closely with modelling firms to enhance their models, while creating their own models to fill gaps in modelling for reinsurance purposes.

While actuarial analysis remains the foundation of sound modelling, it is clear that modelling risk at a higher level requires a deeper understanding of other sciences as well. Large brokers now deploy experts in mathematics, meteorology, economics, seismology, and finance, all engaged in developing better ways to understand risk and its impact on a cedent's risk portfolio. Modelling firms have made similar investments.

Increased investment fostered growth in the types of events that could be modelled. Property catastrophe models went beyond hurricane and earthquake to address tornadoes and hailstorms. These techniques have been particularly helpful to ceding companies with risks in the mid-America region of the US.

Early earthquake models were used primarily for property exposures. But there is an increased concern for the potential for catastrophic loss in other lines, notably workers' compensation. Modelling companies have expanded model application to this area.

Our global scope and broad expertise have enhanced our ability to contribute to the develop-

ment of more sophisticated modelling techniques. Following a number of devastating floods in Europe, Guy Carpenter worked with modelling firms to develop flood models for Belgium and Germany. Interest in modelling flood risks also came from South-east Asia, where the government of Taiwan is developing a model-based analysis on the flood peril for Taiwan.

Following the events of 11 September, the industry realised an important lesson in estimating losses from a catastrophic event: they can cause severe loss across several lines of coverage. Modelling the terror risk has proven difficult, but not impossible.

Immediately after that event, urban accumulation tools were developed to address risk concentrations and the impact of an event close to such risk concentrations. It is apparent that modelling terrorism risk differs markedly from modelling natural catastrophes. Analytic techniques borrowed from wartime operations research have proven valuable.

Investments pay off

The investment in intellectual capital has paid off in the development of the terror models. While not perfect, every advance is the product of previous contributions made by those who have invested in the science of modelling risk.

This year, with Arium, a specialist in risk analysis and decision support, Guy Carpenter created CASUS — the first model of its kind for the personal accident insurance sector. CASUS helps analyse a personal accident insurance portfolio by highlighting where a catastrophic event may cause a substantial loss. Developers of CASUS had to address the complexities that have made personal accident losses particularly difficult to model in the past, such as mobility.

More recently, Guy Carpenter has applied modelling in the directors' and officers' (D&O) market. In partnership with the National Economic Research Associates the company has created a proprietary model called Elite, which quantifies expected frequency and severity for a specific D&O insured or portfolio. Cedants will be better able to make more informed decisions about their reinsurance program as a result.

Models are now used for complete portfolio management, which includes the development of underwriting strategies, rating and pricing, risk selection, reinsurance, retrocession, and other forms of risk transfer. Modelling has come of age.

It has also grown as a science. There is no doubt it will continue to evolve, as will our understanding of risk. New models for wildfire and other property perils are just the beginning. It is expected that modelling will expand into areas such as credit risk, investment risk and other non-insurance forms of operational risk, even overall enterprise risk.

Modelling is now a core competency rather than just a helpful analytical tool.

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