

Flooding

The New Business Risk for the 21st Century?

Events such as Hurricane Katrina have raised awareness within the international business community that flooding is a serious issue. Dr Justin Butler, Managing Director of Ambiental Technical Solutions - a company which specialises in flood risk assessment, mapping and modelling - explains the issues surrounding flood risk and some of the products and services Ambiental can provide to better understand and reduce flood risks to valuable industrial properties.

Floods affect more people and cause more damage each year than any other natural hazard. For example, the 2004 Asian Tsunami killed approximately 280,000 people. The most recent estimates of economic losses due to flooding in New Orleans from Hurricane Katrina range between \$US15 – 25 Billion. The nature of flood risk is also changing: increased development in urban areas is changing rainfall run-off patterns; and climate change may also be altering the spatial variability and intensity of precipitation. “It is no longer safe to assume that if you haven’t flooded before, you won’t flood in the future” comments Dr Butler.

However, there is a general lack of awareness on the part of UK homeowners and businesses regarding the seriousness of flood risk. For example, in a recent survey conducted by the UK Environment Agency, around 34% of people in flood risk areas had not checked to establish whether or not their insurance policy covers losses arising from flood damage. “There is a tendency for people to think ‘It’ll never happen to me’. The fact is, it could ... we just don’t know when” says Barbara Young, Chief Executive of the Environment Agency (UK Environment Agency Press Office, 12/10/05).

UK business, and particularly the manufacturing and industrial sectors, can ill afford to be so complacent. “Flooding is now a serious issue facing many business leaders in the UK and abroad” comments Dr. Butler. “This is especially the case for manufacturing companies which often have sites located close to water courses or the sea, and have valuable assets located within the ever expanding flood plain”. Flooding as a commercial risk can be especially important for companies which operate internationally and have European branches located in flood risk areas.

PPG 25

Recent flood events in the UK, such as the October 2000 event which affected large parts of Southern England, the Boscastle event in 2004 and Carlisle in 2005, have pushed flooding up the political and business agendas. The Association of British Insurers (ABI), which represents the interests of UK insurers, and the UK Government, through the

Environment Agency (EA), are pushing for stricter legislation and controls in relation to new development in flood risk areas.

In England, the main vehicle in this push for tighter flood control measures is PPG 25 – the UK Government’s Planning Policy Guidance Note 25 (Tan 15 in Wales). Under PPG 25, any new developments in areas determined to be at risk of flooding by the EA require a Flood Risk Assessment (FRA) to be undertaken. The FRA examines not only whether the development is in a vulnerable location within the floodplain, but also how the development will impact on flood risk for the surrounding area. For example, will it increase surface water run-off? Are there design measures that can be used to mitigate the risk of flooding locally and downstream?

Ambiental has considerable experience in conducting FRAs across the UK and understands the requirements of PPG 25 and Tan 15. Ambiental have a team of highly qualified surveyors and specialised consultants to conduct site surveys, liaise with the Environment Agency, undertake hydrological analysis (if required), identify mitigation strategies and provide reports for the planning process. In many cases, Ambiental’s services can be used to improve the chance of a new commercial or residential development gaining planning permission in a flood prone area.

As part of the planning application, the results from the FRA are provided to the local planning authority and Environment Agency for consultation. Between April 2003 and April 2004, 700 planning applications were refused because no FRA was provided. However, 323 residential and commercial planning applications were nonetheless granted during the same period even though objections were raised by the EA relating to flood risk.

This situation is likely to change during 2006 when a radical shake up of PPG25 is due. PPG 25 is likely to be implemented and enforced more widely in the future. “The business community is going to become increasingly more affected by PPG 25” states Dr Butler.

In future, it is likely that consultation with the EA may become compulsory for all flood risk applications, instead of voluntary. In addition, there will be stronger emphasis on the need for an FRA to be undertaken for every planning application – commercial or residential – in a flood risk area.

The FRA process includes consideration of:

- Location of new developments. Positioning new developments away from the most vulnerable areas is often the best way to reduce the damage to plant and machinery caused by flooding.
- Flood resilient construction. New developments in higher risk areas should incorporate some degree of flood resilience into their design, so that in the event of a flood, the damage is reduced.
- Drainage considerations. Issues relating to appropriate and sufficient drainage should be addressed fully at the planning stage so as to increase the likelihood that a new development secures planning permission.

Flood Modelling

One of the key factors in the Flood Risk Assessment process, and for understanding flooding in general, is the ability to model water flows before a flood actually occurs. “Water flow is a complex natural process to model” says Rahul Tandon, senior programmer in charge of model development at Ambiental. “Only through modelling and numerical simulations can we begin to understand complex systems, such as a flooding, as they occur in nature”, comments Mr Tandon.

Ambiental have developed an ultra high detail flood risk model (Flowroute©) which can be used to estimate depth, duration and velocity of flood water through buildings. Flowroute© is the product of three years research and development in collaboration with Cambridge University and is “the most comprehensive and detailed flood model ever” says Dr Butler. No other commercially available model has the level of detail, flexibility and scope of Flowroute©. One of the major benefits of Flowroute© is that it can be used to identify flood risk for a particular site, for a group of sites, say, within an industrial park, or alternatively can be used to produce digital maps showing flood risk for an entire city.

Using new airborne laser scanning technologies which can be carried underneath a light aircraft, a highly detailed three-dimensional representation of the earth’s surface is built up. This representation includes, buildings, trees, natural features and topography. Using multiple passes, features as small as 25 cm can be detected and represented – including people going about their daily business. This 3D topographical model is then coupled with advanced fluid dynamic algorithms to route the flow of water around and through buildings so as determine the location and extent of flood risk.

Using Flowroute©, Ambiental have created the most detailed flood map ever for the city of Cambridge, which was badly hit by flooding in 2000/2001. There are another 135 major cities at risk of flooding in the UK, including London, which Ambiental is currently working on. Ambiental intends to develop flood mapping products and services for the international market.

“One of the main advantages of Flowroute© is that different flood scenarios can be simulated to determine levels of risk for small or large areas” comments Dr Butler. This makes the model particularly useful for the insurance, property and industrial sectors which are showing considerable interest for premium setting, portfolio selection and optimising the location of industrial facilities to reduce risk.

What are the benefits of commissioning a Flood Risk Assessment for your new or existing industrial plant?

- Reduced risk/potential losses – by identifying the extent to which your site, or parts of the site lie within a flood risk area and relocating valuable plant and machinery as appropriate.
- Reduction of insurance premiums – insurance companies are starting to favour companies which look for innovative solutions to the flood problem. A flood risk assessment could be submitted as part of the underwriting process.
- Improved chances of a new site gaining planning permission – for new industrial developments, submission of a Flood Risk Assessment report can improve your chances of securing permission significantly.