Mitigating flood risks – A matter of innovative risk assessment, prevention measures and disaster aid

Mr Amer Ahmed of **Allianz Reinsurance** says Asia is over 60 times more vulnerable to flooding than the US, and the conditions are expected to worsen over time as sea levels rise and rainfall become more torrential. He gives an update of the tools and measures that countries and insurers are using, and or can use to manage or mitigate flood risks.

No one ever accused nature of being predictable. Flooding on the Elbe River in Germany, supposedly a centennial event, has so far occurred twice in just over a decade, and while 2012 proved a relatively quiet year for natural catastrophes or "Nat CATs", the same could not be said of previous years, when devastating floods ravaged large parts of China, Pakistan and Thailand.

The Thailand floods were one of the top five most expensive Nat CAT events in modern history, with the cost to the insurance industry estimated at around US$20 billion. What measures need to be taken – both by countries in flood-prone areas, and the insurance industry as a whole – to limit the future damage from these large scale Nat CAT events?

Worsening conditions expected with time

Asia is over 60 times more vulnerable to flooding than the United States. During monsoon season, New Delhi can receive as much rain in a single day as New York does in an entire year. While Bangkok continues to sink steadily, Thailand has suffered at least seven major flood events in the last 30 years.

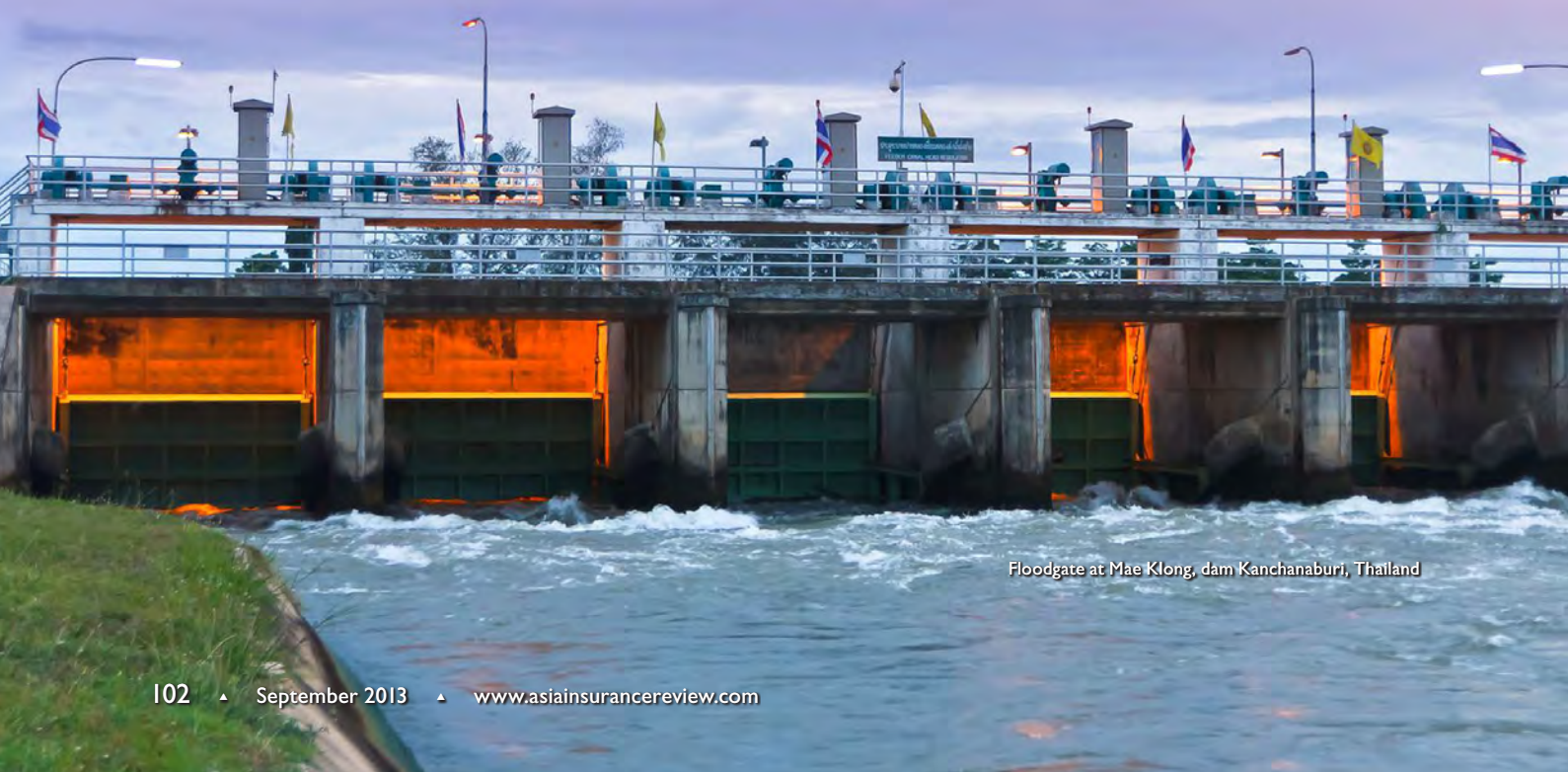
Conditions are predicted to worsen over time, as rising sea levels and increased precipitation take their toll on the world's coastal megacities (megacities are generally defined as having populations greater than 10 million), several of which are located in Asia.

Climate Risks and Adaptation in Asian Coastal Megacities, a report jointly produced by the World Bank, warns that by 2050, flood-prone areas in Bangkok could increase by 30%, and that in some scenarios the number of people affected by this change may have increased by up to 75%.

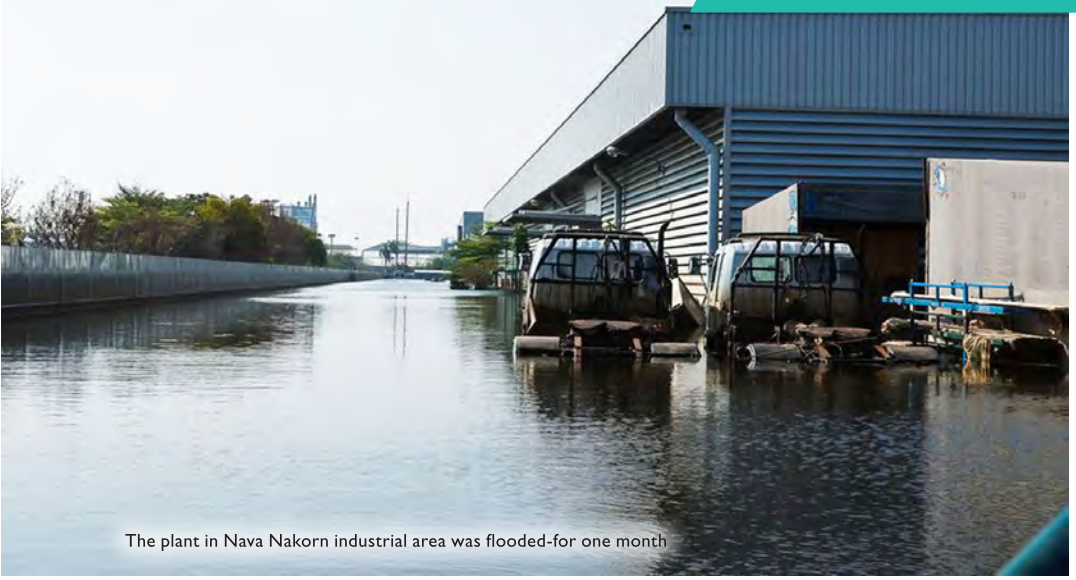
The anticipated impacts on Ho Chi Minh City and Manila are no less devastating, while Swiss Re's recent Flood Hotspot: Focus China report listed the insured large losses from a storm surge scenario in the Pearl River area, which includes Guangzhou and Shenzhen - the most affluent cities on the Chinese mainland, at $35 billion.

Paucity of data in Asia still a problem

While the flood scenario risk models and simulations used by the insurance industry continue to increase in sophistication, there can still be certain limitations. Detailed topographical data is often difficult to obtain and



Floodgate at Mae Klong, dam Kanchanaburi, Thailand



The plant in Nava Nakorn industrial area was flooded-for one month

the causes of flooding can vary: rising rivers breaching defences, so-called "flash flooding" where high precipitation levels cannot be absorbed into the land surface, and coastal flooding as the result of storm surges.

The models must also account for mitigation measures such as dams and dykes. Potential flood losses can be difficult to predict since the spread of such losses can range from minor damage to complete devastation. Information on building age, material and design can assist in predicting how well a structure might withstand floodwaters, but here Asia poses a particular problem due to the paucity of available data.

Flood protection and flood resilience measures

The same Coastal Megacities report warns that current adaptive flood measures being taken by cities such as Bangkok – including improved flood warning and evacuation strategies, dyke construction and education campaigns – have not taken climate change models into account. Taking additional measures such as greater coastal protection to halt erosion, and increasing the capacity of pumping stations could reduce future flooded areas by an estimated 51%.

In Europe, flood protection measures have been developing over more than a century and the focus has shifted in recent times, away from engineering-based solutions – dykes, dams, and self-closing flood gates designed to hold back the waters as long as possible – toward flood resilience, or measures to limit the damage caused by flooding and reduce recovery and clean-up times.

This can include measures as simple as storing valuable items on a higher floor of the house, or more localised measures such as compensating farmers for better land management practises which improve the water storage ability of the land.

Far reach of disasters

For the insurance and reinsurance industries, there are other factors to consider. Whereas damage costs in the past remained more or less isolated to the Nat CAT event area, increased globalisation means impacts are ever more far-reaching. Global supply chains can be disrupted and losses can accumulate, mounting quickly and exponentially.

Perhaps one of the most demonstrative recent examples came with the 2011 Thailand floods, which impacted several manufacturing hubs in industrial areas. A digital technology factory responsible for 60% of its company's hard disk drive (HDD) output was severely impacted.

While contingency production measures were in place, the company had not anticipated the scale of the devastation and production capacity fell from 60 million pieces in Q3 2011 to just 28 million in Q4. This created a 150% price hike in the cost of a HDD unit, which jumped from $69 to $176.

Bulk purchasers of these HDDs, such as computer manufacturers, then experienced a significant increase in their production costs due to the price hike – creating a profit shortfall covered under "additional cost of working" clauses of their insurance policies.

Better understanding of business processes needed

The total cost of this type of Contingent Business Interruption (CBI) can be difficult to predict. Better knowledge of supply chains assists to some degree, but large companies can rely on up to 2,500 other businesses as first-tier suppliers alone.

When second and third tiers are added, the network of inter-dependent businesses can reach tens of thousands. Assessing these businesses for their Nat CAT risk is impossible, so the industry needs to work more closely with its clients, to have a better understanding of their business processes and dependencies, as well as mitigating risk via special limits for CBI impacts.

Insurers need to improve risk assessment models

In the same way that countries need to enhance their flood protection and prevention models, the insurance and reinsurance industries need to work toward better risk assessment models and damage minimisation methods.

Allianz is part of a working group which coordinates with the independent reporting agency PERILS to provide rapid flood maps after significant events. This allows immediate impact assessments while floods are still developing, enabling the flood footprint to be quickly gauged and measures to be implemented more quickly.

In 2011, Allianz Re also worked with consultancy JBA to produce the first-ever flood-risk model for India, simulating the effects of floods in the country's largest cities, and has continually developed new ways to mitigate risk.

In 2007, Allianz was the first company ever to issue a "CAT Bond" including flood risk, and has regularly issued further cat bonds since, transferring the risk of Nat CAT events such as earthquakes and storms to the capital markets. Innovative strategies such as these will be needed more and more in the future in order to mitigate growing exposures in an ever more complex world.

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