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## BIG INTERVIEW

# Tackling casualty accumulation head on

Despite recent advances, there will always be a requirement for greater transparency and stress testing in the casualty modelling process, says the chief executive of risk modelling firm Arium



Rasaad Jamie  
Global markets editor

Although the capability for modelling liability catastrophe exposures is at least a decade or so behind the progress made in the neighbouring field of property catastrophe risk modelling, there have been some significant advances over the past two to three years in the development of tools and techniques for managing the accumulation of liability exposures. This includes scenarios to assess the extent of potential liability losses.

Robin Wilkinson, chief executive and founder of Arium, a London-based firm which develops risk modelling solutions for the insurance and reinsurance industries, says one of the major factors behind the current pace of progress in the area of liability exposure management is that in recent years, the industry has become much more focused on gathering liability loss and other relevant data.

"Our casualty analytics platform has been in development for some years now. But, more recently, the industry has not only been more focused on collecting more casualty loss data but also on collecting better-quality portfolio data. That is critical for risk modelling. In my view, the time has come to address the issue of casualty accumulations head on," she says.

For Wilkinson, it is reminiscent of the early days of property catastrophe modelling when insur-

ance companies had limited data on their property risks. "What has happened in the liability insurance sector is companies are now finally starting to collect and retain better data, and we are helping them capture data for their existing portfolios," she says. "There are also a number of initiatives in the market to help them capture better data going forward. Some of this information is very obvious – the size and nature of the business which is being insured. It is a chicken and egg situation. You can't get good model results without good-quality portfolio data, but without a model, there is limited incentive to collect the data."

### Liability arising from secondary risks

Arium is probably best known in the London market for the work it has done in partnership with reinsurance broker Guy Carpenter. This includes Arium's development of Casus, a modelling tool released in 2003 which tracks the accumulation of personal accident risk exposures across multiple portfolios, across geographic locations or as a concentration of exposure in one temporary location such as a cruiseship. In addition, the Casus risk modelling tool, developed in the aftermath of the September 11, 2001 terrorist attacks, also tracked instances of catastrophe near misses in various industry sectors, including in the aviation, maritime and food manufacturing sectors.

Arium also co-operated with Guy Carpenter on the initial development of its casualty cat model/ which was introduced in 2008 and which was one of the

very first risk models to allow users to track catastrophe casualty accumulations.

Arium has pretty much been at the forefront of the development of liability exposure management since it was launched in 1998 as a specialist legal and liability risk modelling firm and consultancy by Wilkinson, a former head of legal services at British Airways, where she developed a framework to identify the legal and liability risks across the entire organisation. As thorough as her framework was, she did miss one important risk: deep vein thrombosis.

"The airline's core risk is obviously ensuring flight safety. I was focused on liability arising from secondary risks – for example, issues in areas such as in catering, engineering, medical and IT – but I overlooked the potential harm, not of an aircraft accident but of continuously flying. As an in-house lawyer what I cared about most were the liability risks to the company that I didn't see coming, which means there is no procedure in place to manage that risk."

Initially, Wilkinson's legal risk management framework provided the basis for the legal risk identification and assessment services provided by the firm. Arium later developed its risk analysis tool as a more sophisticated risk measure and the tool was subsequently used by Arium for the modelling of air safety, employee liability, data protection and legal risks, as well as the risks associated with the public policy measures, Wilkinson says. "We provide our clients with a number of tools. Our risk analysis tool is all about dependency relationships, to help



## Robin Wilkinson CV

Robin Wilkinson is a founder of Arium and has been involved in risk analysis since the early 1990s.

She previously served as head of legal services at British Airways Plc and as associate counsel at United International Pictures.

She was admitted to the New York bar in 1982.

make decisions in data poor areas. The firm's casualty analytics platform, the tool we use for analysing casualty accumulation risks, is also about establishing connections but it uses a different approach based on network theory and supply chain data. Casualty accumulations arise from interconnected risks, where liabilities can potentially implicate companies connected through a supply and distribution chain. Networks are used to capture those connections. This new approach gives a different perspective on risk."

When Arium launched as a modeller of liability risks in 1998, it was ahead of its time. It was also very much ahead of the data that was being collected by insurers, according to Wilkinson. "These were early predictive models. At the time, for example, we were asked by an insurer to look at its product recall book. It had made the assumption raw products, such as uncooked chickens, were riskier than others. That was based on an underwriter's own

experience. Nobody was capturing the insurers' data to show whether there were in fact more claims from raw food products than from other products. We discovered for a market that creates a lot of data, the insurance industry was not retaining any. The information existed but it was in everyone's paper files and not immediately accessible."

At the time, Wilkinson says, Arium did not have a risk model as such. "It was not a sausage machine where you put the data in one end and got output from the other. It was a structure which allowed you to look at areas of uncertainty and how risks related to each other, a way of managing uncertainty with the little data that was available."

### Public policy

Outside insurance and reinsurance, Arium has over the years provided liability risk management services to a number of other industry sectors including the utilities, manufacturing, airline



## Wilkinson on...

### Uncertainty in the casualty area

**"At any moment a new product could come to market and change everything. Property catastrophe models have faced the challenge of incorporating data on climate change, which is both complex and continually evolving. However, even that is more predictable than the way events unfold in the casualty environment"**

and legal sectors. The firm has also assisted public sector bodies in the UK and the US, including the UK Drug Policy Commission (UKDPC), with the analysis of liability and other risks associated with the unintended consequences of public policymaking as a result of the flawed assumptions and incomplete thinking that often underpin public sector policy decisions.

In 2011, Arium published a report, with a foreword by the UKDPC, on how the unintended consequences of public policymaking might be anticipated and even avoided by adopting a systematic policy analysis and dependency modelling approach based on the use of its risk analysis tool.

More recently, Arium has started working with the Lloyd's market on developing a conceptual framework to assess the market's exposure to potential liability catastrophes across multiple lines of business. One result of this co-operation was the publication by Lloyd's in November last year of its Emerging Liability Risks report.

Lloyd's is looking at ways to improve liability exposure management and one way to reduce the inherent uncertainties associated with liability risks is for the market to utilise Arium's casualty analytics platform, which combines liability loss scenario design with business supply chain interconnectivity.

#### Near misses

The monitoring of catastrophe near misses very much remains a feature of the risk modelling tools and platforms developed by Arium. This, Wilkinson says, is particularly useful in terms of assessing what else might possibly go wrong when designing potential loss scenarios. In this regard, she sees the food manufacturing sector as particularly vulnerable to the accumulation of liability exposures. She cites the example of a liability catastrophe near miss where a potentially harmful

red dye from India got into the food chain in Europe. "Now, can you imagine the situation if the contaminated dye had not been picked up. It could have gone everywhere. It was used as an ingredient in a well-known food sauce which in turn was used in lots of other food products. Or imagine if the horse meat scandal was not just mislabelled meat but meat that wasn't fit for the food chain. These are the kind of near misses that the aviation industry tracks and could help indicate the potential scope of liabilities. It highlights what could happen in the food industry. The question for us as risk modellers is what else might happen that is a lot worse?"

Arium however, is specifically looking at these near misses from the perspective of the risk portfolio of an insurer. "The question is what does any potential catastrophe event have to do with the business of a particular insurer? It's not just about imagining the next asbestos, but also about looking very closely at the portfolio of a specific insurer or reinsurer and seeing what are the scenarios that could create significant losses for that portfolio."

#### Reinsurers

One of the most encouraging recent developments for Wilkinson is that reinsurers are now a driving force behind the insurance industry's collection of casualty accumulation data. This trend, she says, was particularly evident in the presentations given at the Geneva Association's 11 Annual Liability Regimes Conference: "Keeping the floodgates shut? Mastering accumulation and bodily injury exposures in a rapidly changing environment" in Rorschlikon, Switzerland, in November last year.

"This was not previously the case and came as a surprise to me because you don't associate reinsurers with the capturing of policy level data, except in property. In the past, the liability accounts

of reinsurers contained only treaty-level data. But it is becoming very clear, and this was certainly one of the central themes at Rorschlikon last year, that reinsurers are now very focused on collecting policy-level data to model their liability accumulations," she says.

This trend also represents something of a departure for Arium, which is increasingly working with reinsurers and specialty lines insurers. Previously, the London market broking community constituted the firm's main client base. "This is because brokers were looking for tools because they needed to provide risk analysis and modelling solutions to their clients. More recently, particularly since we have started working with Lloyd's, we have been able to get more direct feedback from underwriters, exposure managers, pricing actuaries and enterprise risk managers, which has been very valuable for us."

#### Legal-economic landscapes

Although the approach taken by Arium toward mapping the accumulation of liability catastrophe risks is very different from that of the modelling of property catastrophe exposures, the firm has devised an economic landscape which is to liability risk models what geographic landscapes are to property catastrophe models.

"We are helping insurers map their portfolios onto an economic landscape to see where they have clusters of exposures. They can also create what we call a liability footprint. Like having a property footprint on the Florida coast, we are able to provide insurers with a liability event footprint, a view of their exposures across a number of interconnected industry sectors which provides an aggregate loss."

Wilkinson says the Arium casualty platform also provides insurers with a consistent methodology and an open architecture on which anyone can use that methodology to design a liability scenario, whether a cyber, professional liability or product exposure. "They can then look at the parameters and stress test certain estimates of the financial, regulatory or legal circumstances envisaged in the scenario to arrive at the potential loss allocated to their portfolio, akin to a liability realistic disaster scenario. Critically, they will have the flexibility to

ask themselves what particular combination of circumstances will make the loss cross materiality thresholds."

#### Bearing the brunt

A big issue for insurers is the uncertainty around which parties in the business supply chain will ultimately bear the brunt of a liability loss. "For every truly systemic loss such as asbestos, there are other major losses in which only some companies in an industry are impacted. Even if perfect data about prior losses and perfect data about every company's complete supply chain were available, it may be impossible to predict in which company an error may occur and which other companies may share that liability. Take a financial loss such as Madoff as an example. Who started the Ponzi scheme, which companies invested directly and indirectly and who their advisers were, would have been impossible to predict."

One of the features of the Arium casualty platform, Wilkinson explains, is its ability to assess the loss impact for different picks of companies throughout the supply chain network. "Users of the tool can look at all of the accounts in their portfolio that might be vulnerable to a liability event. They can then assess and make note of the two or three companies that are most at risk. The platform runs through several different supply chain scenarios and provides an overview of what the accumulation of your exposures might be, based on which policies were picked."

To do so, the tool enables an insurer to consider the policies and accounts potentially impacted. "Once the tool helps you identify the policies which could be vulnerable to a liability event you can run a loss allocation, like a realistic disaster scenario, to envisage the potential range of losses in your book. If that loss looks unacceptable but not unrealistic you can then consider how to mitigate the loss, whether through reinsurance, policy terms and exclusions – the industry has an amazing arsenal of risk mitigation and management techniques once it identifies the potential risk and the type of policies potentially impacted. The question is not just what events may happen but which of my policies are

most vulnerable? Do I have one policy with a very large limit, a policy potentially implicated in a multitude of scenarios? The tool is not just giving you a range of outcomes but is also allowing you to stress test the loss and interrogate the outcome. Transparency means you can ask yourself if the loss is believable and makes sense. What the property cat models have taught us is that models may be wrong but they are useful and that model results should be understood and stress tested."

The big question for Arium and the rest of the risk modelling sector is how far are they from developing a fully-fledged casualty catastrophe risk model which is comparable to the best property catastrophe models available in the market today?

According to Wilkinson, Arium is working towards that goal in so far as it is achievable. Through its work with Lloyd's and other companies in the London market, the US and Europe, the firm has been accumulating a lot of feedback. Arium is currently in the process of preparing to launch its Casualty Analysis Platform into the wider market. "2015 was a very exciting year for us because for the first time, we were able to bring all these concepts together and combine them into one fully functional tool."

The big challenge in terms of producing a casualty catastrophe risk model, Wilkinson says, is the much greater uncertainty inherent in the casualty area, given that the outcome of liability events is dependent on the actions of human beings and on economic, technological, legal and regulatory change. "At any moment a new product could come to market and change everything. Property catastrophe models have faced the challenge of incorporating data on climate change, which is both complex and continually evolving. However, even that is more predictable than the way events unfold in the casualty environment. There will always be a requirement for greater transparency and stress testing in the casualty catastrophe modelling process. One of the challenges for the team at Arium is to resist putting too many assumptions into the model. Instead, we must continue to develop technology that is as flexible and multi-dimensional as the area of risk that it is designed to model." ■