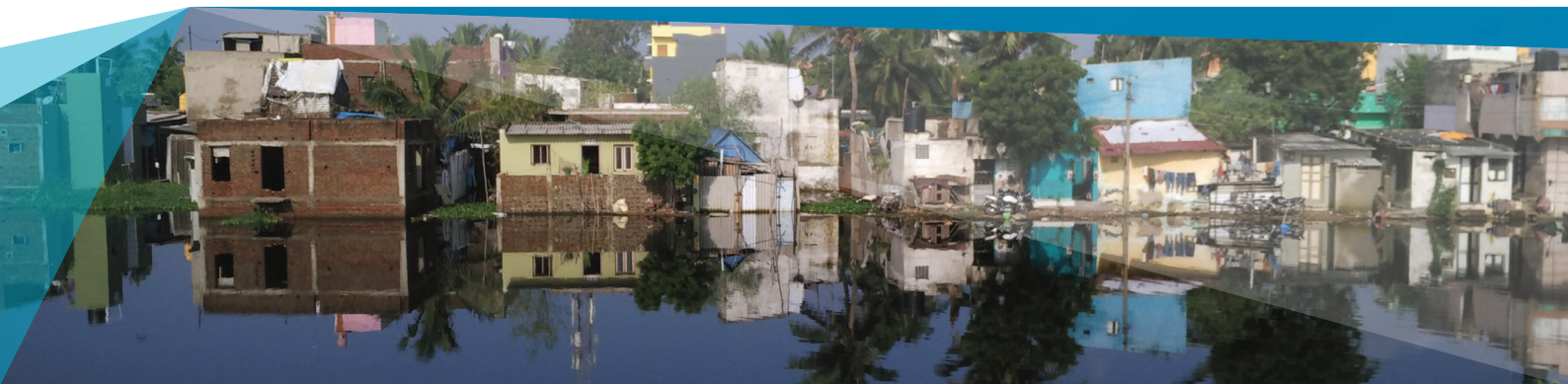


GUARDING AGAINST NATURAL CATASTROPHE



Extreme weather events and natural disasters ranked as the top two risks in terms of both likelihood and impact in the World Economic Forum's The Global Risks Report, 2018¹ (The GRR).

These risks can manifest in a range of weather-related losses, such as flood, earthquake, hurricane or other natural calamities. The impact of these natural hazards upon economic well-being and human suffering has increased, and, as indicated in The GRR, is expected to continue to increase.

TYPICAL IMPACTS OF THESE TYPES OF EVENTS

- Significant property damage.
- Business interruption – local and global.
- Financial impact on the affected business, its customers and suppliers.
- Employee hardship.
- Reputation damage and market share.

Marsh Risk Consulting (MRC) offers a broad range of catastrophe risk consulting services to help you better identify and quantify your natural hazard risks. We can help you determine the most appropriate strategies to prevent, reduce and cope with risks and any resulting business interruption, depending upon a business' industry, location, facilities and individual circumstances.

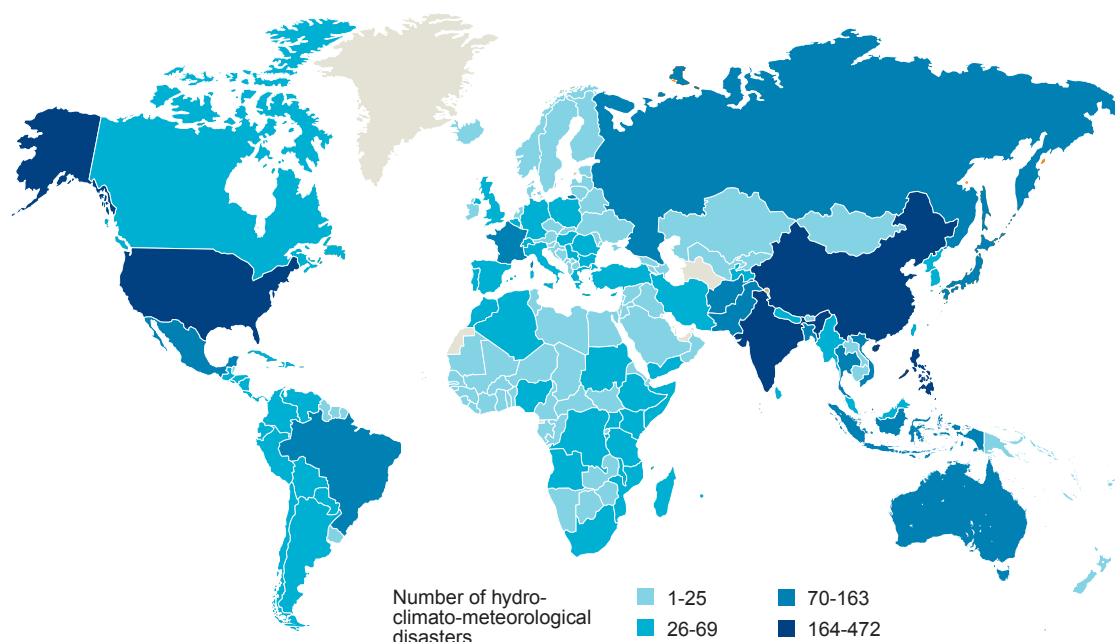
PREPARING FOR WEATHER EVENTS AND NATURAL DISASTERS

Preparing your business plays an important role in minimising the potential impacts of a natural disaster. A risk management strategy involves both:

- Risk reduction – investing in preventing or mitigating human and economic losses:
 - Reducing risk exposures (e.g. land-use planning).
 - Reducing vulnerability (e.g. retrofitting high-risk buildings, design of new buildings, improving site conditions and active and passive protections).
 - Better responses (e.g. crisis management and emergency response planning).
- Risk coping – transferring the remaining risk via insurance and other risk-financing.

¹World Economic Forum, The Global Risks Report 2018, 13th Edition, <http://wef.ch/risks2018>

Number of weather-related disasters reported per country (1995-2015)



UN office for disaster risk reduction (UNISDR) revealed that 20-year review (1995-2015) shows 90% of disasters are weather-related; United States (472), China (441), India (288), Philippines (274), and Indonesia, (163) record the most

KEY NATURAL HAZARD EXPOSURES AND IMPACTS

EARTHQUAKES



The level of destruction caused by an earthquake depends upon:

- The depth, size and direction of the fault line and the magnitude of energy it releases.
- Soil condition.
- Building construction quality.
- Impacts and Risk Reduction

Impacts and Risk Reduction

Considerable progress has been made in improving the earthquake resistance of building structures, but often little is done to secure and

protect buildings' contents, such as storage racks, electrical and water piping, flammable liquid/gas piping, and critical equipment.

Earthquake impacts to these components can result in fire or other damage and significantly interrupt a business. While eliminating damage entirely is impossible, a substantial reduction in damage can be achieved in a cost effective manner by simply restraining vulnerable items.

Impacts and Risk Coping

Numerous commercial and industrial zones and have been established in regions with major seismic exposures.

Many facilities in these areas either do not have earthquake insurance, or operate with marginal limits and very high deductibles. As a result, the potential impact due to an earthquake can cause significant damage to property and business continuity.

WINDSTORMS



Severe tropical storms (hurricanes, typhoons and cyclones) can cause widespread devastation.

During a windstorm, damage to buildings' structural frames aren't the main concern, as these are generally designed with good safety

parameters. However, a very small tear in buildings' envelopes, like an opening in a wall, can cause significant damage:

- Internal building pressure can result in roofs loosening.
- Wind and rain entering buildings can result in damage to interiors.

Keeping a building's envelope sealed is one of the most effective ways to prevent windstorm damage and is a simple matter of wind resistance. If the roof, walls and windows can withstand forces exerted by wind and wind-borne debris, the building will survive.

FLOOD



The impact of water damage to a property can be varied. Flash floods following heavy rains can strike almost without warning. Levels along rivers can rise slowly, or storm surges can wipe out large areas.

Floods cannot be prevented, but the potential risk and causes of flooding and their impact can be understood and an appropriate strategy can be put in place to address the risks and reduce the impact of a flood event and any resulting business interruption.

MRC can help by:

- Determining the potential source and types of flooding the area is exposed to.
- Determining expected flood depths.
- Determining a warning time for flooding.
- Determining the duration of flooding.
- Assessing property damage and business interruption risks and existing flood mitigation opportunities.



RESPONDING TO A NATURAL CALAMITY

How a business and its people respond after a disaster, is a critical part of managing a crisis and ensuring business continuity.

Making sure you have plans in place to keep your employees safe and enabling them to be nimble and know what to do during and after a disaster, are central to your business' and your peoples' ability to recover quickly – both personally and professionally.

MRC CASE STUDIES

Client 1

A leading fast-moving consumer goods group with global operations.

Scenario

In April 2014 a client's Chennai plant experienced wind gust reaching 75 kph. This damaged the building's roof. MRC was engaged to help the client re-engineer the roof to improve its reinforcement.

MRC Solution

Technical guidance and assistance to re-engineer the roof to improve its reinforcement.

Result

MRC's work was put to test when a severe storm hit the property in early 2017. Our work was a success – the roof withstood the storm without any major damage.

Client 1

A PET film manufacturing client with an operational base in Thailand.

Scenario

The client's property was located in a flood zone according to existing maps of the area. As a result the company's insurer was charging large premiums for property cover.

MRC Solution

MRC conducted a detailed flood study to evaluate the flood exposure risks for the property and recommended measures to mitigate the risks.

Result

By putting in place the recommended measures the client was able to obtain a cheaper premium from same insurer.

HOW MRC CAN HELP

MRC offers a broad range of catastrophe risk consulting services to help you better identify and quantify your natural hazard risks and help you make more informed decisions about your mitigation and risk transfer requirements.

MRC assists companies to:

- Identify their exposures.
- Evaluate the potential impact of those exposures.
- Implement cost-effective mitigation strategies at the local site and at the corporate level.
- Develop catastrophe specific plans.

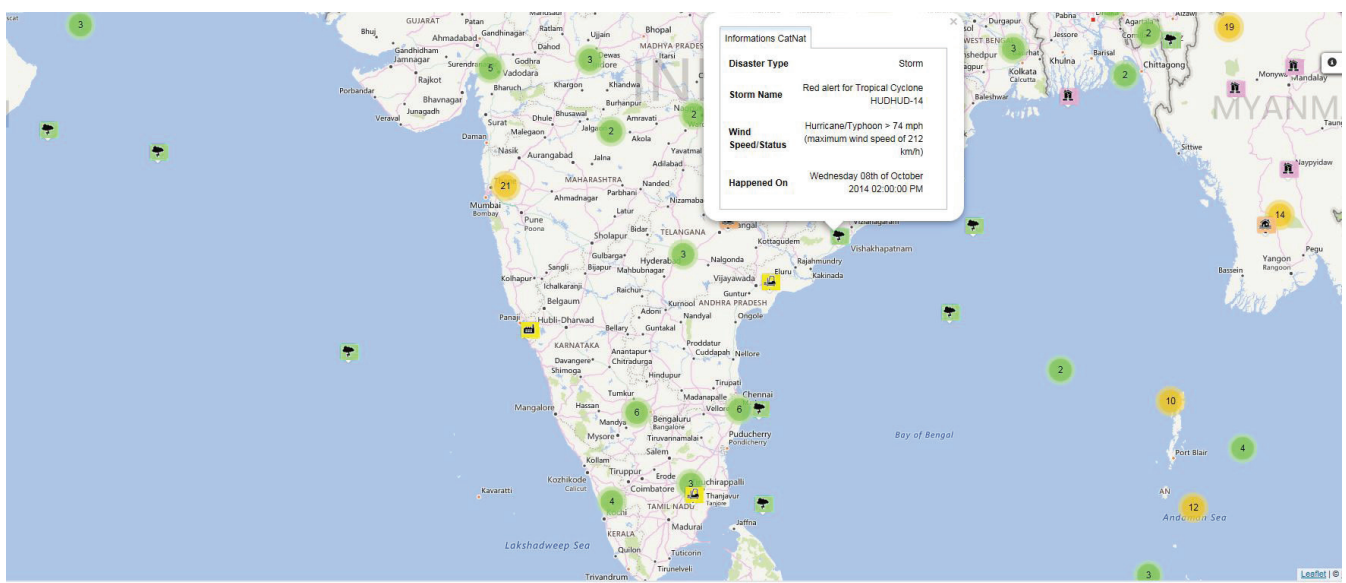
Each assessment identifies key, non-structural recommendations and any remedial action that can be taken to minimize potential property loss and subsequent impact upon ongoing operations.

MRC monitors and circulates warnings obtained from The National Hurricane Center and other sources to companies with locations exposed to hurricane, riverine flooding and heavy rains. This is done using an internally developed GeoLocation portal.

MRC's specific natural catastrophe services include:

- Natural hazard analysis for a cluster of locations.
- Hazard reviews of assets within the natural catastrophe exposed locations.
- Natural hazard exposure report for specific sites.
- Natural hazard exposure assessment visits.
- Detailed quantification of the natural catastrophe hazards for a site, including quantification of the site's probable maximum loss.
- Natural Catastrophe Modelling – provides the probable loss exposures that may arise from natural catastrophe events.

MARSH – GEOLOCATION



EARTHQUAKE EXPOSURE EVALUATIONS



- Design and review earthquake protection for fire safety system.
- Evaluate flammable liquid and gas system against earthquake hazard and provide a solution.
- Evaluate site for content shake damage including proper anchorage of electrical panels and storage racks.

WIND EXPOSURE EVALUATIONS



- Detailed evaluation of roof system and wall cladding including doors and windows.
- Review of roof drainage design.
- Review of skylight fixing on the roof.
- Review of security of roof mounted equipment.
- Site visit to review the roof installation as per design and review of workmanship.

FLOOD EXPOSURE EVALUATIONS



- Generate flood maps (using Munich Re CatNet flood model).
- Develop detailed flood study.
- Recommend appropriate, cost-effective and practical risk improvement measures to help mitigate property, operational and life safety risks.
- Review flood emergency response plan.

KEY BENEFITS OF USING MRC'S SERVICES

Understanding your risks and knowing your options in terms of risk reduction and risk transfer provide peace of mind. MRC's services:

- Promote awareness of the natural catastrophe risks to which companies are exposed on a global basis, and highlight companies' specific potential impacts.
- Assist companies in shaping their risk management strategies for dealing with natural catastrophes.
- Enable senior executives to make more informed decisions around their business continuity planning needs, particularly in natural catastrophe prone regions.
- Can reduce uncertainty – a detailed probable maximum loss assessment for a key facility can reduce uncertainty around the modelled losses by taking into account actual site specific vulnerabilities.
- Identify risk improvements you can make to help reduce losses or anticipated downtime from a natural hazard event.





THE MARSH DIFFERENCE

A global leader in insurance broking and innovative risk management solutions, Marsh offers the experience, knowledge, and insight required to identify and manage property exposures in the current risk environment. Marsh was one of the first companies to establish specialized industry practices for property risk consulting.

Marsh risk professionals are knowledgeable about the regulatory, technical, and business challenges of all major industries, and continually monitor research development, building codes, and local regulations to ensure that your organization's risk solutions reflect the current local codes and best practices. We can help establish your risk profile and recommend cost-effective strategies for mitigating property related risks.

For more information about Marsh Risk Consulting and other solutions from Marsh, visit <http://marsh.co.in/service/riskconsulting/> or contact riskconsulting.india@marsh.com or contact your local MRC representative.

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PH18-0283