

## **Focusing more on insurance and flood risk**

**Following the recent flooding in the UK, and with increasing concern over the potential impacts of climate change, Dr. Justin Butler looks at how a major 'Katrina like' event could affect the insurance industry in the UK.**

### **Introduction**

Global catastrophes such as Hurricane Katrina have forced many countries, including the UK, to look long and hard at the vulnerability of their own urban centres. It is now thought that the floods caused by Katrina have cost insurers around \$30 bn, making it the most costly hurricane to make landfall in US history. Although Katrina's wind speeds caused colossal damage, it was the devastation from associated floodwaters which surprised the insurance industry the most. However, as demonstrated by recent events, there is also growing evidence of an increasing flood threat in the U.K. It is now clear that the insurance industry will have to adjust their policies and practice to cope with increasing frequency and severity of flooding events.

### **The Flood Risk Problem**

Flood risk can come from a variety of sources including river (fluvial) flooding, tidal flooding, coastal storm surges, flash flooding, surface water runoff (pluvial flooding), overflowing sewers, groundwater and breaching/overtopping of flood defences. Indeed, many of the world's major cities, including London, Paris, Tokyo, Amsterdam and New York are at risk of flooding. On average, floods cause more damage and kill more people each year than any other natural disaster. Between 1998 and 2002 Europe suffered over 100 major flood events, killing 700 people and causing £25 billion in insured and economic losses (source: European Environment Agency, 2006). Experts believe that flood risk is currently increasing in many parts of the world.

It has been suggested that a combination of heavy rainfall and storm conditions could result in up to £30 billion worth of damage across the Thames region from a major catastrophic flood event (source: Environmental Defence, 2005).

Climate change, increased wealth in at risk areas and continued development on floodplains are increasing not only the severity and frequency of flood events, but also the vulnerability of those people and assets at risk.

## **Flood Risk and insurance**

Along with home owners, insurers are key stakeholders in the flood debate and regularly campaign for more government spending on flood defences. Unlike other countries where the state underwrites voluntary flood schemes (such as the USA's National Flood Insurance Program (NFIP)), in the UK, flood is covered as part of standard household insurance policies. Under the "Statement of Principles", the Association of British Insurers (ABI) and the government have an agreement whereby the ABI will continue to make flood insurance available where risk is adequately managed. However, this relies on the government to continue its investment in flood defences and other risk mitigation measures.

In the UK, the government is planning to build thousands of new homes, especially in the South East of the country, to help address growing demand. Some of these developments are likely to occur in areas identified to be at risk of flooding. For example, the regeneration of the Thames Gateway includes the building of 120,000 new homes and redevelopment of the Lea Valley for the Olympic Village.

Neil Mercier, head of property for AXA Insurance, stresses that the government must work more closely with insurers to encourage more resilient building standards as, for example, 90% of homes in the Thames Gateway are at risk of flooding (Dowell, 2007).

Given the predicted impacts of climate change and increased development in the Thames region, levels of flood risk are likely to increase in many parts of London in the future (Thames 2100, 2006). An estimated 75 per cent of the property value at risk from tidal floods in England and Wales lies within the Thames tidal flood plain. The increasing reinsurance costs, could leave the UK insurance sector facing either massive losses or a marked increase in premiums to maintain cover. If a 'Katrina like' event were to occur in the UK, a large storm surge flood along the Thames could cause damage in excess of approximately £580 million (RMS, 2003)

As such, the UK could also face significant losses in the event of our own worst-case flood scenario. According to the government, over four million people and £200billion worth of assets are currently at risk of flooding in the UK, and this figure is predicted to increase four fold by 2080 (Foresight report 2004):

*'Climate change and increased urban development mean that more homes and businesses will be at risk of flooding, especially in coastal towns and cities such as London, where tidal and storm surge flood risks can create the potential for catastrophic losses. The existing flood risk analysis tools that are available do not adequately capture the complexity and severity of extreme flood events in urban areas. So, action needs to*

*be taken now to reduce the potential human and financial costs associated with major UK flood events in the future.'*

## **Flood risk information – insurance requirements**

For insurance/reinsurance underwriting and pricing purposes, flood risk information needs to be reliable, high detail and easily interpretable. At present, many insurers and reinsurers have access to flood risk information for Europe and other parts of the world.

However, this information tends to be low resolution, national scale flood risk maps, which in many cases only provide an analysis of flood risk at postcode or county level. In terms of reliability, the geographic resolution which many of these models operate on tends not to lend itself to modelling flood risk in complex urban environments.

Further, some models do not reliably account for the standard and quality of a city's flood defences, which can greatly vary the degree of flood risk within a specific area. As a result, flood risk in urban areas, where there is the greatest concern in terms of potential insured loss, can be oversimplified and, in some cases, overestimated.

Ideally, any facility for modelling flood risk should produce detailed information including the depth, duration and extent of flood water down to the individual building level. It should be able to examine the degree of flood risk faced by the nearby infrastructure such as access routes, roads and suppliers. This information, in turn, can be used to realistically predict the degree of interruption a business could suffer from a flood of a given magnitude.

A good urban focused modelling strategy has a number of benefits in terms of adding value to insurers' and reinsurers' existing investments in flood risk technology. By focusing on providing detailed data on flood risk in urban areas, where there is the highest concentration of insured exposure and in many cases the greatest level of risk, this information can be integrated and combined with insurers'/reinsurers' existing in-house or third party national-scale flood risk maps and models.

## **Flood Defence**

The state of flood defences in the UK is of growing concern. For example, it is likely that some of the recent flooding could have been avoided or at least reduced from improved defences. The ABI has called for increased flood defence spending from government, saying that an extra £8bn needs to be spent during the next 25 to 30 years to improve coastal defences along the East Coast.

The ABI paper "Turning back the tide: the case for sustaining investment in flood management and defences" looked ahead to the levels of spending on flood defences that will be needed up to 2010. In this paper, the ABI concluded that the £150 million per annum uplift planned for 2005/06 needs to be sustained, in real terms, as the minimum acceptable level of investment throughout this period. However, according to the ABI, the government's flood defence spending needs to rise from £500m to £750m each year. Only time will tell whether or not this goal will be achieved following this autumn's spending review.

### **Environmental Management: Incorporating flood risk into the planning process**

Just as for Environmental Impact Assessment, it is at the strategic level that that Flood Risk needs to be managed. Driven by new legislation such as Planning Policy Statement (PPS) 25, regional-scale, strategic Flood Risk Assessments (SFRAs), which allow flood risk to be consistently incorporated into the wider planning process, are currently undertaken by most Local Authorities. Results and conclusions from SFRAs are then used to inform more site specific Flood Risk Assessments (FRAs).

In anticipation of the 2012 Olympics, the Lower Lea Valley recently conducted a SFRA as part of its regeneration strategy. As a result, developments taking place in the wider Lea Valley area now benefit from an invaluable source of flood risk information.

SFRAs should be designed to help Local Planning Authorities identify areas suitable for certain types of development. SFRAs generally follow a four step process: (i) historical flood mapping and flood risk zonation; (ii) assessment of local flood defences; (iii) evaluation of residual risk posed by a flood event more severe than what existing defences have been designed to cope with and; (iv) consideration of potential hazards resulting from a breach or failure of current defences and identification of areas particularly at risk as well as opportunities to reduce this risk.

A FRA, on the other hand, outlines the main risks of flooding to a particular development site and recommends mitigating measures to reduce the impact of flooding to the site and surrounding area. Like SFRAs, FRAs are part of the planning process and ensure that developers are aware of, and incorporate, the Environment Agency's recommendations within development plans.

### **Understanding and reducing flood risk**

Apart from campaigning for more spending on flood defences or stricter building guidelines, insurers are looking into more sophisticated

mapping and database techniques to manage their portfolios. It is now more widely recognised that increased precision and spatial resolution in geo-referenced data is necessary. Essentially, to analyse and control insurance risks more efficiently, insurers must know the risk situation, concentration, and affected lines of business within insured areas better (Siebert, 2007).

Powerful analysis and mapping utilities in Geographical Information Systems (GIS) can create specific flood risk information to increase the accuracy of flood risk rating and premium setting (Butler, 2007). Since eighty percent of all data in the insurance world are spatially referenced, GIS concepts are as appropriate in the insurance sector as they are in telecoms, energy supply and vehicle navigation (Siebert, 2007). To improve risk transparency, insurers and reinsurers want to know the location of risk and indemnity limits. The key to achieving this is geographical underwriting which produces the transparency needed to analyse the insurer's risk in spatial terms (ibid.).

GIS links insurance market data, portfolio and loss data, hazard information, hazard maps, GPS coordinates, aerial photographs and satellite images. For portfolio management and optimisation, the geographic location of risks must be determined as accurately as possible. Although complicated somewhat by variability in the quality and comprehensiveness of geocoding / address information available in policy documents, properly geocoded data can support most insurance requirements. GIS can also support claims and handling and quicker loss estimation following flood events (ibid.).

Insurers not only want to map flood risk, they now want to model all of its aspects. Currently about a third of the British coastline is fronted by hard defences, but the picture is more complicated concerning river floods. Current thinking suggests that climate change may increase the risk of urban floods by intensifying rainfall (Dowell, 2007). Many existing flood risk models are plagued by uncertainties and this makes pricing risk more and more difficult (ibid.).

### **Signs of Improvement**

Despite apparent budget cuts and the frustrations expressed by the Association of British Insurers, there seems to be a good indication that the UK government and other agencies – from the public as well as the private sector – are making improvements towards flood risk management. The government has recently granted the Environment Agency strategic control over coastal flooding and erosion management, meaning that it can now work on the issue on the policy, plan and program level (Bond, 2007). This can ensure that investment in flood

defences and erosion control can be concentrated in priority areas and used to its best effect (Bond, 2007). As for flooding resulting from climate change, organizations like UKELA (United Kingdom Environmental Law Association) are devoted to litigation for a better environment. In conjunction with new developments in high detail flood risk mapping, strengthened controls on new developments in flood risk areas, and increased availability of SFRA's and FRAs, these measures and initiatives should in the future pave the way to a better understanding, and hence improved management, of the risks posed by flooding.

#### EDITORS NOTE:

Ambiental is using pioneering new technology, developed in conjunction with Cambridge University, to help industry and commerce better understand the risks associated with environmental catastrophes such as flooding and hurricanes. They work with major blue chip companies including Norwich Union and BP. Using their proprietary flood risk information system, Flowroute™, Ambiental produce ultra high-detail, three dimensional flood risk maps and information (including depth, duration and extent of flood water at the individual building level) for UK and international cities. For example, Ambiental have recently completed a simulation predicting the potential impact of a Katrina type coastal storm surge event on Miami, one of America's more vulnerable cities.

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