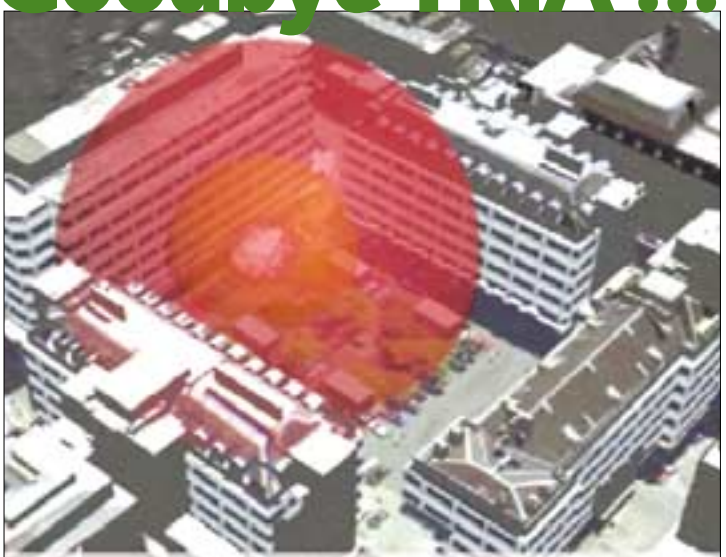
Goodbye TRIA ... hello terrorism modelling?



Regardless of TRIA's future, insurers and reinsurers will need to better understand how terrorism can be modelled if they are to effectively underwrite this complex risk, argues Dr Justin Butler

With an increase in the take up of terrorism related insurance cover in the US from 27% in 2003 to approximately 58% in 2005 (*President's Working Group report on Financial Markets, 2005*), and as the science of terrorism risk assessment evolves, some would say that there is no longer a need for TRIA – which is due to expire on 31st December, 2007.

Recent terrorist attacks, as well as forthcoming events such as the Beijing and London Olympics, are likely to result in an increased demand for terrorism cover and terrorism risk modelling around the world. As such, insurers and reinsurers need to better understand how catastrophic terrorism risk can be modelled if they are to take advantage of the increased demand for cover whilst securing competitive advantage in the market.

Terrorism models come in a variety of shapes and sizes depending upon the functional specification and complexity of the analysis required. However, at a fundamental level, terrorism risk models need to enable: (i) an assessment of likely target locations and attack frequencies (i.e. where, and when, an attack is more or less likely to happen); and (ii) simulation of the effects of, and losses from, a conventional bomb blast or from the dispersal of hazardous agents from non-conventional weapons (for example, Chemical, Biological, Radiological, Nuclear (CBRN) attack). In other words, what affect a device could have on the surrounding area and the subsequent loss.

Assessment of where and when an attack is likely to happen is arguably the more problematic component as this requires the quantification of terrorist target selection using stochastic methods. The second component requires quantitative, spatial analysis of the urban fabric, building vulnerability and historical blast yields or information relating to the spread of contaminants and their effect on people and property within the surrounding area.

Depending on the application and the level of detail required, several different approaches to terrorism risk modelling are available, each of which incorporates, to a greater or lesser degree, the components described above. For example, at a very simple level, two-dimensional representations of a blast wave from a conventional explosive device can be linked to the location of insured exposures on the ground so as to enable estimation of area effected and hence, loss accumulation. This deterministic approach is used, for example, in the Lloyd's Realistic Disaster Scenario (RDS).

However, as Copernicus rightly pointed out, the world is not flat and the congested, complex nature of modern cities means that patterns of risk from conventional and non-conventional attacks are anything but simple.

To incorporate the influence that the complex urban fabric has upon patterns of terrorism risk, a three-dimensional representation of the built environment can be created from new sources of topographical information (for example, remote sensing) to better assess the effect an attack may have on an individual or group of buildings.

As such, the effect that a bomb blast/CBRN release has upon people and structures can then be used to estimate property damage as well as the likely number of casualties and, via the explicit treatment of impacts to transport and infrastructure and business interruption exposure. This more rigorous approach can be used to refine Estimated Maximum Loss (EML) for a given event or multiple events.

Finally, if large-scale, wider area terrorism risk assessment is required, national-scale probabilistic catastrophe models can be used. These look at the distribution of loss for multiple and different types of terrorist events and their impact on different lines of insured business. This probabilistic based approach can be used in, for example, reinsurance pricing and accumulation analysis.

It is important to note that the choice of an appropriate model should be influenced by: (i) purpose (i.e. at which point in the risk chain will the information will be used – primary underwriting, reinsurance, etc.) and, (ii) the level of detail or scale required.

There has, of course, been considerable public and commercial interest in terrorism and blast modelling since 9/11. Technological advancements, informed by historical attacks – both successful and unsuccessful – have led to improvements in the design and scope of models that can be used for terrorism risk assessment.

For example, in relation to the assessment of likely target locations, significant advances have been made in our understanding of how terrorist organisations operate in relation to their intent, capability and opportunity to attack. Integrating this information with mathematical models for analysing behaviours provides a more scientifically robust method for identifying those locations, buildings, and other 'points of interest' (for example, soft targets) which are more or less likely to be targeted by terrorist organisations.

Notwithstanding these new developments, the utility of the next generation of terrorism risk models can only be fully realised by having access to improved exposure information. Only by knowing what we are actually insuring and where, can we expect to get a better handle on risk and probable losses from terrorist attack. The optimisation of risk profiles can only be achieved by combining good quality exposure data with appropriate probabilistic and deterministic risk models, which capture the complexities of the urban environment and the terrorist threat.

As 9/11 showed the industry, anything can happen. However, given the increase in uptake of terrorism cover in the US in recent years, it is safe to assume that this will continue after the demise of TRIA.

Furthermore, as the bombings in London, Madrid and Bali have demonstrated, many cities around the world are at risk of terrorist attack and this is also likely to stimulate demand for increased levels of terrorism cover worldwide. Whatever the future holds, increasingly sophisticated terrorism risk models and improved access to detailed exposure information should play an important role in helping us understand and price this complex risk.

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