NATURAL HAZARDS:

Flood Mitigation

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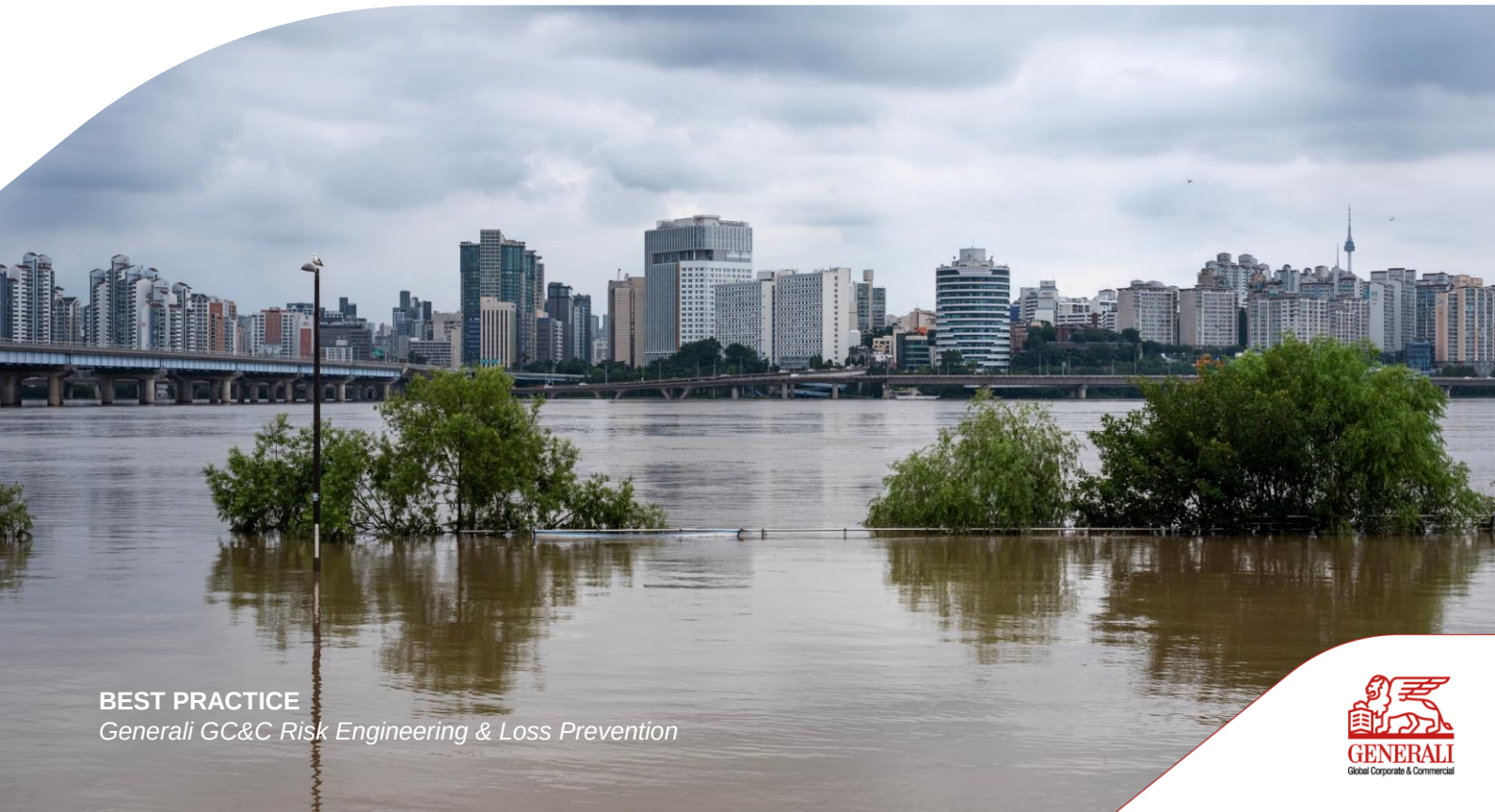
Background

Floods are the most frequently occurring natural disaster, causing widespread devastation, resulting in destruction of property, business interruption and loss of life.

The associated impacts of climate change will likely result in an increase in both the frequency and severity of flood events across the globe.

Floods can severely impact businesses, disrupting operations and damaging property.

However, businesses can take action to significantly reduce their impact, through preparation and mitigation tailored to the specific exposures, improving resilience to these events.



Understanding Types of Floods

Exposures can vary based on the type of flood event, which is why it is important to understand the differing impacts each can have:

Fluvial Flooding is flooding from a water body such as a river or lake, where the water level rises, exceeding the capacity of the water body and causing it to overflow onto neighbouring land. The severity of these floods is influenced by the topography of the location and the intensity of the increase in the volume of water.

Pluvial Flooding is flooding from a severe rainfall event, also known as flash flooding or surface water flooding. Flash flooding can be intensified when a large volume of water occurs in proximity to elevated terrain. Severe rainfall in conjunction with a large volume of water being released from an upstream location, such as a dam, can also increase risk of significant flooding. Flash floods generally result in a large volume of water moving with force, causing property destruction and moving debris. Surface water floods tend to occur when localized drainage systems become overwhelmed, causing water to ingress into property and urban areas.

Storm Surge is flooding due to a rise in sea level caused by a natural catastrophe such as windstorm events (typhoon or hurricane). The severity of damage caused by storm surge is influenced by the intensity and direction of the storm, the onshore and offshore topography and the adequacy of sea defenses.

As temperatures increase this will cause more water to evaporate from the land and oceans, and changes in the frequency and magnitude of heavy precipitation events may in turn affect the frequency and magnitude of river flooding. *(#1)*

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Cost of Damage

Between 2017-2022, losses from flooding across the globe amounted to US$300bn, of which only US$45bn was insured. *(#2)*

Each year, floods cause significant damage to commercial property across the globe. The ultimate cost of these floods includes the financial impact of interruptions to business operations. In many cases, business interruption exposures from flooding are underestimated, unknown or have not been considered as part of an organisation's business continuity plans. The reason for flood exposures being overlooked may be because the premises / company have not previously suffered a significant flood loss, or the business operates in an area that historically has not been prone to flooding.

The effects of climate change will likely increase the frequency of these events, so it's critical for businesses to properly assess their exposure to floods and to ensure that the scope of this assessment extends beyond areas historically affected by flooding. The use of data analytics and climate change scenarios analyses (GHG-greenhouse gas, trajectories) will help businesses understand the potential risks in detail. Based on this, businesses can then focus on mitigation strategies to reduce the cost of current & future flood events.

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Time to Adapt & Act

Uncertainty on flood risk is increasing with climate change. Main uncertainties arise from level of damage, frequency of events and where events will happen.

Mitigation is now more important than ever when it comes to flood risk management. The investment in mitigation will be compensated by long term resilience.

Property damage caused by flooding is at an all-time high. Flooding is also causing significant business interruption costs and supply chain disruption.

Always seek professional advice on how to protect your assets & people. GC&C Risk Engineers have the expertise & experience to help you become resilient to flood events.

Flooding in Asia

On September 7th, 2023, the Hong Kong Observatory issued a black rainstorm signal following the recent Typhoon Haikui event. The black rainstorm event was in force for over 12 hours. In 24 hours, September recorded 800mm of rainfall over the Eastern & Southern districts & 600mm at the Hong Kong Observatory. This was the heaviest rainfall event in 140 years. *(#3)*

In 2021, Malaysia suffered devasting flooding. Whilst the country does experience flooding in monsoon seasons, the country did not anticipate extreme flooding to main areas of Kuala Lumpur and Selangor. Government officials estimated losses to be around US$1.5 billion. *(#4)*

In 2020, China experienced historic amounts of rainfall during their summer monsoon season. Extreme rainfall affected major rivers across the country. Water levels across 15 rivers exceeded warning levels. 21 large scale floods were experienced during this year, the most since 1996. *(#5)*

In 2018, the Region of Kerala in India experienced 40% more rainfall in two months during their monsoon season than the average. These flooding events are estimated to have resulted in at least US$3 billion worth of economic losses. *(#6)*

In 2011, Thailand suffered extreme flooding, with suggestion that this event was the largest insured loss from freshwater worldwide. This was the highest rainfall event in the country's records. As well as the record rainfall, the countries topography aided the flooding event. *(#7)*

11 General Risk Management Suggestions

Quick & Easy Fixes

EMERGENCY RESPONSE PLAN
Ensure your emergency response plan is relevant, up to date, appropriate for your facility and exercised at least annually before any wet season.

RELOCATION OF CRITICAL EQUIPMENT, EXPENSIVE STOCK & CONTENTS
Ensure all critical equipment, expensive stock and contents are located on upper floors. It is often the case that basements, at high risk of flooding, are traditionally used to house such items.

TRAINING
Ensure that employees know what to do before, during and after any flood event. All areas of the emergency response plan should be known, implemented, and followed with roles and responsibilities clearly allocated.

ENSURE DRAINAGE IS APPROPRIATE
Make sure all drainage systems are in working order, designed correctly, and are clear of any debris that could prevent water flow.

YARD STORAGE / EXTERNAL EQUIPMENT
Make sure yard storage / external equipment is limited around your premises as certain items can cause floating debris, which could penetrate building façades (such as glass).

SLOPES / TOPOGRAPHY
Be aware of external sloping and the topography of your locations. Even with small flooding events, the topography can materially increase / decrease your flood risk. Understand any potential weak points and mitigate the risk.

11 General Risk Management Suggestions

Mid to Long-Term Solutions

INSTALL FLOOD PROTECTION
A well-designed flood protection system should be considered to protect your assets. It is important the system is designed to protect your risk and is maintained effectively.

EXTERNAL PROTECTION SYSTEMS
Occasionally inspect and check that all local protection systems are in good order. For example, a local river which has overgrown vegetation or foreign objects present could cause a backup of water. Consult with local authorities if you identify any issues.

RAISE ENTRANCES / OPENINGS
Any openings to your facility or property should be raised to an acceptable level to reduce the risk of water entering the premises. This would go for any external plant rooms, which may be detached from the main premises.

CONTAMINATION
Ensure any underground tanks, such as fuel reserves, are adequately sealed from water penetration according to the manufacturer's guidelines.

EXPECT THE UNEXPECTED
Due to climate change, flooding events are now occurring in areas which have never flooded before. Ensure mitigation is a top priority regardless of previous events. Utilize climate modelling analytics to understand the risk in better detail.

Main Technical Reference Documents

(#1)
Climate Change Indicators: River Flooding - United States Environmental Protection Agency. (2016)

(#2)
Natural Disasters, Floods – Munich Re.

(#3)
Hong Kong Floods: September 2023. JBA (2023)

(#4)
Surprise Malaysian Flood Highlights Climate Crises: World Economic Forum (2022)

(#5)
China's Unrelenting Season of Flooding: Earth Observatory (2020)

(#6)
Insurance Claims From Kerala: Reinsurance News (2018)

(#7)
The 2011 Thailand Flood: Royal Meteorological Society (2013)


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