Claims management following natural catastrophes

Events · Lessons · Contingency plans

Knowledge Series
Claims management

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Foreword

Dear Reader,

After the record-breaking catastrophe losses in 2011 and 2012, many insurers may still be trying to make sense of the "surprises" arising from events in Christchurch, Tohoku, the US Midwest, Thailand and then the US East Coast. Nevertheless one point has become clear: high-quality and up-to-date natural catastrophe contingency planning and claims management are absolutely essential.

It would be difficult to argue that any of the individual events were truly "unknown unknowns", yet the lessons and solutions needed to address the challenges are far from simple. One aspect that the recent catastrophes have brought to light is that both the insurance industry and its clients have good reason to review their nat cat contingency and claims management frameworks. The development of global supply chains, for example, has dramatically changed potential loss profiles, and supplier risks are among the exposures that deserve detailed consideration.

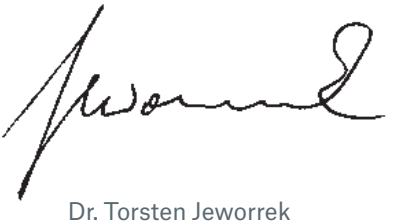
The events of 2011 and 2012 have also shown us all how highly complex natural phenomena can produce extreme losses. The significance of such events as levee failure, record storm surge, cloudburst flooding, nuclear incident, tsunami, supply-chain interruption or even "unknown" industrial hot spots is now more apparent than ever.

Twenty years ago, when category 5 Hurricane Andrew battered its way through Florida and into the record books, we learned the painful lesson that preparedness for market-moving natural catastrophes and the ability to draw conclusions from nat cat loss experiences are key. Today, we know that nat cat events are marked by ever-changing loss patterns.

With this brochure, we wish to share old and new insights with a wider audience of clients and other interested stakeholders. The articles look at the specific challenges and issues associated with major nat cat events. These include contingent business interruption exposure and transparency, accumulation of industrial hot spots, flood and storm losses and coverage, post-loss amplification, loss adjustment issues, legal and jurisdictional challenges, and – of increasing importance – the preparedness and reaction using professional nat cat contingency planning.

We provide findings from the major 2011 and 2012 events – the earthquakes in New Zealand and Japan, the flooding in Thailand, the thunderstorms and storm Sandy in the US – as well as from past events like the Chilean earthquake and Hurricane Katrina, the largest insured nat cat loss ever. To offer further insight into how catastrophes could be managed effectively with different approaches, we have also included interviews with the Insurance Council of Australia and about the role of a loss adjuster.

We would like to take this opportunity to thank all those who contributed to the brochure.



Dr. Torsten Jeworrek

Contents

Tasks and challenges following natural catastrophes

Natural catastrophes are marked by ever-changing loss patterns. A concerted and proactive approach to claims management is required to ensure that the necessary professional action is taken quickly in the event of a major catastrophe.

Natural catastrophes generally result in mass claims and large claims – meaning claims management quickly morphs into crisis management. Besides having to process thousands and thousands of claims efficiently and accurately, insurers have to cope directly with the effects of a catastrophe that make claims handling more difficult, such as ruined infrastructure and inoperative communication networks.

Superstorm Sandy as captured by NOAA's GOES-13 satellite on 28 October, approx. 9.00 a.m. local time. The system's western cloud edge is already over the mid-Atlantic and northeastern United States.

Increasing frequency and new loss dimensions

Natural catastrophes are major loss occurrences which usually cause immense economic and human losses. Munich Re is certain that their frequency and impacts will continue to grow. The insurance industry must be prepared to face an increase in losses from natural catastrophes in coming years.

According to Munich Re's definition, a natural hazard event becomes a natural catastrophe when it harms human life and well-being and/or causes substantial property losses. Munich Re also defines a further category: great natural catastrophes. In line with United Nations' criteria, these are natural catastrophes causing emergencies that the affected regions cannot handle without external assistance.

Munich Re has observed a distinctly increasing trend in the frequency of great natural catastrophes. More worrying to

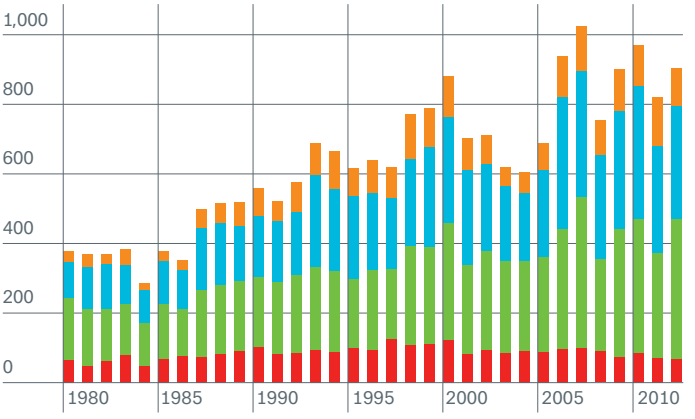


Figure 1: Number of natural catastrophes 1980–2012

- Geophysical events: Earthquake, tsunami, volcanic eruption
- Meteorological events: Tropical storm, winter storm, severe weather, hail, tornado, local storm
- Hydrological events: River flood, flash flood, storm surge, mass movement (landslide)
- Climatological events: Heatwave, cold wave, wildfire, drought

Source: Munich Re

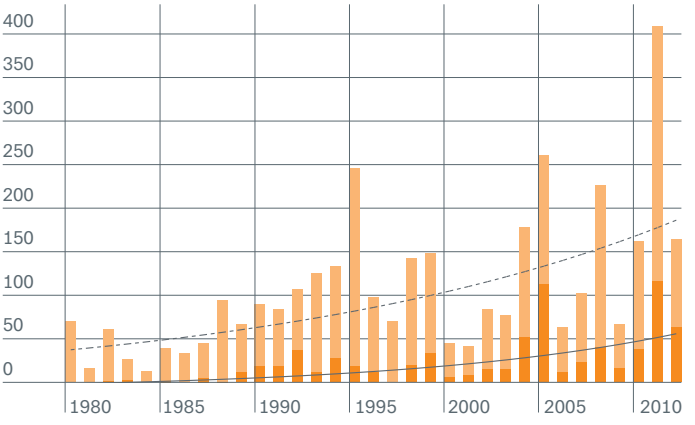


Figure 2: Overall losses and insured losses 1980–2012 (US$ bn)

- Overall losses (2012 values)
- Of which insured losses (2012 values)
- Trend: Overall losses
- Trend: Insured losses

Source: Munich Re

insurers than the growing number of events themselves are the increasing economic and insured losses resulting from such great catastrophes.

The geographical scope of these events can cover huge regions, resulting in millions of single losses. The complex consequences from great natural catastrophes make them "multi-line events", in which property, marine, motor, life and many different types of policies can be affected at one and the same time.

Even so-called "regular" natural catastrophes are having ever-greater impacts due to increased density of population and the accumulation of high-value assets in, for example, industrialised areas in more and more hazardous regions. New loss dimensions represent new challenges for claims management – the insurance industry must be prepared to cope with increasing burdens from natural catastrophes and ensure that these risks continue to be insurable.

A lone cyclist rides through the devastation in Kesennuma, northern Japan, a week after the Tohoku earthquake and tsunami.

The inundated Nava Nakorn Industrial Estate on the outskirts of Bangkok, where hundreds of high-tech facilities suffered floods of up to two metres.

Expectations during a disaster event and effective claims management

For the insurance industry, natural catastrophes mean mass claims and claims involving large sums insured. All policyholders have the right to properly processed claims, even in exceptional circumstances. The key to professional settlement lies in proactive and optimal claims management.

The special dynamics of natural catastrophes call for flexible responses and high work input from everyone involved. Due to the chaos arising after an event, insurers can expect to experience a time lag in claims reporting. In the aftermath of a natural catastrophe, urgent emergency measures take priority at disaster sites. Infrastructure may be destroyed in the affected region, preventing access for loss adjusters to inspect risks. Further, policyholders may not be able to locate their policies – which may have been destroyed – making claims notification difficult.

With these extraordinary challenges in mind, how do insurers act or respond – internally and externally – before and during an event? Above all, how do they satisfy clients' expectations as soon as possible afterwards? A nat cat contingency plan helps insurers define the various measures and organisational processes necessary to overcome these challenges in a natural catastrophe and work toward successful settlement.

Special dynamics of natural catastrophes

While international insurers and reinsurers have experienced earthquakes, floods, storms and tornados in the past, variables such as increased globalisation, changes in socioeconomics and – especially – changing claims characteristics have given rise to new challenges in recent years. The events in 2011 highlighted the risk of over-reliance on catastrophe models. Understanding model risk and the limits of those models could become even more important in future.

Many of the natural catastrophes of 2011 and 2012 underscore the necessity of improving exposure management, underwriting and risk controls. Unmodelled or underestimated losses such as those from tsunamis, soil liquefaction or contingent business interruption demand consideration. Risks in regions of the world without models or where models are not advanced must be appropriately estimated.

The flood in Thailand showed that increasing industrialisation remained low on the radar of insurance companies, with only a minority noting that exposures were increasing. The growth of outsourcing to Thailand led to a greater number of business

and contingent business interruption claims than anticipated. The Tohoku earthquake proved to be a severe hit, triggering claims based on losses from the earthquake and tsunami. Christchurch, New Zealand, suffered three earthquakes in just 15 months, revealing previously unknown fault lines and accompanied by extended liquefaction losses. The tornado series in the US again demonstrated the limits of models, as this type of windstorm is particularly difficult to simulate. Storm Sandy in the USA entered new loss dimensions, with the well-known loss pattern resulting from a storm surge hitting high-value and high-insurance-density areas like New York.

While unprecedented events can never be ruled out, insurers and reinsurers expect to adapt to new information by increasing the sophistication of current models used to assess risk exposures. An important lesson for insurance companies is that ever-changing loss patterns challenge an entire organisation and bring it to its limits. Recent events enable the insurance industry to prepare better than ever for the special dynamics of natural catastrophes. This requires professional nat cat contingency planning that takes into account the additional challenges like tsunami, liquefaction, contingent business interruption losses, settlement issues, etc.

Natural catastrophes of past years had major implications for the regional and global insurance and reinsurance marketplace due to disasters that were unexpected in size and nature. The natural catastrophes in the past three years have taught the insurance industry that a robust risk management culture, effectively handled models and use of professional nat cat contingency planning are as crucial as advanced claims handling after a catastrophe. Due to their complex repercussions, catastrophic natural hazard events are often referred to as multi-line events, in which property, marine, motor, life, health, personal accident, workers' compensation insurance and travel insurance policies can all be affected at one and the same time. Generally speaking, all catastrophe events constitute an enormous test of physical and psychological endurance, not only for claims departments, but also for insurance companies as a whole – this was the case, for example, with the earthquakes in Chile in 2010, Tohoku, Japan, in 2011, and New Zealand in 2010 and 2011, but also with the flooding in Thailand in 2011 and with Hurricane Katrina in 2005 and Storm Sandy in 2012 in the USA.

The following catastrophe portraits give a deeper insight into the events, claims management, nat cat contingency planning and lessons learnt.

Earthquake

Earthquake Chile 2010: Maule

Gerhard Loos, Munich Re do Brasil Resseguradora S.A.

The 2010 earthquake that hit Chile came 25 years after the last major event of this kind. Initial attempts to assess the extent of ensuing damage were highly contradictory and imprecise. Despite the shortage of living experience and reliable information, the country's insurers reacted swiftly and with a very high level of professionalism. Damage was mitigated and claims were settled rapidly.

A powerful earthquake rocked southern and central Chile in the early hours of 27 February 2010. The quake, which began at 3.34 a.m. local time, occurred along the subduction zone between the downgoing Nazca slab and the overriding South American plate, a contact zone that frequently triggers strong earthquakes. With a magnitude of 8.8 (Mw) on the Richter scale, the event was the sixth-strongest earthquake ever recorded worldwide. It took place in the northward continuation of the strongest instrumentally recorded earthquake ever, which happened in 1960 and caused widespread destruction including a Pacific-wide tsunami. To the north, the rupture area continued up to the Valparaíso region, where a magnitude 8.0 earthquake had released energy in 1985.

According to the US Geological Survey (USGS), the hypocentre of the 2010 quake was at 35.846S and 72.719W, 105 km northeast of Concepción, close to the coast, at a depth of 35 kilometres. This portion of the subduction zone had last ruptured in a major earthquake in 1835. The rupture process lasted about 120 seconds. Many strong aftershocks were registered, in some cases with magnitudes exceeding 7. As to be expected, aftershock activity gradually declined over the months and years that followed.

Most of the slip along the fault zone occurred in depths of 10 to 30 km, with an average offset of four to five metres and maximum offsets of 15 to 20 metres. Perhaps because of decaying displacement towards the ocean bottom and an uplift of most of the coastline, the tsunami was smaller than expected or predicted, and definitely far smaller than the one triggered by the 1960 earthquake. Nevertheless, waves crossed the entire Pacific, causing inundations in Japan more than 20 hours after the earthquake with a wave approximately one metre in height.

The 2010 earthquake in Chile destroyed the Alto Río Building in Concepción. It was the only modern multi-storey building to completely collapse in the quake.

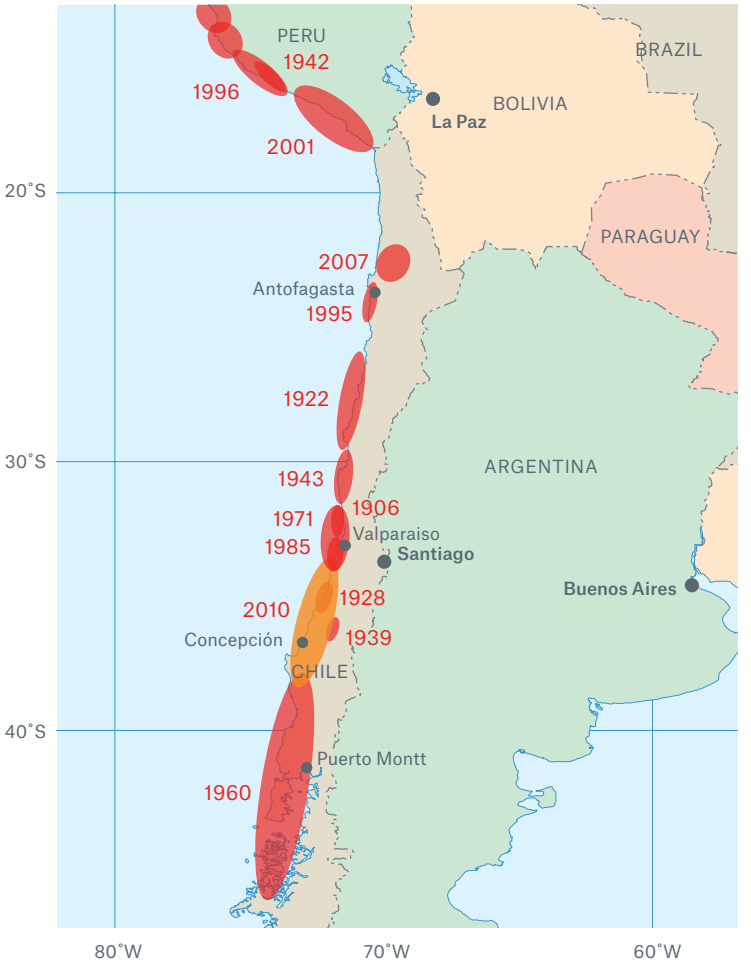


Figure 1: Major earthquakes in Chile and southern Peru since 1900

Historical ruptures of earthquakes since 1900 (modified according to Matthew Pritchard)

Rupture of 27 February 2010

Source: Munich Re

Locally, waves of up to 11 metres hit various towns and villages in Chile, causing significant damage along the coast, especially in the towns of Talcahuano and Dichato.

The number of fatalities exceeded 520. Damage covered a huge area of about 600 x 200 km. Overall, about 370,000 buildings were destroyed or heavily damaged, many of them in the capital Santiago. Total economic losses amounted to US$ 30bn, with total insured losses coming to US$ 8bn.

Claims management

According to the Chilean Insurance Association (AACH), the number of claim notifications reached more than 234,500, over 190,000 of which were related to residential buildings.

Claims notifications began coming in immediately after the event and added up to some 135,000 notified claims (residential plus commercial/industrial) by the end of March 2010.

The last strong earthquake that hit central Chile (Santiago area) in 1985, had caused 5,200 insured claims with a cost to the insurance industry of US$ 85m and estimated total economic losses of US$ 1,046m.

Considering the smaller dimensions of that event and the time elapsed since, the huge avalanche of claims arising from the 2010 earthquake made it extremely difficult for the market to respond appropriately in due time.

Nevertheless, companies, brokers and, in particular, loss adjusters immediately started to implement their contingency plans or define the first emergency steps, mainly to reinforce their staff, hiring additional workforces within a few weeks. International insurance companies based in Chile called on contingency plans and professional assistance from their headquarters or offices in other countries to build up their local nat cat teams. Local companies quickly reorganised to be better prepared for dealing with the sudden extraordinary workload. Some of them based their efforts on the elementary components of a contingency plan which had been discussed in a Munich Re earthquake simulation workshop held for the market some months earlier.

Loss adjusters called for professional support from their associated offices in other countries for the adjustment of commercial and industrial claims. Larger adjuster firms engaged hundreds of local professionals (mostly young architects and engineers) and gave them basic training for the inspection and adjustment of residential claims.

The coastal town of Dichato near Tomé, Chile, in the aftermath of the tsunami.

Although the strict deadlines set by the Chilean regulatory entity Superintendencia de Valores y Seguros (SVS) for notification and adjustment of claims could not be met, they proved to have the positive effect of accelerating the whole process. The claims notification deadline was extended to 30 April 2010. The deadline for the adjustment of claims normally given to loss adjusters (90 days after notification) was postponed shortly before it was to become due, as a result of discussions between loss adjusters and the SVS. The new deadlines for residential claims were individually fixed, depending on the settlement programme each loss adjuster had to present. Six months after the event, at the end of August, as many as 82% of residential claims had been adjusted, with indemnities for 68% of that figure paid.

Chilean regulations permit only locally registered adjusters to work in the country, which was initially a big concern to many international reinsurers, especially to those with no presence in Chile and with insufficient knowledge of the local situation. However, this concern was clearly shown to be unfounded during adjustment processes. Local adjusters showed a generally high level of professionalism, and international adjusters, brought in to boost capacity, always worked in teams with local colleagues. This helped in avoiding potential problems such as ignorance or misinterpretation of applicable local regulations or legislation, or the application of foreign codes not valid in the country. This kind of error sometimes occurs when adjusters work alone in an unfamiliar country.

Within a week of the earthquake, Munich Re had established a task force in Santiago to assist and collaborate with insurers and brokers. This team helped find quick solutions for affected insureds, including agreements on specific fast tracks for adjustment of massive residential claims and frameworks for immediate first remittances to insurers, enabling them to effect advance payments without delays.

Adjustment process

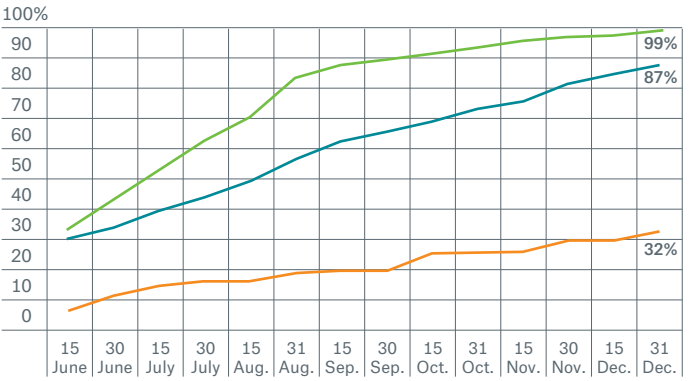
According to the SVS, 23.8% of the 4.056 million existing residences in the affected area (between the V Region, Valparaiso and the XIV Region, Valdivia) had earthquake insurance in 2010, with some 190,000 (19.6% of those insured) affected by the earthquake and requiring inspection and adjustment. Thanks to swift emergency measures taken by adjusters and insurers, 99% of all residential claims were adjusted by the end of 2010, only ten months after the event. Total indemnities for these claims amounted to roughly US$ 1,300m. Some 31% of notified claims were closed without indemnity, in most cases because losses were below the

insured's deductible and/or insureds did not further pursue claims. The standard deductible was 1% of the sum insured for personal lines and 2% for commercial and industrial policies.

Figure 2: Evolution of paid claims in 2010

— Commercial/Industrial < US$ 60m
— Commercial/Industrial > US$ 60m
— Residential

Source: Superintendencia de Valores y Seguros (SVS)



Of the 32,117 notified commercial and industrial claims, 82.4% had been adjusted and 53.4% indemnified in total, amounting to US$ 2,778m, by the end of 2010. Adjustment of major and more complex claims continued in 2011, with 96.7% closed by the end of 2011. This increased total indemnities to some US$ 4,417m. Only a few major and complex claims remained open.

Lessons learned

One of the first aspects to emerge in the earthquake's aftermath was the limited reliability of modelling. Several institutions worldwide estimated the insured and economic losses caused by the event. These first estimates were so dissimilar – most of them higher than actual losses – that no clear conclusion could be drawn from them. Some risk characteristics were misjudged or not fully considered. These included contents of buildings, type and age of construction (quality of construction was underestimated), subsoil conditions, business interruption, deductibles, limits in policies and the effects of a tsunami. Individual high-value risks are difficult to model, too, and these contributed significantly to the overall insured losses, one example being a wood pulp mill with a black liquor recovery boiler damaged by the earthquake.

The main building itself at Santiago International Airport withstood the quake safely, although non-structural elements were badly damaged.

Design code

Chile has a good design and construction code in place, which was created after the strong 1928 earthquake in Talca and amended several times after quakes hit the country. It was last updated in the mid-nineties on the basis of experiences from the 1985 event. Thanks to this code, damage from the 2010 earthquake was kept within acceptable limits and fatalities did not reach numbers that could have been expected from a magnitude 8.8 event.

It turned out, however, that the code did not adequately consider some aspects such as non-structural elements and subsoil conditions. These issues have been addressed by the responsible authorities in Chile, and the code is being amended.

Design code compliance

Most of the – fortunately few – structurally damaged multi-storey buildings that had to be demolished (only one totally collapsed) revealed a failure to correctly observe and implement the strict design code during construction.

This highlighted the need for monitoring compliance with the design code during construction. Strict corresponding requirements should also be set for integrally imported objects, like steel wine tanks.

The earthquake caused many wine storage tanks to topple when their legs snapped.

Damage to the ring motorway in Santiago was limited to a section with unfavourable sub-soil conditions.

Identification of massive claims

Mortgage insurance was the source of 90% of residential claims. An initial proactive but uncoordinated approach among all parties involved (brokers, banks, homeowners) led to double and even some triple filing of one and the same loss. This situation sometimes even resulted in two different loss adjusters inspecting the same loss. Similar effects were seen in cases of insureds lodging claims via the internet and then, to be on the safe side, also phoning a call centre regarding their losses.

Market-wide standardisation of the identification system for massive risks would be advisable. This could simplify administration of the claims and avoid superfluous work at times when manpower is scarce.

Mortgage policies

There was no standard wording for mortgage policies and each company had its own policy with different coverage. This situation created some confusion in adjustment, disappointments among mortgagees and a challenge for claims settlement.

The SVS has reacted quickly and developed a new standardised policy, whose utilisation is now compulsory.

Ambiguities in the wording of industrial or engineering policies

Some non-standardised operational and engineering policies for major risks have been custom-written to fit the requirements of the insureds. This way of structuring policies is certainly well-intended, but harbours the risk of inconsistency, as clauses and wordings are compiled from different origins. Several wordings that allowed room for different interpretations or even contradicted other clauses of the policy were identified during the adjusting process.

Some of the ambiguities came from poor definitions of the time deductible for business interruption (BI) covers, of the basis for the BI sum insured and the basis for the underinsurance calculation. The implication of these ambiguities came to over US$ 10m for some individual claims.

To mitigate such – unfortunately recurrent – problems, it is advisable to utilise standardised policies as far as possible or to invest sufficient time in checking and verifying that the additional clauses are self-explanatory and consistent with the main wording of the policy.

Lateral spreading and subsidence made many roads impassable, like this bridge outside Talca, 255 km south of Santiago.

Contingency plans

In general, all insurance companies, loss adjusters and brokers responded very quickly and expediently to the earthquake. Almost all had a contingency plan of some kind, yet each of these plans focused on the company's own activities only, and there was a lack of general coordination in the market as a whole.

A global or master emergency plan, possibly implemented via the insurance association, which sets and regulates the processes and formalities requiring coordination of involved parties, would be extremely helpful in ensuring more effective overall claims management following a nat cat event.

Conclusions

Although experience from the last severe earthquake 25 years earlier had all but disappeared, the Chilean insurance market showed a high degree of professionalism in facing the consequences of the 2010 catastrophe. Despite initial problems due to insufficient immediate availability of professionals and to the difficulties arising from badly damaged infrastructure, adjusters and insurance companies quickly adapted to the gravity of the situation. Strong teams were assembled and staff dispatched to the hardest-hit areas within the first weeks, and insurers proved equal to the massive and difficult tasks.

This event represented a valuable learning experience and showed that there is still room for important improvements in future. The SVS and the AACH have been playing a very active and important role in these improvements, adapting or expanding regulations and specifications for the insurance industry, with the final goal of even better protection for insureds.

The market´s challenge now is to continue implementing the amendments and to develop joint and coordinated response solutions, in order to be better prepared for the next earthquake.

Earthquakes New Zealand 2010/2011: Darfield and Christchurch

John McWilliams and Diane Dunbar,
Munich Reinsurance Company of Australasia Limited

Between September 2010 and June 2011, the city of Christchurch, New Zealand, was hit by a series of earthquakes termed the Canterbury sequence. Arising from a previously unknown fault system, the quakes ranged in magnitude from 5.0 to 7.1 on the Richter scale. Together, they represent the costliest natural catastrophe in New Zealand's modern history.

At 4.35 a.m. local time on 4 September 2010, Christchurch, the largest city on the south island of New Zealand with a population of around 370,000, was shaken by a powerful earthquake. It measured 7.1 (Mw) on the Richter scale and caused widespread damage as well as two serious injuries. The quake was followed by several thousand aftershocks.

Over five months after the initial event, termed the Darfield earthquake, a magnitude 6.1 (Mw) shock struck the city and suburbs of Christchurch at 12.51 p.m. local time on 22 February 2011. This event, the Lyttelton earthquake, caused 185 fatalities and significant property damage. Measured ground motions in the city centre were considerably higher than in the September 2010 earthquake. Consequently, damage was more concentrated and higher than in the initial event, with severe liquefaction additionally contributing to the losses.

The region saw a further earthquake centred near the suburb of Sumner at 2.20 p.m. on 13 June 2011. With a magnitude of 5.5 (Mw) and followed by a magnitude 6.0 aftershock, the event caused one fatality and yet more damage in Christchurch and Lyttelton. Four further earthquakes with magnitudes between 5.0 and 6.0 shook the east coast near New Brighton on 23 December 2011. As with the other quakes, local ground liquefaction and coastal rockslides occurred.

Further damage resulted from the fact that many structures shaken in the 2010 event had not been repaired and were therefore especially vulnerable when a subsequent earthquake hit. The ground motions in large parts of Christchurch were higher than 0.5 g (up to 1.89 g), with the result that even some larger reinforced concrete structures that suffered only minor damage in September 2010 collapsed. In the city centre, many masonry buildings that were heavily affected in

A closer view of Christchurch's cathedral showing the damage to its steeple, stained-glass windows and form work.

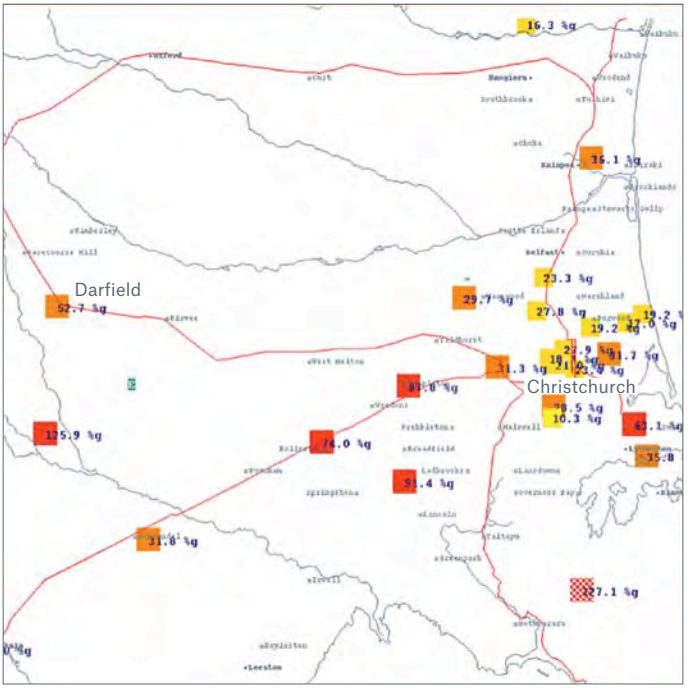


Figure 1: Measured ground motions from the September 2010 earthquake

Peak ground acceleration (%g)

- III >0.0
- III >0.51
- IV >1.1
- V >2.5
- VI >5.6
- VII >12.6
- VIII >28.0
- IX >62.0
- X+ >138.0

Source: GeoNet/GNS Science

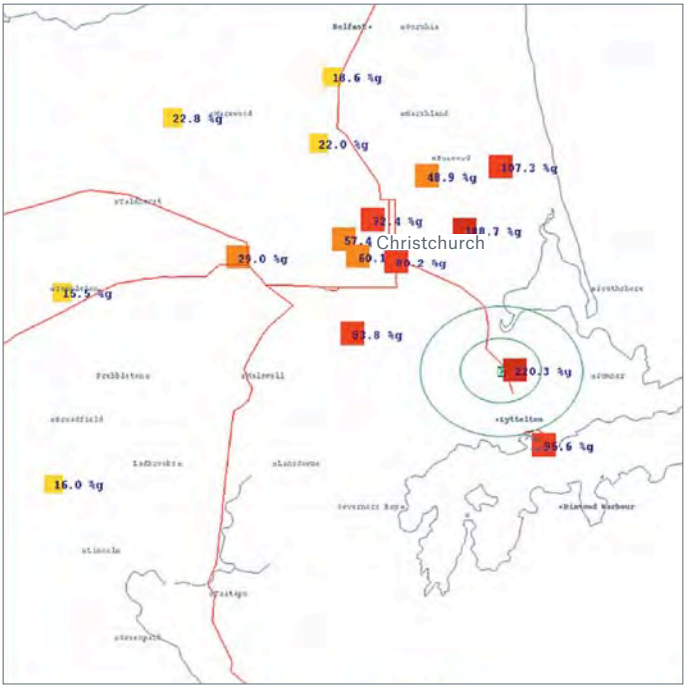


Figure 2: Measured ground motions in the Christchurch region during the 22 February 2011 earthquake. The central business district was affected by ground motions exceeding 60% g (gravity acceleration). The most severe ground motion measured outside of the epi-centre was to the east of Christchurch measuring 189% g.

Source: GeoNet/GNS Science

2010 were fully destroyed after the February earthquake. Large structures and multi-storey buildings like Christchurch Cathedral, the 26-floor Grand Chancellor Building and the Canterbury Television Building (CTV) collapsed or were heavily damaged.

Nat cat claims management and lessons learned

All natural peril catastrophes have complexities. The Canterbury earthquake sequence has shown that even in a well-established market and despite preparation, the scale of an event can surprise all concerned and change the way we approach events of this size in the future.

Thousands of aftershocks have occurred since September 2010, but five main earthquake events were recorded (4 September 2010, 26 December 2010, 22 February 2011, 13 June 2011, 23 December 2011) subject to various reinsurance hours clauses, in general ranging from 72 hours up to 168 hours. Earthquakes outside of these periods generated small losses, which were retained by insurers.

The sequence of earthquakes generated more than 600,000 domestic and commercial claims across the industry including losses from the Earthquake Commission (EQC). Approximately 100,000 homes were damaged, with 15,000 requiring complete reconstruction. These figures reflect the country's high insurance penetration.

Despite the best efforts of private insurers and the Earthquake Commission (EQC), unforeseen delays have occurred both in initial loss assessment and in the commencement of repairs. These are due to limited claims and loss assessment resources (including engineers and geo-technicians), the volume of claims and the number of events occurring close together. This has led to further difficulties with the apportionment of claims across the events in domestic and commercial lines.

Table 1: These statistics on the three main earthquakes indicate the devastation caused by the Canterbury sequence.

Source: Munich Reinsurance Company of Australasia Limited

Period	Event	Overall losses NZ$ m original values	Insured losses NZ$ m original values	Fatalities
4 September 2010	Darfield, NZ	10,000	8,000	
22 February 2011	Lyttelton, NZ	27,000	19,500	185
13 June 2011	Sumner, NZ	3,000	2,500	1
Total		**40,000**	**30,000**	**186**

Roads in Christchurch, New Zealand's second city, suffered liquefaction damage.

The Earthquake Commission (EQC) covers the first NZ$ 115,000 (including Goods and Services Tax) for building and NZ$ 23,000 (including GST) for contents, and land damage separately covered for repair based on a notional projected house coverage area as defined by the Earthquake Commission Act. Private insurers offer a top-up cover over and above the EQC cover (excluding land). The existence of two covers and their differences have led to duplication of loss assessments and a strain on loss adjustment resources. In addition, the differences between EQC and private insurance with regard to buildings covers gave rise to different repair methods and costs as well as complications in the claims evaluation processes between EQC and insurers. The delay in the rebuilding process, due to the ongoing seismic activity in the region, is likely to contribute to post-loss inflation.

The majority of domestic insurance policies were on a replacement basis, calculated according to the declared size of the home/unit. There is no sum insured cap, so policies respond to repair or replacement in compliance with relevant laws. There appears to have been a mismatch between estimated replacement square-metre values for the purposes of underwriting and the ultimate costs of the claim with all factors taken into account.

Private insurers sought a declaratory judgement from the High Court of New Zealand with regard to the reinstatement of EQC's domestic cover after an event, a move which caused delays in the assessment and acceptance of claims by both insurers and the EQC. The judgement was ultimately in favour of the insurers' position and required that the EQC cover be reinstated after each event, which gave private insurers clarity on policy response as well as for the purposes of reserving.

With the February event, a state of emergency was declared, notably, around the central business district. It was closed for over a year, restricting efforts to assess commercial losses and commence repairs. In addition, difficulties arose with the interpretation and settlement of business interruption losses.

Post-earthquake changes to the building codes and standards regarding increased seismic-strengthening factors for buildings in the Canterbury region are also affecting repair and rebuilding costs. In response, insurers were successful in seeking a High Court judicial review of Christchurch City Council's ability to impose higher standards in its Earthquake Prone Building Policy (EPBP) to commercial building consent applications.

The Redcliffs district was hit by a severe landslide, which destroyed many homes.

The widespread ground deformation/liquefaction resulted in an unusually high proportion of domestic total losses. Areas of domestic land affected by liquefaction have now been classified by the government into three categories (TC1/TC2/TC3) on the likelihood of future land damage from earthquakes. (TC1 - Unlikely future damage), (TC2 - Minor to Moderate future damage) and (TC3 - Moderate to Significant future damage). With categories TC2, and in particular TC3, repairs or rebuilds will need to incorporate modified building foundations at additional cost. In some areas, this is further

A bird's-eye view of the central business district of Christchurch, New Zealand, showing Cathedral Square (top centre) and the Avon River flowing through the city.

complicated by the involvement of EQC's land cover and how it will respond with respect to land remediation as covered under the EQC Act.

Also observed is a change in the approach of insureds, with an increased tendency to seek declaration of a total loss rather than repairing property whenever possible. The high exposure of heritage-type buildings in the Canterbury region and the complication arising from differences between their repair or rebuilding costs and the sum insured/replacement valuation have been a further source of difficulties.

In light of the many complicating factors arising from the earthquakes, it is not surprising that insurers have increased referrals to reinsurers on policy-response matters and management of claims processes to ensure that reinsurers are clearly informed and are part of the decision-making process, considering the reinsurers' financial burden. With open dialogue and consultation, this has allowed informative decisions to be made swiftly, to progress settlements and will hopefully reduce the risk of litigation.

Political responses included the creation of a government body, Canterbury Earthquake Recovery Authority (CERA) with significant powers in relation to decisions on the recovery of Canterbury. For the insurance industry, the following factors are among the most consequential:

— Ability to declare vast areas of land as uninhabitable due to infrastructure issues and the further susceptibility of the land to further damage (e.g. liquefaction, rockslides, flood or life risk), including buildings that were not a physical total loss. Properties in these areas (Red Zone) are bought by CERA and the policyholders' insurance rights are transferred to CERA or the land is sold to CERA and the owner agrees with the insurer on the replacement or repair cost of the building.

— CERA's ability, for safety reasons, to order the demolition of buildings in and around the CBD, leading to limited access to assess insurance damage or challenge the demolition order.

— CERA's Blue Print - Redevelopment Town Plan for Christchurch CBD in which certain indicated properties will be acquired by the Crown by negotiated purchase or, if not purchased, compulsory acquisition will take place. This raises further implications for coverage issues under commercial policies, ongoing repairs or possibility of seeking building consent applications in the areas affected.

Conclusions

The events have clearly demonstrated that the best way to deal with a natural catastrophe of this nature and size from both insurance and reinsurance perspectives is to have a dedicated claims management team in place to coordinate the response as well as teams to specifically manage these claims. This allows a highly focused approach and use of specialist advisors and techniques not utilised in day-to-day business processes and service.

In view of the scale of domestic repairs and rebuilds, insurers should consider arrangements with a building project management company that can respond quickly and manage major repairs or rebuilds while also containing costs as best as possible.

The length of ongoing seismic activity has caused delays in the rebuilding phase of this catastrophe, and due consideration of inflationary aspects (e.g. labour, materials, worker accommodation, etc) must be allowed for in reserving and monitored once the rebuild phase ramps up.

The creation of government authorities following an event creates challenges for insurers, which can be affected by the mandate and authority of such an agency. In any event, insurers must be vigilant that existing policy terms and conditions are complied with. It is also important that industry bodies

representing insurance companies are able to make representations to the government bodies to ensure that insurers' and reinsurers' interests and concerns are addressed, including the implications of government decisions on existing contractual obligations that cannot be altered.

The number of events and the claims-cost apportionment to each event remains one of the ongoing challenges arising from the Canterbury earthquake sequence. Even if good records for the documentation of each claim event existed, the issue remains complex. While most properties had an initial assessment of the loss, a more detailed full damage assessment may not have been carried out before the next event occurred. Thus it can be difficult to apportion the specific damage and the cost of those repairs to the relevant event. We nonetheless have to rely on the lodgement of claims, loss

The Porritt Park hockey fields were damaged by both liquefaction and ground surface undulations. Remaining evidence includes pooling water and sand in the open field to the right of the hockey fields.

adjusters' reports, engineering analyses, quantity surveyors' reports and other information from experts to determine as best as possible the appropriate allocation of damage and cost to an event. It is important to maintain open dialogue with insurers regarding this process and the ability to openly review claims files to gain a better understanding of the allocation issues.

Involving all levels of management (senior, client and underwriting) ensures a better understanding of the issues that we collectively face (e.g. hazard risk management and evaluation of policies). An example of this is the underwriting lessons learnt from various issues raised or identified with the claims department. These have led to discussions with clients and changes to supplied exposure information, terms and conditions (both original policy and reinsurance) and/or to the consideration of limiting some exposures for certain risks.

The above sample of complexities of this series of events shows that open communications and dialogue between insurer and reinsurers and industry bodies are essential in the management of a complex loss of this nature. The Canterbury earthquake sequence involves many factors causing further delays and complications, which will take some time to resolve, especially if litigation is to be avoided wherever possible. Yet objective discussion aimed at finding solutions within the terms of cover remains the best path to speedier resolution of the loss and recovery for all parties.

Earthquake Japan 2011: Tohoku

Andreas Langer, Munich Re

Friday, 11 March 2011, 2.46 p.m. local time: people across northeastern Japan were looking forward to the weekend ahead when a massive earthquake hit. At a magnitude of 9.0 (Mw) on the Richter scale, the quake triggered a threefold disaster with long-lasting consequences.

Geoscientists classify the Tohoku earthquake as the world's fourth-strongest quake of the past 100 years and the most severe event of its kind ever recorded in Japan. The epicentre was 130 km offshore of Japan's main island, Honshu, 370 km northeast of Tokyo Bay. The most heavily affected prefectures were along the eastern coast: Ibaraki, Fukushima, Miyagi and Iwate. Scientists state that Honshu Island shifted 2.4 metres eastwards. Three types of destruction ensued:

- Earthquake (EQ) damage
- Destruction by the resulting tsunami
- Radioactive contamination due to the Fukushima nuclear power plant incident

Thanks to Japan's stringent building codes and the immediate activation of national rescue forces, loss of life and damage to property as a direct consequence of the earthquake were not as high as they might have been expected in a less well-prepared region. The vast majority of fatalities and devastation were caused by the ensuing tsunami, with around 94% of the death toll attributed to the massive flooding. Several hundred kilometres of coastline were destroyed and whole villages washed away. In some bays the run-up was higher than 40 metres.

An aspect in which preparedness and crisis management have been criticised is the Fukushima incident. The most severe nuclear accident since Chernobyl, the multiple meltdowns have triggered worldwide discussions of safety regulations and reliability of nuclear power plants and led other countries to accelerate the phase-out and reduction of nuclear power in their national energy mix.

Cars near Sendai Airport, Japan, were swept up by the tsunami that followed the Tohoku earthquake on 11 March 2011.

The economic loss reported via various sources depends heavily on the scope of damage considered. Follow-up effects like damage due to nuclear contamination are difficult to quantify and contain a high degree of uncertainty. Hence, the economic loss without the effects of nuclear exposure is put in the region of US$ 210bn. The insured loss is estimated to be US$ 35–40bn. This huge discrepancy between economic and insured loss is largely due to low insurance penetration in the private sector: only 23% of the private homeowners had EQ cover in place regarding the governmental scheme (JER).

Challenges for the insurance sector

The main challenge for the insurance community was the sheer numbers of cases to be handled simultaneously: claims in both commercial and personal lines numbered in the hundreds of thousands. Claims related to household and residential covers, which are purchased through commercial or cooperative insurers (Kyosai), made up the substantial share of the insured losses.

Damages due to earthquake shock, tsunami or liquefaction had to be assessed, with soil liquefaction losses reported even at locations far away from the epicentre, including reclaimed land areas in Tokyo Bay. Insurance companies realised immediately after the event that more loss assessors were needed.

Firemen survey the destruction in Kessennuma following the tsunami.

In addition to retaining external (domestic and international) loss adjusters and forensic experts, ad-hoc training measures for internal staff were organised at short notice. Employees from other departments like marketing or underwriting were trained in claims assessment and adjustment of residential homes. The training programmes covered topics like the correct application of the insurance structure and wording, how to conduct a site survey and how to properly assess damage to structures, buildings and their contents. With the help of demonstration videos, claims pictures or – where possible – examples of damaged model buildings in training centres, a basis for a standardised loss assessment process was laid.

Trained staff members were then dispatched to the affected areas for a limited period (2–3 weeks) to support the claims departments in assessing losses at damaged sites. This was not always easy, as blocked roads and damaged railway systems hindered accessibility, especially in the early days after the disaster. Other colleagues from home or branch offices took over after the assessors on site had finished their assignments. This rotation system ensured an uninterrupted workflow and rapid claims settlements.

Standardised EQ loss adjustment sheet for residential property

On-site claims assessment generally involved calculating the loss ratio for an entire building with the help of an EQ loss adjustment standard. Various building parts (foundation, outer and inner walls, roof, vertical beams, floor, ceiling, etc.) were assessed individually. The cost of the damage was then estimated in relation to each element's respective value by means of a calculation tariff. The weighted average of the component loss ratios then provided the loss ratio for the whole building.

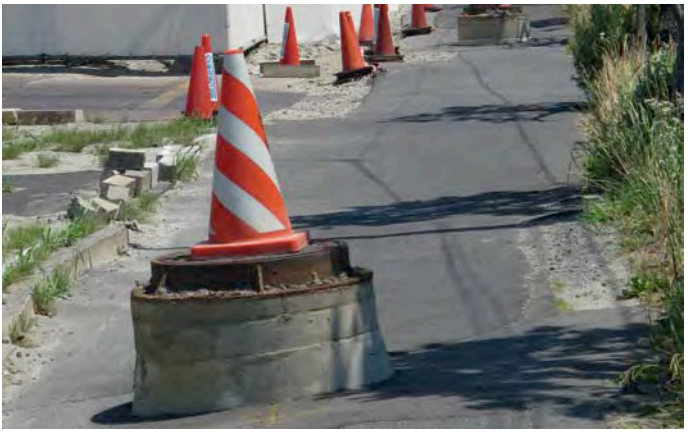
Under the Earthquake Insurance Law, indemnification is limited and payouts are based on the classification of "partial", "half" or "full" damage. Accordingly, payouts are staggered with 5% for partial damage, 50% for half damage and 100% payout for total damage. However, as the EQ sum insured is usually only 30–50% of the fire sum insured, the maximum payout in the case of a total loss is limited.

A novelty for the tsunami area along the northeastern coastline was that satellite images and aerial photographs were taken as proof of total loss. This accelerated and facilitated claims handling significantly.

The insured residential risk is ceded to the Japanese Earthquake Reinsurance pool (J.E.R.). In the event of an earthquake, liabilities are allocated between J.E.R, participating non-life companies and the Japanese government, with government participation increasing according to the magnitude of the event. As early as the beginning of August 2011 (not even five months after the event), the J.E.R. had settled more than 96% of the 760,000 registered claims up to that point.

Claims processing and application of supportive IT systems

Handling mass claims in a proper and time-efficient manner is always an extremely difficult task. An integrated IT claims system that manages and records the entire process is highly beneficial in mastering the challenge. Ideally, such a system should be used by the head office as well as prefectural and branch offices. By logging a new claim once the insured notifies the insurer for the first time and updating it as soon as more information comes in, a company can ensure that there is no gap in the flow of information between the various levels of claims management. The EQ loss adjustment sheet as well as photos taken during the adjuster's onsite assessment can be included in the file. Multiple entries in different systems become superfluous, saving time and precious manpower resources.



Protruding manholes are a typical sign of subsidence damage in reclaimed land areas (here: Tokyo Bay).

Ideally, such an integrated process guarantees a uniform reserve-setting process and allows consistency and monitoring of the exposure on an aggregated basis.

The commercial and industrial sector

The penetration rate for EQ insurance among Japanese corporations is very low, with estimates for commercial and industrial clients at under 15%. In addition, coverage is usually bought on reduced-indemnity or first-loss basis only. Business interruption (BI) cover for commercial clients is also very restricted or even absent, and BI claims comprise a relatively small share of overall losses. Hence, many industrial clients were not indemnified by insurance at all. Or, in cases where an EQ cover was in place, the from-ground-up losses suffered exceeded the limit of liability, and indemnification was provided for only a part of the monetary loss.

With respect to contingent business interruption (CBI) cover, most policies triggered were those written outside of Japan (US and Europe). The automobile and electronic industries were affected most, due to the global and complex supply chain in those sectors. Initially this exposure was expected to involve the highest uncertainty, but this could not be verified on closer scrutiny.

Conclusion

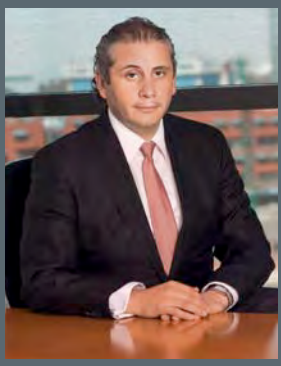
The Tohoku earthquake was unprecedented in terms of both size and the subsequent events it caused. The outlier effects, the massive tsunami and the nuclear power accidents in Fukushima were not within the foreseen scope of feasibility – either of the scientific community or of the Japanese government or corporate risk managers.

We have learned from the Tohoku EQ that continued research into the effects of earthquakes is essential to minimising loss of life and property damage. Building codes and protective measures against earthquakes and tsunamis require further development. Business continuity plans and organisational procedures have to be adapted to the lessons learned from the recent event.

The Japanese insurance industry deserves special mention: insurers contributed immensely to the mitigation of damage and suffering by adjusting processes at short notice and where appropriate (ad-hoc training in the claims sector, standardised loss assessments) and accelerating the payout processes.

Mexico's natural disaster fund – Insights from the leading loss adjuster

Faced with natural perils ranging from Atlantic and Pacific storms to earthquakes, Mexico is exposed to heightened natural catastrophe risks. The Mexican government has identified disaster risk reduction as a national priority, creating the Fund for Natural Disasters (FONDEN) in 1999 to improve its financial preparedness for catastrophic events. Ricardo Espinosa, leading loss adjuster for FONDEN, talks about how this concept could play a role in other markets as well.



Ricardo Espinosa is leading loss adjuster for the insurance cover of the Mexican Fund for Natural Disasters.

Munich Re: Could you please outline your role as Leading Loss Adjuster in the FONDEN Cat XL Programme?

Ricardo Espinosa: The main challenge in my work within the programme is to monitor the erosion of the annual aggregate deductible and of the excess layer. This can be caused by an accumulation of thousands of individual losses as a consequence of a number of natural events during the policy year. The monitoring is carried out by different teams of loss adjusters – around 40 experts in total – and my task as Leading Loss Adjuster is to coordinate all their efforts. So I am responsible for getting the big picture and ensuring that all the claims, all the losses, are efficiently managed. One of the key features of the programme is a highly detailed adjustment protocol, or loss protocol. It's instrumental in my work and for the performance of FONDEN.

We'll get back to the loss protocol later. Who decides what is a natural catastrophe event?

The Mexican government has created rules to identify a natural catastrophe. Independent technical bodies use these parameters (a kind of "event trigger") to decide whether a reported event qualifies as a natural catastrophe. This keeps the programme crystal clear and ensures efficiency.

As adjusters, we need to review the parameters and determine whether the technical entities have applied them.

Who gives instructions on how to adjust the claims and how is this communicated?

There is a legal process. When a catastrophe occurs, the affected state or federal entity has to declare a catastrophe to obtain funding from FONDEN. A claim is filed, which is then reviewed by the responsible independent government bodies. They decide according to established parameters whether or not the event qualifies for funding. So it's not FONDEN itself that decides, but rather an independent entity.

Are you and your team involved in this legal process when a catastrophe strikes?

Not at this stage. After an event is declared a disaster and funds allocated, a committee is set up. We participate in that committee as observers and review all the claims coming in.

The committee starts its work by discussing the overall damage caused by the catastrophe, not in detail but on a preliminary basis. For example, it may be established that schools or hospitals are affected, but without knowing at that time how many are involved and what the actual scope of damage is. This also applies to roads, bridges and other parts of infrastructure.

This is followed by inspections and individual loss assessments.

So you get information on potential losses and then you proceed to evaluate them. How do you go about on-site inspections?

Well, once we have the first loss estimates, we know that there are, for example, roads affected or schools or hospitals. We have two phases of inspections. In phase one, we immediately send a team to review the general scope of damage. A group of our experts would typically accompany a government team as observers and look at schools or roads in an affected city. We don't try to assess the damage in detail at this stage, because the government team representing the municipality or state that has been hit – the claimant – is producing its own estimates.

What happens after a claim has been filed?

As soon as FONDEN receives a claim and a disaster has been confirmed by the independent entities, we receive a first estimate, a preliminary scope of damage produced by the affected state, and begin the adjustment process according to the rules of the loss protocol, which is included in the reinsurance contract. The way we proceed depends on various things. For example, we need to determine whether the loss amount is above or below the franchise stated in the policy.

If the loss exceeds the franchise, phase two of the inspection process begins. We draw on different adjuster firms to set up teams to go on site and examine the damage in detail. The damage may involve different types of property, such as roads, schools, hospitals, housing or hydraulic installations, and each adjuster firm is responsible for certain sectors. For example, the firm I'm with is in charge of roads. In the case of damage to roads, we as leaders in that sector organise a team to inspect on site with the aim of assessing the damage with 100% accuracy.

You mentioned the loss protocol as part of the reinsurance contract. Could you talk about that in greater detail?

The slip, or reinsurance contract, includes a protocol that determines the adjustment process on a step-by-step basis, with deadlines and guidelines to follow. It is literally the core of the programme, because it gives certainty to all parties. Everybody knows what we have to do and how we'll do it as well as when we're going to release reports – bordereaux – to inform the reinsurance market.

You and your team become involved in the adjustment process when mass losses occur – hundreds or even thousands of claims. How do you assess the dimensions?

At the beginning, we don't inspect individual loss events. Our focus is on determining whether the franchise has been exceeded. If this is the case, we assign teams to inspect each different type of loss according to their respective sectors – roads, schools, hospitals and so on.

This has to be organised for maximum efficiency, because the loss protocol sets tight deadlines. For example, for losses below US$ 200m, we have 45 days to inspect all the individual losses and produce figures. The task is massive.

There is a coordinator for each sector, who reports back to central management on the progress of each team every two or three days. So we get the findings on an ongoing basis and can continuously update our documentation of losses, rather than wait until the inspection is completed. Within each sector, we have an assessment of the overall scope of damage, which is broken down into individual items, or actions as we call them. We review each of these items – in the current period, we have processed 1,200 actions.

With that workload, you obviously can't go into too much detail for each loss. How do you handle quantum determination?

This is really the main challenge in our work. We have people in the field doing the inspections and relaying that information to people in the office, who add up the numbers and work out the overall figures. For example, once the field team establishes how long the damaged section of a road is, the office people can calculate the total cost using unit-price analyses. Here, we have set per-kilometre prices for different types of road –

concrete, asphalt, one-lane, two-lane. These unit prices are established in the loss protocol and have been agreed on with the insured since the beginning of the programme, which is another reason the loss protocol is so important. The prices are also reviewed and updated regularly, prior to losses.

Can you explain the reporting process in more detail?

Our rules of operation and the adjustment protocol contain instructions we have to follow. Each adjuster team is responsible for producing figures within certain deadlines established for different types of losses. The engineers have a set number of days to complete certain documents and the adjusters are obliged to produce reports with figures based on the documentation within set deadlines. All details are documented electronically and as hard copies. In addition, we have deadlines to file summary reports each month. As Lead Adjuster for my sector, it is my responsibility to file a monthly report, which in turn goes into the composite report. This bordereau is distributed to the cedants and brokers, who pass it on to the reinsurance market.

Here again, the adjustment protocol provides step-by-step instructions on what we have to do. It includes a flow chart showing the information required at each stage, such as photographs of damage, each with a GPS reference. This is important, because we sometimes need to demonstrate to a client that we actually inspected the damage on site. In the event of disputes, this photo documentation gives us a great degree of certainty, especially now that digital GPS photos are accepted in Mexico's courts.

You've mentioned a lot of different stakeholders – loss adjusters, brokers, insurers, municipal and federal entities – how do you deal with them all?

It's complex, but it helps that the programme is very well organised. For example, there are four different brokers and they all have their own roles. This year there is one broker leading with claims. So we lead with that broker and the cedant and deal with the FONDEN people. We have monthly meetings with all parties involved where we review each event in detail. In the case of a dispute or any issue in the claim, this gives us the opportunity to review the policy wording, the FONDEN rules and the adjustment protocol together and try to achieve consensus. If it's a technical issue like the quantum of a loss, we bring the technical experts to the table to explain things.

At the moment, FONDEN is preparing an engineering team to review our figures as we produce them. This will give us more certainty and help us avoid differences at the end – of course they can never be ruled out, because it's normal for people to see things differently.

How is the entire claim management process finalised?

The state entities affected have rules of operation and deadlines to give FONDEN a full and final scope of damage. As soon as we have that, we produce a final loss schedule with a recommended adjustment amount related to the insurance cover. FONDEN then verifies our figures and gives us its final approval. This normally represents the end of the process, because we're careful to address any issues early on.

You've offered a number of insights into the adjustment protocol that was developed for FONDEN. Do you think the concept should be applied to other insurance products?

In fact, I wouldn't say it should be, I'd say it must be. Experience tells me that important policies must have something like it – especially policies that have government accounts. A good loss protocol offers certainty about what each party is required to do and when. It makes the claims handling process easier and helps avoid problems between parties.

Do you think the FONDEN model of nat cat cover for sovereign risks could be used for other markets?

Yes. I think it's so important because this type of policy gives a government security concerning the country's risks as well as the responsibilities of the public sector and its budgets. And yes, I think there are many countries around the world that would benefit from a cover of this kind, because catastrophe losses can reach dimensions that endanger the state itself.

In our programme, we work hand-in-hand with the government. When a disaster strikes, the government's first priority is of course to restore safety and security for the affected population. This can mean clearing roads, removing debris and demolishing unsafe buildings. But the state has little time and capacity for assessing the scope of damage in monetary terms. This is where we can contribute, because our focus is on loss evaluation to ensure accurate indemnification.

So to answer your question, the FONDEN model would have to be adapted to the legal framework of another country, but the basic concept can be replicated to the benefit of society in many countries. In fact, Mexico has been recognised internationally for the quality of its catastrophe risk management, including FONDEN. I think this is a clear sign that it can and should be applied in other countries.

The Fund for Natural Disasters (FONDEN)

Managed by several government agencies and supported by the insurance and reinsurance industry, FONDEN supports the Mexican population in times of crisis. In 2011, FONDEN further enhanced its resilience by purchasing an excess of loss insurance cover for costs arising from the reconstruction of public assets and low-income housing after natural catastrophes. Lead reinsurer is Munich Re, which made a major contribution to the modelling and structuring of the programme.

Flood

Thailand 2011: Flood in central Thailand

Mary Weston, Munich Re, Singapore

The unprecedented flooding that struck Thailand in 2011 highlighted the catastrophe risk within industrial clusters and the threat to global supply chains. It led to the effective shutdown of hundreds of major industrial estates for several months. Claims management was also delayed due to slowly receding water levels and insurers and insureds having to deal with policy interpretation issues related to the facts of the claim. Correct calculation of the value at risk by reference to the basis of indemnity for average relief purposes and business interruption (BI) measurements, including contingent BI losses (in line with the "trends clause" wording), as well as wide-area damage issues proved to be major challenges in claims settlement.

Event

From March to October 2011, persistent heavy rainfall before and during the monsoon season in Thailand resulted in extreme flooding of major parts of central Thailand and the regions north of Bangkok. Flooding persisted from September 2011 until January 2012 in lower central provinces, with water receding very slowly. This was the biggest catastrophe in the history of the country and the most severe flooding for more than 50 years. The event claimed hundreds of lives and inflicted heavy losses on industry and agriculture.

The greatest damage was caused to seven large industrial parks, including developments around Bangkok such as Rojana and Navanakorn, which were flooded to various depths, in some cases exceeding two metres. Around 15,000 companies in 20 provinces were ultimately affected. Insured losses worldwide are estimated at more than US$ 16bn, including contingent BI losses in Thailand and elsewhere.

With total economic losses in the region of US$ 43bn, the flood in Thailand is the world's fifth-costliest natural catastrophe ever. Only the 2011 Tohoku earthquake and tsunami in Japan (US$ 210bn), Hurricane Katrina in the USA in 2005 (US$ 125bn), the Kobe earthquake in Japan in 1995 (US$ 100bn) and the US Storm Sandy in 2012 (US$ 65bn) incurred higher losses.

An inundated car manufacturing plant at the Rojana industrial park in Ayutthaya province.

Characteristics of nat cat claims management and lessons learned

In view of the long duration of the flood and the vast area affected, numerous questions have arisen with regard to the settlement of claims. Technical and policy interpretation issues have been identified as the principal impediments to timely settlement of claims. The most important aspects of those issues are outlined below.

Adjustment of major industrial claims was challenging

Although a substantial number of international adjusters were flown in from reputable international loss adjusting companies, it was observed that the majority were struggling with the size and complexity of the major claims they had been assigned, and the sheer magnitude of losses suffered overall (in the hundreds). For a long period, adjusters seemed to be overwhelmed by the severe nature of the destruction and damage to factories – mainly within the industrial parks – to machinery and equipment, stock, tools, jigs and dies as well as by the task of assessing losses against their asset register entry for adjustment and insurance value purposes (i.e. reconciling records with a physical count). In certain cases, multi-million dollar losses were assigned to less experienced adjusters and/or shared among multiple adjusters, which made claims handling even more challenging. Such insufficient loss

Factory buildings belonging to a semiconductor manufacturer submerged by floodwaters at the Rojana industrial park in Ayutthaya province. The company announced it would close its plant, as renovation costs would be too high.

adjusting capabilities hampered adequate inspection and control of loss sites, enforcement and follow-up of loss mitigation as well as meaningful negotiations with insureds in relation to their claims. In combination, the above factors led to delayed reporting and updates on the reinsurance side or even to reporting that added no qualitative value to the loss assessment in some cases.

Coverage/wording issues dominated

A sound understanding and proper application of policy wording as applied to the facts of the claim has been a decisive factor in settling a tremendous number of claims to date, especially the high-value industrial claims.

Underinsurance calculation: A major challenge

From our review of loss adjusting reports, we observed that pertinent issues such as assessing the insurance value at risk were omitted, reported on in vague terms or assessed incorrectly and without reference to the indemnity provided by the policy. We suspect those issues were caused by the perceived ambiguity in the wordings on how value at risk should be assessed or a lack of understanding on how to apply the terms of policies properly and with reference to the facts of the claim.

The dominant issue observed in these losses – aside from BI measurement – was how to assess the value at risk within the terms and conditions of the policy so as to assess potential underinsurance and the application of average with respect to property damage claims. An insurer and its loss adjuster are obliged to assess value at risk (VAR) in accordance with the terms and conditions of the policy; if the policy does not specify how the VAR is to be assessed, it should be assessed in accordance with the indemnity provided by the policy. In this context, it was observed that VAR was often assessed with reference to the actual cash value (ACV) at the date of loss to avoid or reduce underinsurance or the effects of average, whereas the indemnity in question should have been governed by the replacement value clause. Hybrid value-at-risk calculations, which assess VAR based on a mixture of replacement and actual cash value, were also used and had the potential to artificially reduce the value calculated.

In some cases, depreciation was also used to increase the indemnity payable, to the detriment of (re)insurers. When calculating an ACV indemnity of insured machinery and equipment at the date of loss, reference should be made to the replacement cost of the asset less depreciation. Depreciation in that regard is typically assessed using either the straight-

line or reducing-balance methodology with reference to the age, nature and maintenance of the machinery and equipment. Some loss adjusters limited depreciation to 50%, contending the "*Thai market practice*" of the Office of Insurance Commission (OIC) Thailand permitted this if the machinery or equipment in question was well maintained, irrespective of its age, nature, quality of manufacture or industry. Thai legal opinion has since confirmed that no such practice is permitted by the OIC. On the contrary, Thai market practice does not limit depreciation to 50% where there is knowledge of how long the machinery and equipment have been in use and of its useful life.

In other cases, the uplift or escalation clause was applied to increase the sums insured by the pre-agreed maximum stated in the clause (usually 10%, 15% or 20%) without any evidence that the actual value of the insured property increased over the original declared value in the policy "due to appreciation" and to what extent, purely to moderate any underinsurance which may have existed at the time when cover incepted.

Rescue and restoration activities were limited

Loss minimisation of damaged machinery, equipment, tools, dies and jigs was limited to special tools and key machinery with long lead times only. Restoration efforts were often hampered by an unwillingness of original equipment manufacturers (OEMs) to provide spare parts or warrant the reliability of repaired machinery and equipment. OEM warranties were also cancelled, which resulted in insureds electing to acquire new machinery rather than repair. No repair options were proposed for delicate, high-precision machinery, particularly technology used in the semiconductor, electronics and optical industries, for a number of reasons including warranty issues and technological improvements of such machinery and equipment.

A damaged grinding machine used in digital camera production in a flooded industrial park.

Salvage awards were restricted

The market for salvage in Thailand and other countries (e.g. India) contracted significantly because of the sheer volume of scrap available from the floods and offered in these countries. As a result, salvage efforts yielded minimal returns and had little impact in reducing final settlements.

Betterment: Complex to calculate

The basis of insurance is that the insured should be indemnified for its actual loss, i.e. restored to the position it would have been in had the loss not occurred, and no more.

However, with the rapid pace of technological advancements, and replacement machinery and equipment in most cases representing a vast improvement over damaged counterparts, it proved quite a challenge for insurers and loss adjusters to quantify betterment. Betterment evaluation thus required open dialogue with insureds and the exercise of professional engineering judgement. To be accurate, loss adjusters must discuss the relative performance of the original and replacement machinery with the insured's engineers to identify the performance criteria critical to the insured's business.

It also requires the loss adjuster to compare the performance of

(a) the damaged machinery and equipment either (1) when it was new or (2) when it was damaged or destroyed, against

(b) replacement machinery and equipment, and thereafter produce a percentage range which reflects the improved performance of the new machinery and how that improved performance benefits the insured's business.

Very little in the way of betterment evaluation has been undertaken to date, however. This, we assume, is due to various reasons, including a general lack of awareness of the issue, time and capacity problems and, more fundamentally, a lack of professional engineering skill on the part of loss adjusters. Of the few evaluations we have seen, we have observed a willingness of insureds to agree to a deduction for betterment based on improved performance, which can be easily quantified. However, insureds challenge any deductions for space, labour and energy savings because they take the view that while operating costs have decreased, maintenance costs have increased, as expensive parts and more qualified personnel are required to service the machinery and equipment. Betterment evaluation also requires consideration of savings on space, labour and energy, particularly if insureds reinstate with less machinery.

Relocation no major issue

Contrary to initial expectations, relocation of facilities to other sites in Thailand or even abroad was not a frequent occurrence. Thailand has maintained its position as a major production centre for global manufacturers, particularly in the electronics (e.g. hard disk drive), semiconductor and automotive industries. Transfer of production facilities out of the country was seldom observed, which we believe was due to the dense network of suppliers and customers based in Thailand.

However, where facilities were transferred to another location in Thailand or abroad, policy wordings had to be carefully scrutinised to verify how the indemnity should be calculated (actual cash or reinstatement). Where a reinstatement indemnity was payable, consideration had to be given to whether the new location was more expensive or whether other benefits or betterments – e.g. tax benefits or increased production efficiency – had resulted, leaving the insured financially better off than before the flood.

BI and wide-area damage

Insurance industry practice requires consideration of BI losses resulting from multiple insured and uninsured causes arising from wide-area damage or natural catastrophe situations, provided that the wording allows such considerations (e.g. when a trends clause has been applied).

"Wide-area damage" is related to the perils of earthquake, storm, hurricane, flood and tsunami which cause damage to an insured's business as well as to the wide area in which that business is located. Such a situation usually causes considerable losses to an insured and the area, such as lack of access, a reduction in customers coming to the area, damage to suppliers, and/or suspension of utilities and power. Wide-area damage can significantly aggravate a loss suffered by a business.

The purpose of Section II of BI cover in the standard ABI model wording is to cover losses to the extent that they have to flow from insured property damage. Where BI losses flow from multiple causes – some insured, others not – and those causes cannot be separated (i.e. being concurrent), a loss is technically not recoverable because it would have occurred irrespectively of the insured damage.

The insurance community is aware of one case that deals with the calculation of BI losses in the context of a natural catastrophe, the English High Court decision of Orient-Express Hotels Limited v Assicurazioni Generali S.p.A (UK) [2010] EWHC

1186 (Comm) ("OEH"). In deciding whether wide-area damage should be considered in the measurement of insurable BI losses arising from a natural catastrophe, the court found in favour of insurers that the damage to the insured's property should be ignored, and wide-area damage taken into account, as a "special circumstance" impacting the calculation of the insured's BI loss, contemplated by the trends clause wording.

Bangkok's suburbs under water. The event caused extensive wide-area damage.

While it is it not known whether the issue of "wide-area damage" (has been or) will be tested in a Thai court, we do know that Thai courts in insurance policy cases will pay close attention to – and seek to give effect to – the policy wording, as it records the intentions of the parties. The court will also consider all facts of the claim and any circumstances outside of the norm; i.e. "special circumstances", as per the trends clause wording. BI wordings often – as in the Thai flood cases – allow "adjustments" to be made to provide for "special circumstances" affecting the insured's business either before or after the damage/incident. The wide-area damage of a natural catastrophe (such as the Thailand flood) is arguably a circumstance outside the norm, contemplated by the trends clause.

Some loss adjusters and cedants have contended that a Thai court will not permit adjustments to be made to the calculation of an insured's BI loss because of wide-area damage effects. Those cedants say where several perils operate to cause loss or damage (i.e. material damage and wide-area damage causes), some of which are covered (damage) and some of which are not (wide-area damage), cover is triggered despite the fact that uninsured perils (wide-area damage) may have contributed to the loss, because the contractual provisions of BI cover were triggered by (a) an event causing damage, (b) in consequence of which the insured's business was interrupted and interfered with, causing BI losses.

Such opinions may arise because of a lack of awareness and understanding of the nature of cover offered by BI policies and the implications of the trends clause wording.

Contingent business interruption: A wake-up call

A contingent business interruption (CBI) loss is an economic loss suffered by an insured resulting from "damage" to the property of a supplier or customer. CBI coverage is typically an extension of standard BI coverage and is intended to mitigate the financial risks associated with loss events that affect an insured's suppliers and customers. CBI losses are complex and time-consuming to assess when settling claims, and can in some cases amount to several hundred million US dollars in payouts. A challenge for claims management following Thailand's flood was to swiftly retain experienced loss adjusters and forensic accountants to assess larger CBI losses with complex coverage, valuation and BI issues to resolve. Assessment of CBI losses was virtually impossible at first, as the insurers possess only a limited understanding of complex supply chains. This was especially the case concerning insureds in the high-tech industry.

The impact of production stoppages, delivery disruptions and interrupted supply chains on the large industrial estates was felt worldwide, particularly in the case of the hard disk drive (HDD) industry, as Thailand is the world's second-largest supplier of these hardware components, producing roughly one-quarter of the global HDD supply. Average selling prices of HDDs rose by 28% in the fourth quarter of 2011 as a result of the sudden shortage in supply triggered by Thailand's flood. Higher costs due to production relocation (typically to sister companies or competitor companies) as well as the rising cost of components from suppliers similarly affected by the flood, also pushed prices up.

Leading Japanese automobile companies also had to cease production in Thailand for several weeks, resulting in a combined output loss of 6,000 units per day. Even companies not directly affected by the floods suffered losses – production came to a halt as a result of disruptions in delivery due to infrastructure problems (i.e. flooded/damaged roads). Factories as far afield as Indonesia, Vietnam, the Philippines, the United States, Canada and South Africa were affected by the disruptions. Issues commonly arose regarding the remoteness of damage along the supply chain (i.e. to what extent did losses result from the inability of suppliers' suppliers to deliver?) and with respect to the territorial limits of cover. Adjustments were also made more difficult by the effects of the Japanese earthquake and tsunami in March 2011. This was because in response to that catastrophe many companies had

moved production to Thailand or had sourced supplies from facilities there. This may give rise to complex causation and adjustment issues.

Nat cat contingency planning

Since floods do not occur without warning, efforts can normally be made to prevent and/or minimise losses. In a catastrophe of this magnitude, however, there are limits to these efforts. The situation in Thailand was further aggravated by the fact than many dams, locks and temporary protection systems, such as sandbag barriers, were insufficient to cope with the enormous amounts of water involved. Reliable information on the expected depth of water, planned countermeasures and hazard situations was also not always available during the flood crisis. The situation was also exacerbated by conflicting information from the different government bodies responsible for flood information management for the different provinces affected. Many questions were also asked regarding recourse against those third parties. Flood management efforts by the state were publicly debated even before the flood waters receded, in particular, whether the damage was made worse by the wilful and deliberate discharge of water from reservoirs and dams. Although recourse is permitted under the Thailand Civil and Commercial Code, it is hard to say whether such proceedings will stand much chance of success.

Not all of the facilities were able to transfer machinery and equipment safely out of their premises in sufficient time to preserve them from damage. The relatively few facilities with good disaster management and efficient evacuation and loss minimisation strategies were at an advantage.

Don Mueang domestic airport in Bangkok was swamped in the flooding.

Disaster contingency planning often focuses on emergency response, at the cost of being prepared and able to prevent damage. One major HDD manufacturer benefited from a professional contingency plan: with two of its factories in the Ayutthaya province heavily flooded, it was able to boost production at its Malaysian facility to help offset the production shortfall at its Thailand facility. In contrast, a car manufacturer with factories in Rayong and other provinces was not affected by the flood but still had to halt production because of a shortage of parts supply, as its suppliers located in Ayutthaya were flooded.

After waters had receded, affected facilities commenced recovery processes, which took several months to complete. Communication with workers was also decisive in starting restoration measures immediately and setting up temporary sites to manage business contingency planning. Companies benefited from liaising with their insurers about indemnity, securing cleaning and equipment repair along with other services, so that affected facilities could resume production as soon as possible.

A number of insurers also set up ad-hoc disaster response teams in affected provinces to support their insureds. Such ad-hoc approaches, which are not uncommon in emergency situations, reflect the need to review contingency plans, and take a pragmatic approach that can respond to different catastrophes and avoid the one-size-fits-all model. One decisive move made by some insurers was to bring claims personnel and experienced loss adjusters to the scene as quickly as possible to support recovery and start effective claims settlement immediately.

Conclusion

The floods in 2011 were the costliest natural catastrophe in Thailand's history and also the costliest inland flooding catastrophe worldwide to date. The event was unprecedented not just in terms of the magnitude of the damage caused by the flood over an extended period, but also in terms of the large number of industrial parks affected along with the severe disruption of supply chains throughout the world.

The Thailand floods highlighted a number of critical claims-handling issues i.e. average, betterment, depreciation, escalation, salvage and BI measurements in wide-area damage situations. Loss adjuster reports did not always address those issues adequately, due to a lack of manpower, qualified personnel and time. Nevertheless, the expectation remains that

Vehicle owners parked on an elevated highway in an effort to avoid floodwater in the north of Bangkok.

loss adjuster reports will address all relevant claims issues within the framework of the individual facts and circumstances of each claim. In this regard, proactive loss/claims handling and transparency among insurers and their loss adjusters is fundamental to effective claims management. As professionalism on such a level demonstrates that insurers and loss adjusters are acting in accordance with high standards in handling losses, it enables reinsurers to follow settlements.

The Thailand flood demonstrated once more that the claims-handling organisation, its processes and resources can be better utilised after an event if a professional contingency plan is in place.

This catastrophe alerted both the global economy and insurers to the vulnerability of supply chains and the consequential risks of CBI losses. It clearly exposed the lack of transparency in supply chains.

Our goal is to respond to catastrophes quickly and effectively

Ever-changing loss patterns can challenge an entire organisation and bring it to its limits. The natural catastrophes in the past three years have taught the insurance industry that a robust risk management culture, effectively handled models and use of professional cat contingency planning are as crucial as advanced claims handling after a catastrophe. In this interview, Rob Whelan, Executive Director & CEO, Insurance Council of Australia, offers insight into how highly developed insurance markets like Australia cope with natural catastrophe events with an advanced disaster response and claims management approach.

Rob Whelan is Executive Director and CEO of the Insurance Council of Australia (ICA), the country's peak representative body of the general insurance industry

Munich Re: To begin with, would you please outline the role of the Insurance Council of Australia.

Rob Whelan: The Insurance Council of Australia, or ICA, is the peak representative body of the general insurance industry in Australia. It represents a membership base that accounts for approximately 95% of the gross written premium of general insurance in Australia. Specifically, it represents the interests of the industry to all those who may have some impact on overall industry welfare and sustainability. And that includes politicians and policymakers, regulators, consumer organisations and other lobby groups, other industry groups and of course the media itself. So it is truly the key representative body of the general insurance industry in Australia.

Could you give us some details on the ICA's relationship with the government?

Well this, obviously, is one of our more crucial interactions and relationships and we spend a great deal of our time and energy representing the industry's interests to key politicians and policymakers on both sides, both in the government and in the opposition parties. We treat everybody on an even basis.

We spend a lot of time background-briefing individual members of parliament and their counterparts in the opposition about critical industry issues, and that can range from disaster management through to affordability of insurance or specific policy applications in certain circumstances. And we also try to give them an understanding of the importance of

the general insurance industry to the overall economy and what role it plays. We also try and keep them informed of international developments and any issues we have with how the industry is being governed by regulation and so on.

We have dedicated staff who spend all their time doing that. Plus we have expertise at hand across a range of areas, including experts in regulatory, legal, economics and tax issues, which are the primary topics we talk to the government about. So in many respects this is one of our critical responsibilities, to enhance the industry's position with authorities and regulators and make sure our interests are well articulated to the government.

One of the ICA's tasks has been to develop a natural catastrophe insurance disaster response plan and coordinate it with the government. Could you tell us about it?

This is an area I think the whole industry has been working very hard on, really since Cyclone Larry hit Australia some years ago. That, if you like, was the start of a lot of work that has gone into how we go about organising ourselves to respond to what appear to be ever-increasing natural disasters. The individual member companies have been doing a lot of work to prepare themselves and to have the ability to respond to these disasters, but the Insurance Council itself has also acted. It's taken on a coordination role across the industry to ensure that we coordinate our resources as effectively as we possibly can, that we have a quick response capability when these disasters strike, that we're able to deal quickly and effectively with problems as they arise to make sure they don't get out of hand and impact the industry's reputation.

And, importantly, we're there to assist in any way we can to keep the government informed, to liaise with the emergency services dealing with the particular event and make sure we're also in touch with the community to create an understanding of the role of insurance in recovery. And also of course we manage the media, which has become more of a responsibility of ours, to make sure our efforts and what the industry is doing are well represented. It's a major area of development for us, which has been growing over a number of years and I think will continue to do so into the future.

Does a disaster response plan have to be industry-wide?

The individual companies, particularly the major ones with the largest market shares in the areas most affected by extreme weather events, have pretty sophisticated and well-developed response capabilities and disaster planning within their own companies, but as an industry body we also take responsibility to ensure all those resources that are available are well coordinated and effectively deployed whenever there is a disaster.

The whole idea is for the industry to be seen to actively respond to natural disasters quickly and efficiently, and I think progressively over the years we've built up a very good reputation of being able to respond effectively to these events.

Does a disaster response plan have to be industry-wide?

That's right. A lot of the problems we've had historically have been because the expectations placed on the industry sometimes haven't been met, as those expectations were built on ignorance about what the insurance industry can actually do. And I think it has often been expected that we would just cover everything regardless of the nature of the event or the policy that individuals might have.

We've been doing a lot of work to communicate with the affected communities, so that they are aware of what is possible for the industry to do and what's not possible for the industry to do. We try and manage the expectations more effectively and deal with issues where people perhaps didn't have the right cover in a particular instance. It's all about information flow and quite often if we get to the community quickly and answer their questions, a lot of the issues disappear.

Could you describe the role of the ICA during an actual disaster in greater detail?

The initial response is that we assess the size and impact of a given event. We have a process by which we make a declaration of whether we consider it to be a catastrophic event. To reach the benchmark of a catastrophic event, it has to have certain characteristics: it has to be of a certain size in terms of likely financial impact on the industry, it has to be of enough significance in terms of the community, the political environment – both local and federal – and the media as well. So there are a number of criteria to assess whether we declare an event a catastrophe. Once we do that, we deploy resources immediately to the area. And we start the process of coordinating all affected member companies and we get their resources to communicate with us. We establish working parties and we then start acting on those links mentioned before, those communication links and established relationships with emergency services, with police, with government authorities and so on to let them know what we're doing and what resources we are able to deploy.

So that's all a standard process. We then deploy resources into the area. We set up community liaison areas within what's often termed recovery centres. And they will consist of government authorities, charitable organisations such as the Red Cross, legal aid people and so on. But we're also in there with them at the same time to assist the community. We often establish very quickly a community town

hall meeting, where we provide our expertise and staff to answer all questions around insurance and how insurance will respond to this particular event. And we bring in the financial ombudsman services, which are responsible for complaints-handling within the industry, as well as any other community groups that are responsible for recovery in those areas.

We deploy all those resources and then we also start, as the process of recovery kicks in, to make sure people are informed of the activities of assessors. We tell people how they can process their claims and explain any issues that might come as a consequence. We deal with the media as well, briefing and responding to inquiries, which has become quite a large part of our work, and we also start collecting data, which we do on behalf of the Australian Prudential Regulatory Authority – or APRA. But we also use the data to keep government informed of the claims process, how many claims have been lodged, the estimated reserving for those claims, the process in terms of how quickly claims are resolved, accepted and acted on. And that's on an ongoing basis right through the recovery process for any individual event.

Our disaster response starts very quickly and continues on for quite some time, until we've come to the conclusion that the vast majority of claims have been paid or dealt with and the event can be closed off. That's when we stop collecting the data. It's a well-worn process we've put in place, and it's now the industry standard practice.

Whenever an event triggers massive claims, fraud can be an issue. What are ICA's antifraud activities?

That's an interesting question, because we've just established a fraud task force, with the approval of our board. Up until now, there hasn't been any coordinated, cross-company assessment of the impact of fraud on the insurance industry in Australia. Individual companies have their own investigating teams that assess individual claims for potential fraud, but we recognised that there is the possibility of cross-company fraud going on in a more systemic way, in a more organised way, which would be very difficult for any single company to detect.

We've established what we call a "Fraud Bureau", which started a pilot study just recently to take data from member companies. It has coordinated and analysed the data to identify systemic, cross-company fraud. That information will be reported back to our board at the next meeting. We hope this will show that, in due course, the industry will be capable of establishing sufficient deterrents and identification processes to limit the attractiveness of this industry to elements seeking to commit sustained and organised fraud.

Another source of potential conflict is negative media reporting. You've touched on the role of media management, but what about adversarial situations?

That's become quite a heavy responsibility for us. For example, in 2010 and 2011 when we had the major floods and cyclones in Queensland and heavy storms in southern Australia at the same time with very large amounts of damage. A lot of individuals were not covered for the particular type of flood damage they were incurring, and a lot of the media attention shifted to the insurance industry and nature of insurance policies and disclosure around the level of cover that people had for these types of events. That was pretty intense, and we realised that, as the peak body representing the insurance industry, we needed to gear up our capability of effectively engaging with and managing the demands of the media. And that's what we've done.

So progressively – again, with the board's approval – we've developed a much more sophisticated media capability within the Insurance Council. And we have professionals here who are actually able to feed the media, rather than being on the back foot and just responding to aggressive complaints from the media. We've been able to actually take a more proactive role with the media and we now engage with them on a very regular basis. As a consequence, we're able to get a lot of our messages through in a more effective way. We've built up our capability in disaster management and our ability to respond, but we've also built up our capability of dealing with the media.

What role does Munich Re play in the ICA, as the leading reinsurer in the market?

We have a very capable board member, Heinrich Eder of Munich Re. He's one of our longest-standing board members and we're very happy to have him with us. It's very important for the industry to have representation from a global reinsurer the size of Munich Re for a number of reasons.

Firstly, it gives us a perspective on the international environment. This is truly an international business – we can get carried away with our own parochial concerns, but ultimately the international environment has a major impact on our domestic market. So having an individual who is connected to one of the world's major international reinsurers is a great advantage, because we can call on that expertise and knowledge at any time, and we have done so on a number of occasions. That helps us maintain an understanding of where we fit in the global environment and the implications of many of the issues occurring around the world and how they'll impact the Australian market.

It's also important from another point of view: having Munich Re on our board and so intimately engaged with the Insurance Council gives our member base as well as other stakeholders we deal with on an ongoing basis – like the government and regulators – the reassurance that we've got a very close relationship with one of the major global players. It's about how we maintain the stability of the system. You only have to look at how the reinsurers, and Munich Re in particular, responded to the recent round of major catastrophic events we had in Australia and New Zealand, all of which affected many of the Australian companies as well. The reactions on the reinsurance side really demonstrated the capabilities of the industry to take on these extraordinary events. And I think it was quite reassuring to all those who stepped back and took a look at what actually occurred during those events to see just how capable the industry was to respond and pay up and deal with clients, without any concerns whatsoever as to financial stability. And I think that's one of the very important things Munich Re does for the Insurance Council, giving that reassurance that we have that type of backing for the Australian market available to us.

Storm

Hurricane USA 2005: Katrina

Thomas Toth, Munich Reinsurance America, Inc.
and Klaus Wenselowski, Munich Re

Katrina was an anomaly among US hurricane catastrophes due to the sheer size of losses and number of claims it caused – estimated at 1.7 million by the Property Claims Service organisation. By comparison, the combined claims total of all four large hurricanes (Charlie, Frances, Jeanne and Ivan) to strike Florida in 2004 came to 2.3 million.

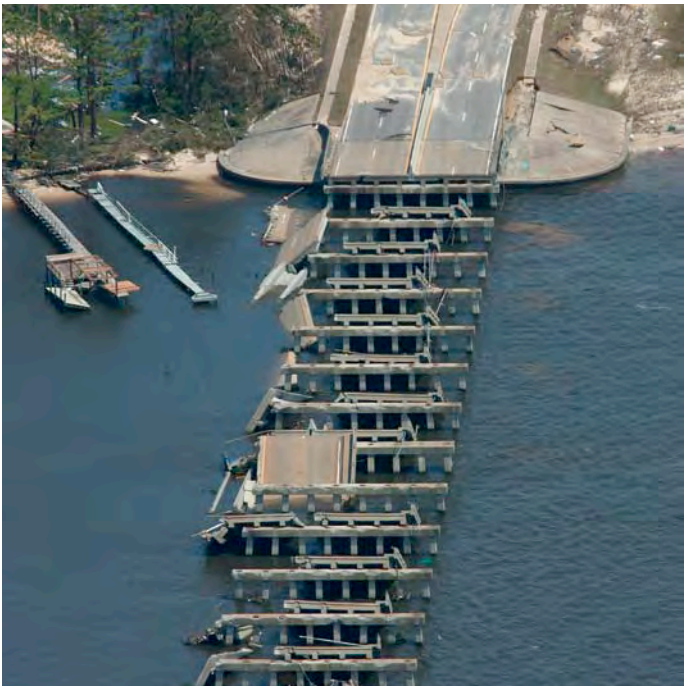
It all began on 23 August 2005, with a low-pressure system in the Bahamas, out of which developed the eleventh storm of the year's very active hurricane season. Cutting northward, the system swept over almost the entire length of the Bahamas. Then Katrina turned west-southwest, placing Florida directly in its path. A combination of "ideal" conditions allowed the storm to grow into a class 1 hurricane (sustained wind speeds > 119 km/h).

Katrina made landfall a few kilometres north of Miami on 25 August at 5.30 p.m. local time, packing 130 km/h winds and 1.5 metre storm surges. Residents of the county were taken by surprise and had little time to prepare. A dangerous tornado formed at the hurricane's fringe.

As it swept across the Florida peninsula, Katrina briefly weakened to a tropical storm, only to gain force again in the Gulf of Mexico. Here, with the Loop Current creating conditions that continuously added momentum, the hurricane again changed course, this time from west-northwest to north. The system entered a period of rapid intensification in which the wind speeds increased by 120 km/h to more than 250 km/h within 60 hours. So Katrina became the first hurricane of the season to reach class 5, the highest category, which means – according to the Saffir-Simpson scale – wind velocity exceeding 250 km/h and a rise in sea level of more than 5.5 metres.

Katrina reached peak speeds of 277 km/h and hurricane force as far as 165 km away from its eye.

A helicopter drops a sandbag to provisionally repair a broken levee in the aftermath of Hurricane Katrina in New Orleans.



The bridge on US Route 90 across St. Louis Bay was destroyed by high winds and waves.

On 29 August at around 6.00 a.m. local time, Katrina made landfall again, this time as a class 3 hurricane southwest of New Orleans in the marshy Mississippi Delta. It cut a northward path east of New Orleans, leaving the city unaffected by the strongest winds. For the city and eastern coastal region, the most destructive elements were heavy rainfall (up to 25 cm in the city) and – above all – the storm surge.

Topology and geography

Understanding the effects of Katrina in and around New Orleans requires some knowledge of the area's topology and geography. New Orleans was built between the Mississippi and Lake Pontchartrain, near the river's estuary. The lake is, in a sense, a branch of the Gulf of Mexico. Only a small part of the city, the French Quarter, is situated above sea level. Due to continuous expansion – especially southward in the direction of the Mississippi Delta – most of New Orleans is below sea level, relying on a complex system of dykes for flood protection. The federal Army Corps of Engineers is responsible for constructing dams, which are then managed by local levee boards. The low-lying areas are drained into the lake by means of ditches. Also relevant to the scope of damage were two canals south of the city, which were built to facilitate shipping traffic. The Mississippi River Gulf Outlet (MR-GO) led to the Gulf, while the Industrial Canal led to the lake. It is important to note that the dykes were built on peat, which becomes

compressed under weight and had caused the levees to gradually sink over time. The sunken levees were insufficient to provide the planned level of flood protection, a fact that had been established in studies by the Federal Emergency Management Agency (FEMA).

Due to powerful winds, the storm surge was particularly high to the east of Katrina's path. Waves from the southeast of the Gulf flooded the canals and lake. This, coupled with massive rainfall, caused a sharp rise in Lake Pontchartrain's water level and subsequent flooding of the city's drainage canals. This alone did not overwhelm the levees. The extreme hydrostatic pressure as well as a weakening of the levee foundations led to their destabilisation and displacement. The constructions were pushed to the extent that they literally broke up. Especially fatal were two of the resulting openings, which allowed large amounts of water to flow into almost all parts of the city.

The 17th Street Canal breach was one of several levee failures in New Orleans which resulted in severe flooding.

Approximately 80% of New Orleans was flooded. In some areas the brackish water was 7–8 metres deep. Drainage pumps were not only too small for the situation, but were largely inoperable due to power outages.

Hit by extreme flooding from the MR-GO and the lake, the Industrial Canal overflowed in several places. This severely damaged its walls and the resulting openings allowed even more water to flood the residential areas south of the city. Also located here was an oil refinery, whose tanks developed leaks, adding crude oil to the brackish water and further damaging nearby flooded buildings.

The authorities, who were well aware of the imminent danger, issued a mandatory evacuation order for all of New Orleans before landfall. As in simulations, many residents failed to follow the order for various reasons. Around 30,000 took shelter

in the Superdome football stadium (since 2011: Mercedes-Benz Superdome), but the building was insufficient to provide protection. Winds had damaged the roof, allowing rain to leak in, and the electricity and water supply broke down. Capable of providing shelter for up to 10,000 people, the Superdome was also massively overcrowded, and was evacuated after a few days.

Along with the flooding, widespread looting in the storm's aftermath made headlines. Looters took not only food and water from supermarkets and department stores, which may have been understandable under the circumstances, but also shoes, clothing, jewellery and TV sets. Some looters even set fire to the buildings they broke into.

One insurance company attracted publicity when it brought in special security guards to protect insured artworks in a museum. However, moves of this kind were an exception.

New Orleans remains marked by Katrina. Many former residents have not returned. Reconstruction efforts have been launched, but in some areas – particularly in the south near the Gulf – it appears questionable whether they make sense. There are various examples elsewhere in the world where city planners have accepted the forces of nature and rebuilt at other – above all, safer – locations following a natural catastrophe. This could be an option for New Orleans, yet those responsible seem determined to defiantly rebuild in the same place but behind improved levees.

Alongside the flooding in and around New Orleans, extensive damage was sustained in many areas along the coasts east of New Orleans. The states of Louisiana, Mississippi and Alabama as well as the Florida Panhandle were hit by storm surges of up to 9 metres, approximately 25 cm of rainfall and extremely high waves (up to 17 metres in places). The flooding extended far inland, mainly due to local topography characterised by many bayous (lake or river arms). As observed in on-site inspections, a relatively low railroad embankment running parallel to the shoreline approximately 1 km inland was able to stop the storm surge. All other obstacles between it and the shoreline – notably, homes and small businesses – were severely damaged, leaving the impression that the area had been hit by a tsunami rather than a hurricane. In many places, buildings were swept away entirely, leaving nothing but the floor slab in place.

Floating casinos built on barges close to the shore were hit, causing heavy insured losses.

Scope of damage

Despite the fact that the coast was largely free of major industry, the damage took on previously unimaginable dimensions. Large hotels, shipyards and infrastructure were hit hard, as were floating casinos. A special tourist attraction, these casinos on barges were built offshore as a way of circumventing a state law prohibiting gambling establishments on the mainland of Mississippi. In Mississippi alone, there were more than a dozen of the giants, all of which were torn from their moorings by the surge. Some were carried far inland, with one landing directly on the US-90 highway. It had to be demolished using explosives. The law that led to offshore casinos has now been changed.

Destruction of infrastructure was also extensive. Many of the affected roads, bridges and railway lines running parallel to the shoreline were heavily damaged. Although these transport routes were not insured, above-ground telephone and power cables were covered and resulted in losses.

Working amid the wide-scale destruction, whether insured or not, was a major logistical challenge for adjusters. With homes, banks, filling stations and water mains in addition to transport routes damaged due to high winds and – above all – flooding, adjusters had to take wide detours in order to make on-site assessments. Lodged in the nearest undamaged hotels, hundreds of kilometres away from the areas hit, they had to travel back and forth from inspection sites. This caused higher-than-average emotional and psychological strain, leading to loss adjusters having to be more frequently replaced by colleagues. To make matters worse, a large number of insureds were displaced and thus difficult to contact.

As a result, adjustment efforts began with the smaller claims on the fringes and – in contrast to the standard process – proceeded inward, with the largest claims at the epicentre settled last. For this reason, insurers had to make subsequent reserves and increase their expected losses. Later hurricanes Rita (in Louisiana and Texas) and Wilma (in Florida), also significant cat events, added to the volume of claims and drew resources away from Katrina.

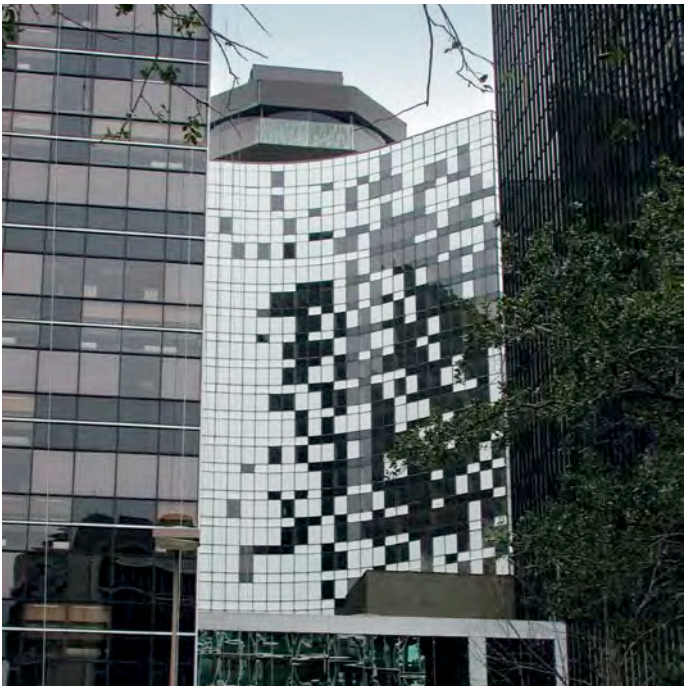
Wind versus flood

One frequent cause of dispute was the attribution of damage to wind or flood in the context of personal lines homeowners' claims. In the United States, homeowners' coverage excludes flood loss, for which a separate cover is available through a federal government programme, the National Flood Insurance Program (NFIP). However, relatively few homeowners purchase NFIP flood insurance. Insureds, their legal representatives and some government officials initially argued that the storm surge that caused losses immediately along the Gulf of Mexico and in inland waterways close to the coast was wind-driven and thus not natural flooding per se. The argument was that the wind pushed the water in the Gulf of Mexico onto the land, making wind the proximate cause. Ultimately, courts ruled that the storm surge was indeed flood, and hence excluded from coverage.

Many homes and businesses in Mississippi and Louisiana (outside of New Orleans) were severely affected by both flooding and the punishing winds, making it difficult for insurers to determine the extent of covered (wind-related) and non-covered (flood-related) damage. In some cases, insurers assessed that wind damage occurred only after the insured property had been rendered a total loss by the storm surge. This argument to release the homeowners' insurers from obligation to pay claims was also addressed by the courts. Insurers generally hired structural engineers to determine which parts of damage were caused by wind and which parts were the result of the storm surge.

Flooding in New Orleans

As described above, New Orleans flooded as a result of breaches in its levee protection. Many insureds, both homeowners and businesses, did not have flood insurance. In an attempt to circumvent the flood exclusion in policies, a theory was put forth that the overflowing of the 14th Street Canal, which caused much of the flooding, was a man-made event. As the exclusion referred to naturally occurring flooding, the argument went, this man-made damage should be covered by homeowners' insurance.



Façade cladding and windows of hotel towers in New Orleans could not hold up to the powerful winds.

Although policyholders initially prevailed at trial-court level, the appeals court ruled that the policy flooding exclusion applied. Another theory asserted to circumvent the flood exclusion was that the proximate cause of the loss was actually negligent construction of the levees and therefore not excluded. The courts rejected this argument.

Business interruption

The period of indemnity for business interruption losses was an issue in the case of Katrina. Business interruption in the US is generally defined as how long it hypothetically takes an insured company to repair/replace its premises and return to business. After Katrina, however, factors such as lack of access to the actual properties for contractors to begin repairs as well as the shortage of building materials and qualified contractors had to be considered. Other considerations in determining coverage of business interruption losses included extensive delays in obtaining government building permits to begin repairs.

A further question that had to be answered was what basis for reimbursement was applicable after a major hurricane. As many businesses that produce locally sold goods or services could expect an increase in demand after a catastrophe, it was argued that business interruption losses should be calculated to reflect larger than normal business volumes. However, US

courts had ruled after previous events that an insured may not benefit from a catastrophe. Katrina-related business interruption losses were calculated based on normal pre-loss business volumes and trends.

Complications

One prevalent issue was that losses could not be mitigated swiftly due to the volume of losses and logistical challenges, resulting in significant mould damage. In the US, mould is considered hazardous and specific protocols for its removal must be followed. This led to substantial additional mould remediation costs.

Many homes on the Louisiana and Mississippi coast were total losses due to combined wind and flood damage or flood alone. For health and safety reasons, civil authorities began clearing properties and bulldozing homes before adjusters had a chance to inspect them.

Lessons learned

Four large hurricane catastrophes struck Florida in 2004, resulting in claims volumes that overwhelmed insurers' catastrophe response plans. This underscored the necessity of contingency plans: insurers learned that they must be in a position to swiftly hire more adjusters and retain engineering experts and accountants in the event that their normal expected losses were exceeded by a single major catastrophe or multiple events. In 2005, they thought they were prepared.

As stated above, Katrina alone led to almost as many claims as all four Florida catastrophes combined. All insurers were again overwhelmed. Responses were slowed due to the sheer volume of claims as well as the logistical problems outlined above.

The main lesson learned is to avoid complacency: do not assume that your catastrophe plan is adequate for all possible events. Insurers must plan for a major catastrophe or multiple cat events of different types within any year, but they also need to recognise that even the best plans may be overwhelmed.

Events in separate areas

All four major US hurricanes in 2004 occurred within the state of Florida, which allowed insurers to easily shift adjusters from one loss event to another. In 2005, two hurricanes,

Katrina and Rita, occurred principally within two states, Louisiana and Mississippi, while a third large hurricane hit Florida, several hundred kilometres away.

The main lesson here is that insurers need to plan for multiple cat events occurring in multiple areas within the same year and include this contingency in their planning. For example, a company may have one employee designated to head its field staff during a catastrophe, but it also needs to train a back-up person to head field staff for a further event.

A second lesson: do not assume the first hurricane catastrophe of the season will be the only big one.

Catastrophe models

Many companies use catastrophe models to predict how many claims a hurricane of a certain wind speed and location will produce and hence how many adjusters and experts they will need for a hypothetical event. However, in the case of Katrina there was significantly more storm surge loss than models predicted and the overall volume of claims was higher. Modelling is a useful tool, but still relatively new.

The lesson is that insurers should use modelling as part of their catastrophe planning, but not totally rely on its accuracy.

Loyalty of independent adjusters

Most large and mid-sized insurers in the US use in-house claims adjusters to handle catastrophe losses, supplemented by independent adjusters (IAs). In the case of Katrina, insurers had neither enough adjusters on staff nor sufficient numbers of contracted IAs to deal with the overwhelming volume of claims. The insurers that had built good relations with the IAs prior to the event had a huge advantage in securing more IAs during the catastrophe response.

Large IA firms typically give preferential service to their largest, most loyal customers. Insurers that worked with one IA company exclusively during the 2004 Florida hurricane catastrophes and continued using the firm in 2005 were generally prioritised when they needed more adjusters than anticipated during Katrina.

The lesson that can be drawn from this observation is that contingency planning should include developing ongoing business relationships with IAs to ensure preferential treatment when necessary.

Innovative responses

Some insurers stopped using experienced in-house adjusters to handle claims when volumes grew far beyond capacity and contracted more IAs to adjust their losses. Their staff adjusters were then responsible for logistical planning, re-inspection, quality control and other supervisory tasks. This approach proved effective.

The lesson learned is that when an unprecedented event like Katrina occurs and overwhelms an insurer's catastrophe plan, the company should be innovative and creative in its responses.

Sign up experts

Just as there was a shortage of IAs in Katrina's aftermath, experts such as salvors, forensic accountants, and structural and electrical engineers were difficult to find, as most had already been contracted and were working at full capacity. Some insurers immediately retained as many experts as they could when the magnitude of Katrina became apparent, before it made landfall. Their foresight and swift action paid off in more efficient claims handling when volumes became very large.

Another innovative approach some insurers used was to hire engineers and other relevant experts immediately when a large claim was reported rather than waiting for the adjuster to inspect the loss. In light of the logistical problems involved with many losses in severely damaged areas, this approach lessened the difficulty of finding the right experts at short notice.

In this case, the lesson is that not only adjusters, but experts in other disciplines must be considered when developing a catastrophe plan. Insurers may want to pay an annual retainer to relevant experts to secure their commitment prior to a catastrophe.

Logistical problems

As outlined above, the extensive destruction from Katrina led to a shortage of hotel and temporary office space. Rental cars were also in short supply, as was gasoline. Much of the population in the affected areas was displaced. Normally, insurers wait until the day – or day before – a hurricane makes landfall to obtain hotel and temporary office space, because the path of the storm can change dramatically. Lodgings reserved ahead of an event may turn out to be in the wrong place or even become damaged by the storm.

People wait in line to buy fuel at a filling station along Interstate 10 in Pascagoula, Mississippi, in the aftermath of Hurricane Katrina. US petrol production was reduced by about 42 million gallons a day.

The lesson learned is that there are certain factors an insurer is unable to control, yet must be prepared for. These preparations include the ability to secure the best possible logistical base for staff operations in or close to affected areas during or immediately after a large catastrophe.

Work overload

One small, but important, aspect learned from Katrina was that many of the senior or executive general adjusters (EGAs) from IA companies became overloaded with work. Multiple insurers hired the same EGAs and their most trusted experts for the largest losses, inadvertently placing the best adjusters and experts under too much pressure and undermining their effectiveness.

The lesson here is the importance of finding out how many losses an EGA or top expert is already handling. If the preferred EGA or expert has too many cases, the insurer should look elsewhere for support.

In conclusion, the biggest lessons learned from Katrina were to plan as thoroughly as possible, be quick to respond to roadblocks and change course if required, and above all be innovative.

Thunderstorms and tornadoes USA 2011: Eastern United States

Thomas Verduzco-Weisel, Munich Re, Singapore

An extremely active spring thunderstorm season in 2011 caused damage on an unprecedented scale across the eastern United States. Numerous tornado outbreaks caused a record US$ 25.9bn in insured losses and over 600 thunderstorm-related fatalities, the highest loss of life from the peril since 1925.

Thunderstorms and tornadoes are the most frequent natural hazard events in the United States. The annual average exceeded 1,200 events between 1992 and 2012, with a maximum of 1,894 in 2011. May and June represented the peak season during this period, with 276 and 243 tornadoes respectively.

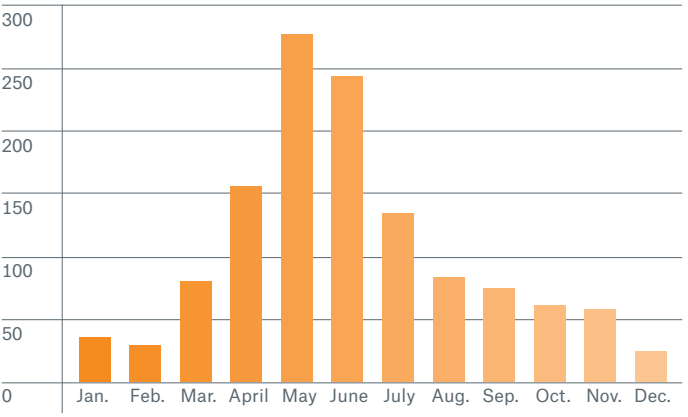


Figure 1: Average number of tornadoes over the last 11 years. Typically, large tornado outbreak days are found in the first half of the year, particularly in spring

Source: Munich Re

The greatest frequency of tornadoes is found in a corridor spanning from Texas through Oklahoma and Kansas up to Nebraska and Iowa. It is mostly here where the geography of the plains along with the influx of cold air masses from the north and warm, moist air from the south come together to provide optimal conditions for the formation of tornadoes. Largely depending on the corridor of the jet stream that crosses the United States in a more or less pronounced U-shape from west to east, tornadoes can also occur further east, north or south.

The path of destruction left by tornadoes in Tuscaloosa, Alabama, 28 April 2011.

In terms of typical damage patterns, it is common to find total losses immediately adjacent to buildings with only minor damage. Most damage is caused by loose objects and debris turning into devastating projectiles, which leave openings in the outer surfaces and allow for wind forces to do greater damage. Average damage paths are approximately 100 metres in width and a few miles long, but for extreme events the damage corridor can exceed one mile in width and be up to 200 miles long.

2011 tornado events and lessons learned

The tornado outbreaks of April and May 2011 rank first and second amongst the costliest US tornado events. In terms of insured losses, the April 2011 tornadoes that hit Tuscaloosa, Alabama and other states cost US$ 7.3bn, making it the tenth-costliest US natural catastrophe on record.

A large proportion of insured and human loss from this series came from a single event: the Joplin, Missouri, tornado in May 2011. The tornado ultimately reached a width of one mile (1.6 km) at its widest point and EF5 intensity. Due to its severity and path over a fairly large town, the Joplin tornado has become one of the costliest and deadliest tornadoes in US history, with estimated overall losses exceeding US$ 3bn and a human toll of 158 direct casualties. About 61,000 insurance claims produced a payout of some US$ 2bn.

What made these events so damaging?

The annual number of tornados with at least 74 mph wind intensity has not significantly changed since the 1950s. Regarding the enormous tornado losses in April and May 2011, two major causes can be established:

(1) Two city areas were affected in one outbreak season, which is a rare coincidence of bad luck.

(2) The substantial La Nina phase prevailing in the first half of 2011 fostered tornado activity in the regions affected in 2011.

Also, both the April and May outbreaks affected more US states than the average (10.5) of the ten most costly US tornado events.

— The April 2011 outbreak affected 13 states: Alabama, Arizona, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, Tennessee, Texas and Virginia.

— The May 2011 outbreak affected 20 states: Arizona, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Michigan, Minnesota, Missouri, North Carolina, Nebraska, New York, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Virginia, Wisconsin.

At the same time, the costs of both events do not come as a surprise. Where a tornado may hit is still very unpredictable, and even adherence to the most recent building codes does not make buildings tornado-resistant, as these regulations do not account for the maximum-force winds produced by the strongest tornadoes, but rather aim at protection from peak wind gusts. Therefore, devastating damage is to be expected when a tornado hits.

However, the 2011 tornadoes do provide new data for further research and thus new findings: a study published by the Bulletin of the American Meteorological Society found that objects picked up by a tornado most likely fall off 10° to the left of its path while some may travel extremely far (over 300 km) 5° to the right side of its path. It is knowledge of this kind that continues to improve modelling of tornadoes and early-warning systems to provide better protection from severe storms in the future.

A changing climatic regime of severe thunderstorm activity

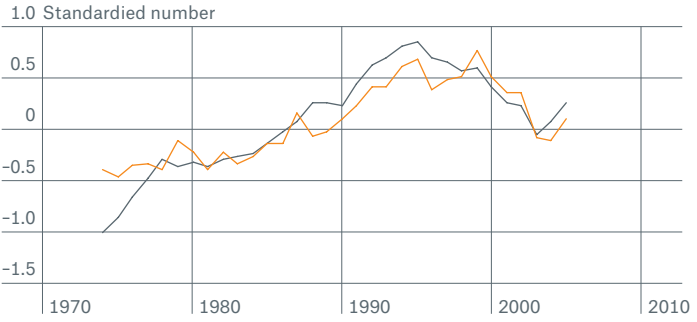


Figure 2: Nine-year running means of both the standardised annual number of direct economic normalised losses exceeding US$ 250m (Can$ 255m) per event, and the standardised meteorological thunderstorm-forcing potential caused by events exceeding a high threshold per season in the US east of the Rocky Mountains

The meteorological measure is derived from reanalysis data and has CAPE and vertical wind shear as components.

— Loss events
— Thunderstorm-forcing potential

Source: Munich Re, NatCatSERVICE

According to a holistic view, damages from severe thunderstorms comprise effects from hail, straight-line wind, and heavy precipitation, in addition to tornado damages. Together with the German Aerospace Centre, Munich Re has conducted research on overall direct and insured US thunderstorm losses since 1970 that have been normalised to the current level of destructible exposure. The findings show a strong increase in annual loss variability, accompanied by an increase in multi-year average loss levels. The research demonstrated that these increases reflect a strictly similar meteorological pattern of change in the times series of severe thunderstorm

A tornado accompanied by large hailstones near the border between southeastern Colorado and northwestern Oklahoma.

forcing as inferred from meteorological observation. The close similarity can be seen in the following diagram with curves smoothed by a nine-year running mean. The black curve pertains to the annual number of overall thunderstorm event losses exceeding a threshold of US$ 250m, whereas the blue curve represents the annual number of meteorological severe thunderstorm-forcing events (y-axis in units of the standard deviation).

This study found that a changing climatic regime can be identified as the dominant driver for the increase in variability and average level of severe thunderstorm-related normalised losses east of the Rocky Mountains over the period 1970–2009 (March–September season), i.e. losses caused by all thunderstorm perils (hail, straight-line wind, tornado, heavy precipitation). It could also be demonstrated that the findings are consistent with the changes that have already been attributed to anthropogenic climate change, in particular an increase in humidity at low levels.

Source: J. Sander, J. Eichner, E. Faust and M. Steuer, 2013: *Rising variability in thunderstorm-related U.S. losses as a reflection of changes in large-scale thunderstorm forcing.* Weather, Climate, and Society (AMS) (Early Online Release), DOI: 10.1175NVCAS-D-12-00023.1

Managing thunderstorm risk from an individual occurrence and aggregate loss standpoint

Nevertheless, from a single-risk perspective, proper construction techniques are critical in reducing thunderstorm losses. Buildings should be constructed with continuous load paths in the walls and proper roof-to-wall and wall-to-foundation connections. Exterior doors should open outwards, windows should be impact-resistant and garage doors reinforced. All these steps can greatly reduce the potential of wind damage, particularly for straight-line wind events and weak tornadoes. Additional wind mitigation techniques, such as hurricane straps, can further fortify a building against wind damage. Hail damage, a much more common type of thunderstorm loss, can easily be mitigated through use of proper building materials,

such as hail-resistant roofing and siding. All of these techniques, if implemented universally, could provide substantial reductions in thunderstorm loss from future events.

From a portfolio perspective, capping exposure accumulations within small geographic areas and insuring a variety of property construction types can be used to limit potential losses from a severe thunderstorm outbreak. The area impacted by an individual tornado or hail swath is very small, so limiting the amount of exposure written in a given development or community can help prevent an accumulation of large losses from a single severe event. This type of geographic control, if uniformly implemented across an entire portfolio, could also help to reduce the accumulation of losses from larger outbreaks that impact hundreds of discontinuous areas. Furthermore, diversifying or limiting certain types of construction in a given geographic region can also reduce losses, as some classes of construction are less vulnerable to wind and hail than others.

Conclusion

Never have thunderstorm losses been as high as in 2011 – a maximum not expected, even after the previous record years of 2008 and 2010. Despite probably being an outlier loss year, the trend of increasing thunderstorm losses does not show any signs of slowing. This is primarily due to increasing exposures, but the change in the climate regime already plays a substantial role.

The heavy losses of 2011 highlight the importance of managing thunderstorm risk, from an individual occurrence and aggregate loss standpoint. Individual events involve less risk in the case of thunderstorms than hurricanes and earthquakes because they do not produce comparably high insured losses. But, due to their frequency, annual aggregated thunderstorm losses are often higher than hurricane losses, and account to a large extent for increasing natural catastrophe losses in the USA. In 2008 and 2009, insured thunderstorm losses were US$ 20bn, more than hurricane losses for the same period (including Ike).

Since 1980, only six hurricanes and one earthquake have had insured loss totals, in terms of original dollars, that exceeded those from the 2011 outbreaks. In the same period, annual hurricane losses have only exceeded annual thunderstorm losses in five cases. Thunderstorm losses are now comparable with the losses from a moderate to severe hurricane season. Insurers must take steps to address this in their risk management.

Storm USA 2012: Sandy

Edward Ryan, Munich Reinsurance America Inc.
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The most destructive tropical cyclone of the 2012 Atlantic hurricane season, Sandy followed a path long dreaded as a doomsday scenario within the insurance community. After developing in the western Caribbean Sea on 22 October, Sandy strengthened and weakened several times, reaching peak intensity as a class 3 storm (on the Saffir-Simpson scale). It swept across seven countries before hitting New Jersey and New York on 29 October. Sandy affected 24 US states including the entire eastern seaboard, causing round about US$ 70bn of damage in the United States alone. Preliminary estimates place total losses in all seven countries affected at nearly US$ 73bn, a total surpassed only by Hurricane Katrina. A total of at least 285 fatalities were recorded throughout all countries hit.

Jamaica was the first country to be hit by Sandy, which proceeded to affect Haiti, Cuba, the Dominican Republic, Puerto Rico, the Bahamas and Bermuda before it struck the US. On the way to the US, the storm underwent the process of extratropical transition, which can be clearly seen by the increasing size of the wind field of the storm. Shortly before landfall the National Hurricane Center declared the storm to be "Post-Tropical", which means the storm had completely lost its tropical character but does not indicate any change in the intensity of the storm. From this point it was called "Superstorm Sandy" instead of "Hurricane Sandy" by many sources. After landfall, it underwent a merge with another low-pressure system, which helped to maintain relatively high wind speeds far inland. In Canada, the eastern provinces of Ontario and Quebec were affected before Sandy dissipated on 31 October.

With a diameter of around 1,500 kilometres, Sandy was the largest Atlantic hurricane on record, and brought wind damage, extended fire losses and severe flooding. The outstanding dimension of the wind field, the track of the storm before landfall, which was more or less rectangular to the coastline and the coincidence of the landfall and the high tide caused a storm surge which set records at several gauges along the affected coast. In New York City, for example, where the old record from 1821 was exceeded by more than two feet (~0.8m), the storm surge inundated streets, tunnels and underground transport systems and caused power outages in and around the city.

The remnants of the Jet Star rollercoaster in Seaside Heights, New Jersey, after Superstorm Sandy.

Damage and exposure estimates

The path of Sandy, with its resulting storm surge and flooding, primarily impacted homeowner properties along the coastlines of New Jersey, New York and Connecticut, as well as commercial properties in the New York metropolitan area. Damaged properties included primary and secondary residences, apartment buildings, condominiums, and projects with builder's risk covers, which included the World Trade Center reconstruction site and large commercial properties, such as financial institutions in Lower Manhattan. Marine losses affected watercraft, warehouses and galleries.

The flood water heavily affected the Chelsea area of Manhattan. Unfortunately, in this area there is a concentration of art galleries with items often stored in basements, resulting in correspondingly high damage.

The widespread damage made adjuster access difficult following the event. While this is typical of all major catastrophes, access difficulty was compounded in the case of Sandy by damage sustained at limited points of entry to barrier islands as well as damage to transportation hubs. In addition, gas rationing was implemented by state governments to ease the general supply shortages.

A further complicating factor was the fact that insurance company offices and large numbers of their staff were directly impacted by the event, requiring insurance carriers to implement their own business continuity plans alongside their catastrophe management plans. This underscored the necessity of effective contingency plans, including a secondary level of suitable staff designated during the planning stage.

Also, the wide variety of policies exposed and damage sustained required a broad range of expertise among consultants to assist with the damage estimation process. Experts in great demand included marine surveyors, fine-art appraisers, electrical engineers and flood-mapping consultants. In some

cases, expertise had not been previously anticipated or identified by carriers. In others, the number of carriers seeking the services of the same experts caused a work overload. This underscored the need to anticipate the types of loss presented by the risks insured and to identify secondary and even tertiary groups of experts, possibly from other parts of the country, to accommodate potential shortages.

Often, access issues are mitigated by the ability of adjusters to approach losses from the outside, working from areas of least damage on the fringe of the disaster area inward to more heavily damaged areas. This allows adjusters to begin to settle relatively minor losses while awaiting access to the hardest-hit locations. However, in Sandy, outlying wind damage was relatively minor when compared to flood damage, negating the effect of this adjustment technique and delaying companies from developing accurate reserve estimates for the event as a whole.

This revealed another difficulty faced by companies seeking to determine their ultimate loss exposures: Sandy was primarily a flood event, an exposure that most companies had not yet modelled. As a result, there was great pressure on adjustment teams to come up with individual loss estimates on a claim-by-claim basis in order to develop overall company exposure estimates. Further compounding this was the fact that Sandy occurred when companies were beginning their year-end financial reporting processes.

Application of deductibles

Since damage was accepted as the result of one loss under the policy, the question insurance carriers faced was not the number of deductibles to apply, but whether carriers could apply hurricane deductibles to claims presented under homeowner or commercial policies. Hurricane deductibles replace the standard fire or all-other-perils deductible under the policy and are stated as a percentage of the value of the property rather than as a flat sum. They were first implemented by the insurance industry following Hurricane Andrew in 1992 and have been an important underwriting tool used by insurance carriers to mitigate loss exposure arising from significant events, while maintaining the affordability of property insurance in coastal areas.

It has been widely reported that insurance carriers were prohibited by order of State Insurance Departments in several US states from implementing such deductibles. However, the ability of insurance carriers to implement wind-related deductibles following Sandy appears to have had more to do with specific policy wording and the characteristics of the

event causing the damage than with government rulings. This was also the case following the 2004 Florida hurricanes and Katrina in 2005.

It has been reported that Sandy was reclassified by the US National Hurricane Center from a hurricane to a post-tropical cyclone prior to making landfall. If policy wording was specifically tied to a hurricane designation, it is logical to assume that such wording would be unenforceable. On the other hand, if policy wording referred to a named storm or contained generic windstorm wording, it is similarly logical that such deductible provisions should have been applicable.

Differences in the criteria for enforcing windstorm deductibles between individual states made it difficult for carriers to apply policy deductibles consistently across all claims. Also, it would have been difficult for carriers to explain under media pressure why wind deductibles are applicable in some cases but not in others. Carriers are encouraged to consult with their reinsurers prior to reaching a unilateral decision, in order to ensure that decisions made will not impact collectability under their reinsurance.

Flood sublimit issues

A related issue affecting coverage for losses arising from Sandy is the application of flood sublimits. In response to issues arising from Hurricane Katrina, underwriters adopted policy wording to make clear their intent to accumulate damage arising from storm surge associated with the event, with windstorm damage as one loss subject to one sublimit. In some cases, however, policy wording specifically stating that such a storm surge was still subject to any applicable flood sublimits may have been overlooked. Due to the unique characteristics of Sandy, where the effects of wind were negligible but flood damage extensive, this led to opportunities for insureds to argue ambiguities in policy wording and negate the implementation of separately stated flood sublimits.

For a number of commercial accounts covering large areas, adjustment issues also arose in evaluating the applicability of flood sublimits to flood claims from Sandy. As in typical losses involving both flood and windstorm, adjusters were required to separate damage by peril. An additional layer of investigation was required for commercial losses, since adjusters were required to confirm whether flood-damaged structures were located within high-hazard flood zones and therefore subject to sublimits. This was not an issue in homeowner losses, since personal lines flood policies do not distinguish between flood zones.

Wave and storm-surge forces damaged the lower levels of the structures of buildings close to the shore line on Long Island, New York.

In general, underwriters do not receive sufficient detail to determine the exact location of specific buildings. If any part of an insured site is considered within a high-hazard flood zone, the entire location is rated on the basis of that exposure. However, the Federal Emergency Management Agency, which administers the National Flood Insurance Program, regards an entire building and its contents to be within a high-hazard flood zone if any part of the building is within that zone.

As a result, adjusters of Sandy claims were required to retain flood-mapping consultants to confirm the exact location of each building's sustaining damage in order to determine if that damage was subject to a high-hazard flood zone sublimit. Once this had been established and damage segregated accordingly, adjusters were then required to consult policy wording to determine whether the high-hazard flood zone sublimit was applicable to all exposures, including extensions of coverage for items such as debris removal, extra expense, etc. In cases where policy wording did not clearly state the sublimit applied to all losses arising from Sandy, arguments were raised regarding ambiguity of policy wording.

Adjustment issues

One issue particular to Sandy losses resulted from the storm's path: it directly impacted financial institutions in Lower Manhattan as well as large power generating and transportation companies in the surrounding area. The values at risk presented by these exposures, as well as labour costs and overheads built into construction contracts in the New York metropolitan area, led in some cases to damage estimates higher than may have been anticipated by underwriters. These significant values at risk placed pressure on adjustment teams to concede limits based on the claimed loss, prior to a full assessment of all damage exposures.

Large fires mainly on Long Island, New York, caused total losses to several neighbourhoods.

Another development related to large commercial risks was the request by insureds for confidentiality or non-disclosure agreements prior to releasing documentation in support of their claims. In some cases, documents were requested to protect claimed trade secrets and the proprietary nature of business conducted or, in others, for security considerations. Adjustment teams resisted blanket acceptance of such requests, except where legitimately warranted and, in those cases, took steps to preserve policy language requiring insureds to cooperate in the presentation of their claims to avoid the appearance of creating a precedent for future claims.

Regulations requiring mediation

A final adjustment issue in Sandy claims yet to be faced by carriers will be compliance with regulations adopted by several state insurance departments after Sandy, which require licensed insurance companies to participate in non-binding mediation with insureds who have disputed or unresolved

claims. The state regulations require the insurance company to provide notice to insureds of their right to request mediation and to pay the mediation fee charged by the mediators.

Number of occurrences

Sandy was a combination of two separate weather systems, a major storm event and a minor snow storm event, which historically would have been considered separate loss occurrences. However, due to the combination of perils causing damage and inherent difficulty of separating the damage by event coupled with the fact that Property Claim Service (PCS) included the peril of snow along with the traditional hurricane perils of wind and flooding on the PCS cat bulletin, carriers accepted all claims as being the result of one loss occurrence. Similarly, reinsurers accepted cessions from their ceding companies under their catastrophe treaties on that basis.

Lessons learned

As mentioned above, the insurance community has long been aware of the potential losses that could result should an Atlantic storm hit the high-value areas of New York. Had Sandy remained at hurricane strength while making landfall, the financial impact on the industry could have been even greater.

The characteristics and timing of Sandy, which occurred during a full moon at the highest point in the tidal cycle, combined to produce a significant flooding event in Lower Manhattan, which is home to some of the world's most valuable financial and commercial real estate. The values presented by the risks insured as well as construction costs in the Greater New York metropolitan area produced exposure estimates that may have exceeded underwriters' anticipated loss expectations, particularly when combined with untested contract wording that attempted to limit flood exposures.

Above all, insurers' experiences clearly demonstrate the need for contingency planning and arrangements to secure the services of requisite experts, including those from outside the affected region. The event made painfully clear the vulnerability of the densely populated US eastern seaboard to the tropical storm systems that hit the Caribbean and southeastern US on a regular basis.

Lessons from recent natural catastrophes


TSUNAMI

Recent catastrophes in review – Expect the unexpected

The recent sequence of devastating earthquakes and a number of weather-related catastrophes have brought home to reinsurers and insurers the fact that natural catastrophes are part of their core business and that the special dynamics of natural catastrophes result in special challenges for claims management.

2011 was the costliest year ever in terms of natural catastrophe losses, arising mainly from the Tohoku earthquake and tsunami in Japan, the New Zealand earthquakes and the Thailand floods. At about US$ 380bn, global economic losses were nearly two-thirds higher than in 2005, the previous record year with losses of US$ 220bn, which included Hurricanes Katrina, Rita, Wilma. The earthquakes in Japan in March 2011 and New Zealand in February 2011 alone caused almost two-thirds of these losses. Insured losses of US$ 105bn also exceeded the 2005 record (US$ 101bn).

The series of significant natural disasters has kept us busy in the recent past: the major hurricane Katrina in the United States in 2005; the earthquakes in Chile 2010, in New Zealand in 2010/2011 and Japan in 2011; the tornadoes in the US in 2011; and Storm Sandy in 2012. In our analysis of all these catastrophes, some interesting features of claims settlement have come to light, particularly with regard to the situation in the aftermath of catastrophes and the challenges facing insurers.

The recent catastrophes all have individual loss patterns with special implications for claims settlement. Natural catastrophe reinsurance has always been and will remain exposed to unpredictable natural phenomena, yet recent events have been a wake-up call for the entire industry. Reinsurers and insurers are now seeking increased transparency on the exposed value they cover in each region.

All the major events of the recent past showed their own special dynamics, which are compared in the following overview table. This table summarises some important claims management issues following natural catastrophe events. Simply by comparing natural catastrophe experiences from earthquakes, floods and windstorms, we have identified important variables

A tsunami early-warning system has been deployed off the shores of Indonesia. Here, a new tsunami-detection buoy is being installed west of Java.

such as supply chain issues and changing claims characteristics (soil liquefaction, storm surge) that present increased challenges. New and unexpected high loss dimensions are the "unknown unknowns" when dealing with major natural catastrophe losses.

It is hardly surprising that different natural hazards cause different secondary damage effects:

- Earthquakes can generate unexpectedly high tsunami, liquefaction, landslide and fire damage
- Storms can generate unexpectedly high storm surge and heavy rain damage
- Flood can generate unexpectedly high damage following breach of levees and landslides

Storm surge, tsunami and liquefaction have influenced loss figures to a major extent and can be critical loss drivers.

An important lesson was also the impact of multiple events (due to either the same peril or different perils) affecting an insurer within a short period or, for example, due to increased ongoing seismic activity. These impacts might be mitigated to a certain extent by way of advanced nat cat contingency plans, which contribute to safer navigation through a post-disaster situation and secure the ability of an organisation to function in terms of professional claims management.

In terms of pure claims management activities, we found that loss drivers like coverage/wording issues or the shortage of experts can seriously affect claims management activities. Also business interruption (BI), contingent business interruption (CBI) and the influence of authorities (political influence) are tending to develop more and more into relevant loss drivers.

At the same time, the relevance of these loss drivers can be reduced by means of highly professional claims and risk management. This approach can be achieved and optimised through a preparedness for dealing with mega-catastrophes. This comes back to professional nat cat contingency planning, ensuring that the resources and processes available can be used in a critical scenario.

Table 1: Important claims management issues following natural catastrophe events.

CBI: Contingent business interruption

CBD: Central business district

Source: Munich Re

Event/Issue	Chile earthquake 2010	New Zealand earthquakes 2010/2011	Japan earthquake and tsunami 2011	USA Hurricane Katrina 2005	USA Storm Sandy 2012	USA thunderstorms and tornadoes 2012	Thailand Flood 2011
New or unexpectedly high loss dimensions	Business interruption, vast area hit	Reinstatement and upgrades according to revised building codes	Earthquake, tsunami	Storm surge, vast area hit, loss of attraction	Storm surge, vast area hit	High frequency of severe events	Vast area hit, CBI, industrial hot spot
Period of interruption	Medium – few months to one year	Long – months to years	Varied – weeks to years	Long – months to years	Varied – weeks to years	Medium – few months to one year	Medium – few months to one year
Impact of multiple events	Limited	Sept. 2010 Feb. 2011 June 2011	Multiple heavy after-shocks	Heavy storm surge	Heavy storm surge	Limited	Limited
Access issues	Limited	Significant in CBD	Extreme in nuclear fall-out zone	Significant in devastated areas	Limited	Limited	Significant in flood plain
Speed of adjuster access/ shortage of experts (yes/ partly/no)	Quick/ partly	Quick, except inside cordoned-off CBD/ partly	Quick, restricted in nuclear fall-out zone/ no	Delayed, wide-area damage/ yes	Delayed, wide-area damage/ partly	Quick/ no	Delayed, wide-area damage/ partly
Precautions, long-term prevention	Advanced building code	Advanced building code	Advanced building code, tsunami warning	Flood prevention measures	Flood prevention measures	Building code, but limited precautions feasible only	Flood prevention measures
Modelling accuracy/ limitations	BI under-estimated	Extended soil liquefaction	Extended tsunami	Storm surge insufficiently modelled	Storm surge insufficiently modelled	Modelling inherently difficult	No model available, unknown exposure
Loss of attraction	Short-term	Long-term in CBD	Long-term in devastated area	Medium-term	Medium-term	Short-term	Reduced demand due to wide-area flooding
Supply chain issues (BI/ CBI losses)	Limited	Limited	Significant	Limited	Limited	No	Significant
Coverage/ Wording issues impacting claims management	Medium	High	Low	High	High	Low	High
Government/ Public authorities influence on claims mgmt.	Medium	High	Low	Medium	Medium	Low	Medium
Effectiveness of nat cat contingency plans	Working	Working with delay	Working	Limited, plans partly overwhelmed	Working	Limited due to extreme exposure	Limited

General lessons from recent natural catastrophes

Nat cat losses can be unexpected

It has been the major natural catastrophes of the recent past that have given the markets most to think about, not just in terms of losses. Some of these losses were unexpected to a degree, underscoring once again the fact that risk and exposure assessment are evolving and are imprecise sciences. For instance, the floods in Thailand demonstrated that the region was home to a large concentration of special industrial risks, rather unfortunately located in the flood plain and not sufficiently protected. This made highly evident the vulnerability of first-, second- and third-tier suppliers, the vulnerability of diversification concepts and the effects on the global supply chains with implications for BI and CBI covers.

Loss driver	Calculated in models	Comment
Ground motion	Yes	
Subsequent fire	Yes	Included in models where significant
Tsunami	So far limited	Some models consider loadings
Ground failure (liquefaction, landslide)	Not explicit	Some models implicitily consider liquefaction, but not extreme cases
Sprinkler leakage	Limited	Considered in some countries
Business interruption	Yes	Considered in most models, BI-sensitive single risks often underestimated
Contingent business interruption	No	No full transparency of the exposure
Post-loss amplification	Yes	Many models already consider at least economic demand surge and claims inflation

Table 2: Loss drivers and calculation of secondary perils in earthquake modelling

Source: Munich Re

Modelling remains important and major nat cat events reveal model limitations

Secondary perils, for example liquefaction and tsunami, had not been modelled or were underestimated. For instance, the tsunami losses of the Tohoku earthquake accounted for roughly 20–25% of the entire insured loss, a substantial portion, whereas the shock damage was overestimated. Considering the Christchurch earthquake in New Zealand, it is estimated that it was not the shock damage but the liquefaction damage that contributed to the lion's share of the overall insured losses sustained. Moreover, portfolio catastrophe

modelling is inadequate for assessing individual high-value risks. In these cases, insurers and insureds must have a detailed understanding of the risk management aspects of the systems involved and the specific potential for business interruption and contingent business interruption, for example. The insurance industry needs to understand the implications and to demand loss control and engineering-based modelling specific to individual high-value sites or portfolios.

Members of the German Federal Agency for Technical Relief (THW) take part in a training exercise simulating a catastrophe scenario.

Such insufficiently modelled secondary loss factors have uncovered the limitations of catastrophe models. The flood in Thailand as well as the highest single loss in the Chile earthquake have once again proved that business interruption losses are difficult to model.

Taking into account the uncertainty regarding the extent to which secondary effects contribute to insured losses, it is understandable that after major events, insurers and modelling agencies have difficulties in providing an accurate first loss estimate. Uncertainty will cause insurers and reinsurers to rethink exposures, for example regarding coastal flooding simulations or contingent business interruption losses.

Considering earthquake, almost all models include ground motion and some post-loss amplification. But gaps exist with respect to secondary perils such as subsequent fire, sprinkler leakage (except the US), liquefaction and tsunami, which are usually not or not fully included in models. Tsunami risk should be specifically considered for highly exposed coastal regions, also in pricing and budgeting. CBI exposure also appeared on the risk and loss landscape and should be considered all the more carefully as the exposure is hard to understand.

Business interruption and secondary perils like liquefaction or tsunami have had a noticeable influence on recent loss figures. As there will always be unprecedented events, reinsurers have to adapt to new information by increasing the complexity and accuracy of current models used to assess risk exposures. The insurance industry has to be aware of model risk and risk-modelling limitations. The extent to which insurers and reinsurers are prepared for and learn from such events affects their credibility.

Business interruption

One common issue for the insurance industry to consider is business interruption (BI) losses resulting from huge single losses. Furthermore, multiple insured and uninsured causes arising from wide-area damage of natural catastrophes can also play an important role. BI losses arising from wide-area damage are not new: they occurred, for example, following the closure of New Orleans after the flooding that resulted from Hurricane Katrina in 2005.

The enormous scale of the damage in New Zealand, Thailand, and in the US after Storm Sandy demands further attention. Following the earthquakes in New Zealand in February 2011, Christchurch's city centre was cordoned off for a period of more than 16 months until July 2012. In Thailand, the premises of many industrial estates were under water for almost three months and their "just in time" supply chains remained disrupted for a much longer period.

With regard to CBI exposures, reinsurers now perceive a need for more information to track risk exposures more accurately. Natural perils modelling must keep pace with globalisation if reinsurers and insurers are to avoid significant losses from insufficiently modelled risks.

The impact of hurricane, storm, flood and earthquake claims on global insurance and reinsurance markets has been significant. There is potential for more, even bigger loss scenarios in the future as property insurance penetration increases.

Overall loss assessment remains challenging

It is often highly challenging to predict the scale of overall losses from a nat cat event at an early stage. Storm surge often accompanies hurricanes, for example, and a combination of flood and wind damage creates a difficult situation for loss assessment. Sandy's record storm surge is likely to be a major loss driver for commercial policies, as they typically provide cover for wind, surge and flood. Some of the hazards like tsunami are insufficiently mirrored in current models, and

initial estimates can deviate significantly from the real loss figures sustained. In addition, BI claims can mount up due to the widespread areas damaged by the natural catastrophe and may become especially difficult to determine, because even single BI losses can easily drive up loss figures.

Role of deductibles influencing claims management

Deductibles play an important role in managing mass claims after natural disasters. For instance, in Chile the earthquake deductibles applied for residential risks were 1% of the sum insured, min. UF 25 (approx. US$ 1,000) and for commercial risks 2% of the sum insured, min. UF 50 (approx. US$ 2,000). After the 2010 quake, homeowners started complaining about the level of the deductibles, which soon became a political issue. The local financial authority asked the insurance industry to withdraw the deductibles. The insurance industry did not accept and explained why deductibles are absolutely necessary for natural catastrophe losses.

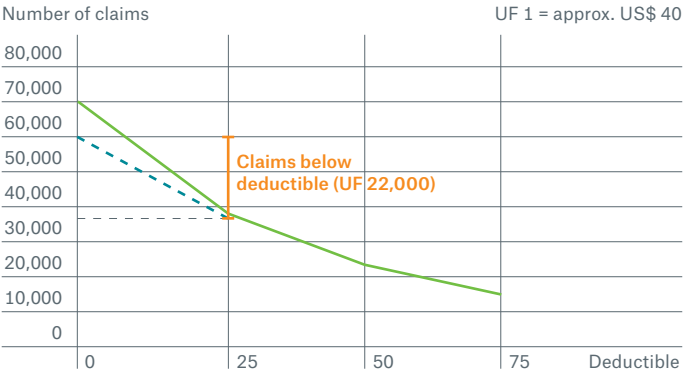

Figure 1: 2010 earthquake in Chile – Influence of number of indemnifiable claims vs. deductible of a reinsurance treaty for residential risks.

Source: Munich Re

This graph, prepared on the basis of the statistics relating to one large reinsurance treaty for residential risks affected by the Chilean quake, shows clearly that the main reason for the application of deductibles is to reduce the number of indemnifiable claims (in this case from roughly 60,000 to about 40,000). This is of utmost importance, as otherwise the effectiveness of loss adjusting would be reduced due to further increased pressure on the limited resources available. Of course, the overall loss burden for insurers and reinsurers is also reduced by the application of deductibles, but more important is the beneficial, significant reduction in the number of claims.

In principle, one could price the elimination of deductibles when calculating the insurance premium of a policy or of a reinsurance treaty. However, the elimination of deductibles would have a highly negative impact on claims management.

Influence of public authorities/government

When a policyholder's property is affected by a denial-of-access order issued by a governmental entity, the order may trigger civil authority coverage and in many cases claim settlement activities and reconstruction may be delayed. In addition to orders by civil authorities that restrict access to property, physical damage as a result of, for example, an earthquake in Christchurch (cordoning off the central business district for months) or Storm Sandy (e.g. evacuation) may also limit the ability of customers or employees to physically enter a policyholder's property, resulting in a business interruption loss.

Role of insurance associations

In light of the influence of public authorities and government, the role of insurance associations is going to become evermore vital. Insurance associations play an important role in planning for, coping with and managing disasters to maintain or improve the image and importance of the insurance industry. Core objectives on behalf of the insurance industry in a market could be the coordination between companies and adjusters in the preparation phase by providing a definition of standardised and simplified procedures of adjustment and damage report, control of policies' quality, terms and definitions (focus on natural perils deductibles, endorsements relating to claims management for natural losses), plans for adjusters' training, simulations between the parties involved, advising companies to split the city or area into zones and to assign adjusters to particular areas.

After the disaster, coordination is often required regarding an external communication protocol with the press, also through social networks, the control of information on the progress of the adjustment (claims, open, adjusted, closed) and finally a publication of damage statistics.

The role of insurance associations could be not only coordinating claim management issues on a market-wide basis, but also communication with the government and public, including proactive communication on positive examples (e.g. damage minimisation, collaboration with the insured persons or with the authorities, etc.). These more coordinated approaches to indemnification of policyholders also help to minimise "demand surge" by ensuring overall adequate supply, as well as limiting the potential for bad publicity from the

media. Insurance associations can help show that there is merit to the insurance industry (insurers, reinsurers, brokers, loss adjusters, etc.) cooperating with each of its partners and constituents to play a pivotal role in the rebuilding and restoration processes following destruction caused by a natural catastrophe. The insurance industry has learned a great deal from recent disasters and there is some hope that the experience will form an integral part of advanced insurance industry catastrophe coordination planning.

Coverage/wording issues remain proven loss drivers

Natural catastrophes cause enormous damage to property and a significant number of those affected are likely to submit claims to insurers. Insurers will then in turn look to their reinsurers. The validity of the claims will largely depend on the particular circumstances of each claim and on the wordings of the insurance or reinsurance contracts at issue. Accordingly, insurers and reinsurers must be prepared to analyse substantial claims in a sophisticated fashion with regard to the legal context. This often goes hand in hand with the need for more transparent coverage conditions and settlement practices in a given market.

In addition to permanent flood protection installations, emergency measures like sandbag barriers put up during the lead time can help limit losses.

For instance, despite the best efforts of private insurers and the Earthquake Commission (EQC), unforeseen delays have occurred both in initial loss assessment and ongoing claims management after the earthquakes in New Zealand due to coverage/wording issues. Private insurers offer a top-up cover over and above the EQC cover (excluding land). The existence of two covers and their differences have led to duplication of loss assessments and a strain on loss adjustment resources. In addition, the differences between the EQC and private

insurance with regard to buildings covers gave rise to divergent repair methods and costs as well as complications in the claims evaluation processes.

Following Storm Sandy, a recurring issue has been the policy language, as flood and "named storm" clauses and definitions on large commercial risks have to meet the underwriters' intent, and also the application of hurricane deductibles.

Thailand, furthermore, raised a "flood" of coverage and wording issues which dominated claims management. For example, the calculation of underinsurance was a major challenge, "betterment" was a complex issue to calculate, and business/contingent business interruption also raised challenging questions.

Unclear policy wordings/coverage have proven to be a major headache in regulating losses from recent disasters.

Effectiveness of nat cat contingency plans is key

Nat cat contingency planning is a process that prepares an insurance company to respond coherently to an unplanned nat cat event. Contingency plans have to consider severe shortages of experts and loss adjusters as well as post-loss inflation due to a shortage of material and services. An important lesson has been to plan for multiple events per region in one fiscal year.

Firemen erect a flood wall in front of the Weltenburg monastery in Bavaria, Germany. It proved a valuable loss prevention measure when extreme rainfall added to the flood situation.

Expect the unexpected - A major lesson learned

Despite fluctuations from year to year, losses from natural disasters show an overall increase in the worldwide insurance market. Natural disasters remain a recurring serious threat for insurers and reinsurers.

In the recent past, more and more surprising natural catastrophes have challenged the insurance industry. Some events have even been – not necessarily correctly – considered to be unknown unknowns, or "black swans". Nevertheless, insurers and reinsurers alike were taken by surprise by the clusters of events in Asia-Pacific and US, many of which were unprecedented and triggered a wider range of claims than expected:

- The Tohoku earthquake proved to be a triple hit (shockwave, tsunami, nuclear fallout).
- Christchurch in New Zealand suffered three earthquakes in just 15 months, revealing fault lines previously unknown. The duration of ongoing seismic activity involves extended problems regarding recovery and reconstruction.
- The tornadoes in the US demonstrated that such wind events can reach overall loss dimensions comparable to hurricanes due to their unusual frequency and severity.
- The flood in Thailand demonstrated the vulnerability of highly industrialised regions and supply chains.
- Following Hurricane Katrina, Storm Sandy revealed once more how prone coastlines are to losses from storm surge.

Other lessons learned for the markets were to adjust and improve the models used and to reassess risk exposures. Insurers and reinsurers must be aware of the model limitations. Building codes have to address loss control features in addition to life safety much more than has been the case thus far.

Professional claims management in the settlement of individual claims is a best practice at most insurance companies today. The recent natural catastrophe losses described here show, however, that this professional approach must also be applied to the management of thousands and thousands of accumulated and large claims. The correct approach to catastrophe loss management is to remember that "after the catastrophe" is always "before the next catastrophe". This means that, after any event, it is necessary to analyse what went well, what went badly, and what can be improved upon.

Nat cat contingency plans promote efficiency when losses occur, in that they entail the organisation of claims handling procedures. In the case of natural catastrophe losses, a holistic approach enables insurers to focus the limited available resources on the hot spots. This not only makes claims handling more reliable, but also reduces costs. Contingency planning brings weaknesses in the company to light and thus generates value added. Furthermore, the extent to which companies are prepared for nat cat events varies and can even affect a company's rating and reputation. Nat cat contingency planning is a process that prepares an insurer's organisation to respond coherently to an unplanned event. The organisation can perform better if it plans thoroughly.

In order to help you prepare yourselves, we have appended a series of checklists related to nat cat contingency planning as a special feature at the end of this brochure.

Nat cat contingency plans

Why you need a nat cat contingency plan

Dieter Ackermann and Dr. Alfons Maier, Munich Re

Natural catastrophes typically result in mass claims and large single claims. The challenge of processing many thousands of claims swiftly and accurately is further compounded by the immediate effects of a natural catastrophe, such as ruined infrastructure and inoperative communication networks. Under these circumstances, handling claims in a catastrophe without an effective and proactive nat cat contingency plan may result in inconsistent procedures, delays, customer disappointment and excess payments. A well-executed nat cat contingency plan can prevent these negative consequences and remove the threat of a loss in confidence that could impair a company's future business. Munich Re has developed these nat cat contingency planning guidelines as a resource to help clients establish their own contingency procedures, which should be adapted to regional perils and local infrastructure.

Nat cat contingency planning secures value

By combining Munich Re's experience and understanding of the traditional tasks of claims management with lessons and conclusions drawn from past catastrophes, you can create a nat cat contingency plan that prepares you for the special dynamics of natural catastrophe losses. In a natural catastrophe event, this plan can support you in channelling the limited resources available to where they are most urgently needed. This not only makes claims processing more efficient and reliable, but also reduces costs. Nat cat contingency planning uncovers weak spots in a company's claims management processes, offering added value that should not be underestimated.

Munich Re has observed certain recurrent patterns in the aftermath of natural catastrophes: the concurrence of thousands of single losses, a lack of information in the first days and weeks after an insured event, poor coordination of claims personnel and a shortage of loss adjusters. These organisational shortfalls can be – and must be – avoided by means of proactive measures.

Volunteers help clear a Staten Island home damaged by floodwaters from Hurricane Sandy.

A recent survey from January 2013 entitled "Natural catastrophes: business risks and preparedness", conducted by the Economist Intelligence Unit and sponsored by Zurich Insurance Group, contains the responses of 170 executives from around the world. It also includes the following summary: "The survey confirms a widespread perception among organisations that natural catastrophes are becoming both more frequent and more severe, and that commensurate importance is assigned to assessing and mitigating the associated risks. Survey respondents say that business disruption from a natural catastrophe would encompass multiple aspects of the enterprise, with the most severe threats confronting supply-chain logistics and continuity of IT support. The research suggests that there is significant room for improvement in companies' planning and continuity endeavours. The findings suggest that while businesses are aware of the challenges they face, most have not yet developed a holistic approach to confronting these risks." The survey was based upon many different types of industry and hence the results emphasise the value of nat cat contingency planning and the need for a comprehensive approach not only for the insurance industry.

The Economist Intelligence Unit: *Natural catastrophes: business risks and preparedness* A research programme sponsored by Zurich Insurance Group, 1 March 2013

The value of nat cat contingency planning

Claims management following a natural catastrophe can quickly morph into a crisis.
A proactive nat cat contingency plan ensures the highest possible level of efficiency in claims management and helps to avoid organisational shortfalls and loss of reputation, while reducing costs at the same time.

Developing nat cat contingency plans for insurers

It is the responsibility of the management of an insurance company to implement a nat cat contingency plan. A nat cat planning team should be formed representing all functions affected in a natural catastrophe, including claims, accounting and underwriting departments, client management, personnel department, and risk and reinsurance management.

Apart from nat cat contingency planning, business continuity management comes into play if the insurer's own organisation is affected. The Business Continuity Institute, an international body based in the United Kingdom, whose goal is the creation of standards in the field of business continuity planning, defines business continuity management as follows: "A holistic management process that identifies the possible impacts

that threaten an organisation. As part of the process, fit-for-purpose procedures are developed to maintain business operations and to protect persons, property and assets within the context of value-creating activities." Knowledge and awareness are the keys to sound preparation of a nat cat contingency plan. Accordingly, claims employees should be thoroughly trained and equipped with an understanding of the following topics:

- Scenarios of natural hazards and potential losses
- Potential exposures for employees, company property and IT equipment
- The company's own capacity/limitations, for example in claims data storage and processing
- Potentially affected markets and clients
- Necessary contacts in an insured event
- Loss adjustment processes and available resources

This information needs to be continually updated, must be accessible to all relevant personnel and should be trained at least annually, e.g. before the start of the storm season.

There is a wide array of approaches to nat cat contingency management, but they are mainly based on one pattern:

1. Identify risks
2. Determine consequences
3. Design countermeasures

Identifying risks

An insurer must take various natural catastrophe scenarios into account, depending on its market and geographical region. Munich Re can offer support in identifying natural hazard risk and also provide specific information on natural hazards and events. For many regions and countries, there are also useful websites available for identifying, preparing and coping with natural catastrophe risks (e.g. information at noaa.gov, rsoe edis, typhoon.weather.com.cn, csi.ac.cn, tropicalstormrisk.com, jma.go.jp/jma/indexe.html, bom.gov.au/, geonet.org.nz/, esa.int/ESA). Severe events like windstorms, flooding and earthquake demand special attention. Many regions are vulnerable to more than one type of natural hazard. It is useful to classify natural hazards according to various criteria, including frequency and season of recurrence, typical severity and size of affected region, average lead time and duration.

In addition to the many aspects that lie beyond human control, it is essential that an insurer has precise knowledge of its portfolios, customers and markets in order to accurately establish

exposure. Understanding all facets of natural hazards will help the planning team determine consequences and implications in the next phase of the planning process.

Determining consequences

The consequences of a natural catastrophe may include property damage and personal injury for both policyholders and insurers alike. In forming a nat cat contingency plan, insurers should take into account their own damage, which should be addressed by business continuity management. First and foremost, however, an insurer must consider the impact of an event on its specific work processes:

- What financial burdens will have to be tackled by the company in the event of claims across all insured segments?
- How can the company adapt its processes to succeed in evaluating, recording and settling a large number of losses within a short period?
- How can the company provide necessary information on occurrences and accurate loss estimations to its reinsurers within a reasonable time?

Consider how the company might answer these questions differently for each natural catastrophe scenario – for example, with roads impassable due to flooding or telephone and data lines down after a windstorm. These analyses coupled with historical experience from previous losses allow us to conceptualise various scenarios as the basis of nat cat contingency planning. In developing a defined scenario, special attention must be paid to aspects such as expectable claim volumes, personnel planning, accommodation of flown-in personnel, transportation, external adjusters and experts.

Nat cat scenario planning is key

Difficulties increase tremendously after a natural catastrophe: the volume of claims, workload, people in need, reporting and communication deficiencies, exposures and challenges faced by every single employee and external professionals like loss adjusters and experts.

A further important point to consider in developing a nat cat contingency plan is how customers typically report claims. For example, in some regions it may be usual for policyholders to report claims to an insurance representative in person only. In

the aftermath of a natural catastrophe, it is likely that residents will want to stay at home to take care of their families, their property, or to prevent looting. Any insurer failing to make available competent contact persons in areas hit by a natural catastrophe is likely to receive claim notifications with a severe time lag, making it difficult to assess the losses. In this case, the problem is the insufficient number of adjusters, not a lack of claims processing personnel in the offices. A failure to provide sufficient numbers of contact persons for the affected clients in a time of need is certain to result in loss of reputation for the company.

Rough estimate of how many adjusters are required

Assuming that each adjuster based at a certain nat cat office can handle an average of four to five claims per day:

- Determine the anticipated claims volume for each nat cat office area (i.e. 100 km/65 mile radius)
- Estimate the target claims management duration
- Estimate the number of adjusters needed

Example:
3,000 claims/90 days target claims management duration/4–5 claims average production per day
> 7 adjusters required

Once the various loss scenarios have been described and analysed sufficiently, the next task is to draft and implement preventive procedures.

Designing countermeasures

Because of the special dynamics of a natural catastrophe, it may be practical to categorise possible actions as follows:

- Proactive or preventive actions
- Measures to be taken during a catastrophe and in its immediate aftermath
- Loss mitigation, repair and restoration or other subsequent procedures important for claims management in the medium term

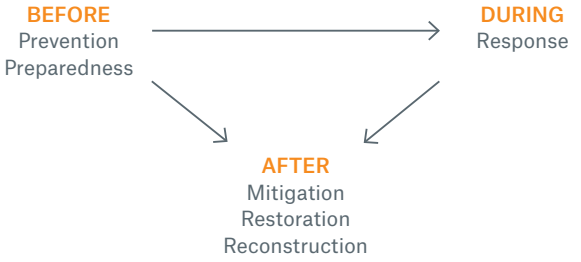

Figure 1: Natural catastrophe cycle.

Natural catastrophes require attention to different phases: a lead time before, immediate action during, and requisite measures after an event.

Source: Munich Re

Preventive measures at the insurer's site of operations include coordination within the organisation of the company as well as repair of physically damaged office buildings and equipment. For example, during the lead time ahead of an event like a storm, additional staff should be granted adequate access rights to IT systems and loss adjustment authorisation required for claims processing. A proactive insurer will arrange the necessary contacts and reach agreements with appropriate companies to secure its ability to perform well after a natural catastrophe, for example by contracting restoration companies as a priority customer in case of flooding at the company offices, but also at the property of insured clients.

With regard to business continuity planning and/or other security measures, preparation against physical damage also includes the securing of files and office equipment in safe places, redundant electronic filing at different and distant locations, the reliable operational readiness of an emergency diesel generator, or the protection of windows and doors.

Measures to be taken during a natural catastrophe and in its immediate aftermath should be anticipated and clarified in the nat cat contingency plan. In a windstorm scenario, telephone systems and communication infrastructure may be destroyed, making it impossible to claim or dispatch a loss by normal channels. In order to record claims promptly, a temporary office could be set up in the affected zone to afford policyholders easy access. Claims managers could distribute claims notification forms, check loss reports and coordinate efficient loss inspections. The reports could then be forwarded to the company via electronic data transmission or a courier, allowing settlement to take place in a timely, professional manner, in spite of the adverse circumstances.

It is helpful to prioritise potential restoration measures, but it is also important to be as flexible as the situation requires. In most cases, the preferred handling of clients' interests should prevail even over the insurer's own repairs. However, if the insurer's loss threatens its ability to carry out claims process-

ing, it goes without saying that the insurer must tackle its own loss first. For example, if an insurance company suffers from flooding, a drying firm (which, ideally, has been contracted beforehand for such an emergency) must start restoring the insurer's facilities before clients' property. These possible scenarios must be considered within the company's own business continuity plan.

Summary – Nat cat contingency plans

Nat cat contingency plans promote flexibility and efficiency when major losses occur by proactively establishing a company's claims handling process and organising procedures following a natural catastrophe event. In the case of natural catastrophe losses, a holistic approach enables a prepared company to focus the limited resources available where they are most urgently needed. This makes claims handling more efficient and reliable for clients and reduces the insurer's costs.

Implementing a nat cat contingency plan involves practising through the use of simulations, drills and follow-up processing. The idea is not only to familiarise staff with nat cat contingency measures, but to detect and remedy any weak spots in the system. After each drill, as after the event itself, all experience gained should be processed and translated into improved procedures.

One important, though often ignored, subsequent measure is to evaluate the company's performance in a natural catastrophe event. Once claims have been settled and the situation returns to normal, consider the lessons that can be learned from the natural disaster to improve future claims management processes as well as risk accumulation and underwriting policies. It is an opportunity to evaluate the effectiveness of the nat cat contingency plan: review the countermeasures that worked and those that did not, analyse the scenarios the company failed to anticipate and use the experience to continually adapt and improve the company's nat cat contingency plan.

A nat cat contingency manual should be written in a way that is comprehensible to an external user without very detailed knowledge of the company. Munich Re can offer the services of its experts – from claims specialists to natural hazards professionals – who can support your company in preparation for and in response to natural catastrophes.

Nat cat contingency plans – Checklists

In the wake of any large-scale natural catastrophe, people are typically left with depleted resources as well as the hardships of utility outages and impaired infrastructure. Natural catastrophes teach us many lessons. In the claims realm, they teach us how to optimise response and, by extension, the quality of service to policyholders. There is, arguably, no better time for insurers to demonstrate their value and commitment to policyholders than during a time of heightened need and tension, when professional and uncomplicated preparation and coordination of resources are called for.

In order to help our clients develop their own nat cat contingency procedures, we have appended a series of points and checklists covering the important concepts that should be included in any nat cat contingency plan. This nat cat contingency planning guide is intended to help you meet the expectations of policyholders, supervisory authorities, staff and shareholders by facilitating professional claims management and an efficient response to future natural catastrophes.

The following pages are intended as a guide to professional claims management for insurers. These general points of advice are guidelines only – it is up to you to define how to implement the steps appropriately for your region and clientele. The measures in the checklists are examples and should not be viewed as exhaustive.

Checklist 1 – Prioritise actions

After a large natural catastrophe, effective and targeted actions are more important than swiftness alone. Normally some of the actions required are considered by business continuity management, and interfaces arising from emergency and crisis management are to be considered. Employees should be fully aware of their responsibilities according to the following priorities:

Note: Points 1–4 should be part of an insurance company's business continuity plan. Points 5–6 are part of the nat cat contingency plan.

- ☐ Ensure personal health and safety.
- ☐ See to the needs of your family and property.
- ☐ Help your co-workers and people in your neighbourhood.
- ☐ Restore the operability of the office as much as possible in compliance with emergency procedures in effect – appointed persons and their deputies assume their emergency responsibilities.
- ☐ Arrange local support for clients, starting in the most severely affected region first. Be active, do not wait for claims reports – attend to clients though they may not immediately come to the office or local insurance support team. Dispatch "mobile offices".
- ☐ Work together with contracted assistance companies, e.g. firms providing clearing equipment, pumps, power generators, etc.

Checklist 2 – Proactive measures

The following steps can be taken proactively to improve claims processing in anticipation of a natural hazard event or in the interest of general preparedness.

Nat cat contingency plans and training

- ☐ Develop a nat cat contingency plan, taking into account the potential occurrence of more than one type of natural catastrophe event, and document it in a nat cat contingency manual.
- ☐ Train all employees in the claims survey and management process at least once a year.
- ☐ Non-claims personnel should be trained/refreshed on claims adjusting in advance of a foreseeable event (such as a windstorm) as support for claims staff. A high level of "claims skill" may not be required, but staff should be equipped with an awareness of policy wordings and legal issues as well as guidelines on the value of goods. Unskilled insurance surveyors or adjusters would not make a positive impression on clients.

IT considerations

- ☐ Design IT and file-keeping systems capable of processing several thousand claims and establish a solution for your system to prevent double accounting when allocating claims.

Communication

- ☐ Establish primary and back-up internal communication channels; make sure claims surveyors and coordinators can keep in contact in the event of interrupted mobile and landline phone services (e.g. by radio sets, satellite phones).
- ☐ Open a toll-free claims hotline (number should be provided to all customers when concluding a policy). In the event of an overload of the hotline, switch to employees' private mobile phones as necessary.

Experts

- ☐ Make anticipatory but binding agreements with qualified adjusters from both the national and the international market.
- ☐ Request individual nat cat contingency plans from the adjusters and draw up joint plans with them.

- [ ] Instruct adjusters on the interpretation of local policy wordings, effects on adjustment and preferred efficient reporting methods, e.g. through standardised loss reports.

- [ ] Agree on the collaboration of outside experts (e.g. technical experts, salvage and restoration companies, forensic accountants, etc.).

- [ ] Check the availability of adjusters and experts each year and keep your nat cat contingency plans up to date.

Claims handling

- [ ] It is important to handle and manage claims with the necessary expertise. One difficult claim may need more effort than ten small ones. To quantify a minimum number of claims to be surveyed, it is necessary to take account of their complexity.

- [ ] Arrange the availability of sufficient "mobile offices" to be dispatched into affected regions. Surveyors should be authorised to pay out claims on site up to a certain amount.

- [ ] Assemble a major-loss team for large risks to be managed as top priorities and as soon as possible after an occurrence. This team should work together with local as well as international loss adjusting companies contracted beforehand to coordinate activities.

- [ ] Draw up a concept that enables clients to produce and dispatch their loss reports more simply (for example, simplified forms or the internet).

- [ ] Consider adding GPS data for every single risk to facilitate comparison of losses with the average in the affected region. This can help detect possible insurance fraud.

- [ ] Prepare a list of available loss adjusters and experts; plan and coordinate loss adjuster deployment. Issue loss adjustment authorisations and adjust levels if necessary.

Underwriting

Outside of claims management, consider the following steps to improve your company's ability to handle disasters through prudent underwriting practices and increased cooperation with your partners (specifically adjusters and reinsurers):

- [ ] Standardise policy wordings (specific endorsements, exclusions, limits, deductibles, etc.).

- [ ] Select risks that are less vulnerable to natural perils.

- [ ] Inspect risks and provide recommendations to improve their capacity to withstand natural perils.
- [ ] Inspect potential disaster areas and determine the probable loss accumulation (geocoding).

Loss prevention

- [ ] Take loss prevention measures (employing technical standards, improved building regulations, using computer backups); this applies to the exposures of policyholders and to insurers alike.

Risk assessment

- [ ] Utilise available options for inspecting and assessing risks at the policyholder's premises in order to check adherence to technical standards for natural hazards.
- [ ] Identify and check accumulation risks in the portfolio regarding natural hazards.
- [ ] Regularly assess and update the probable maximum loss (PML) and notify reinsurers.

Nat cat contingency plans

- [ ] Verify the existence and quality of policyholders' contingency plans or draw up individual nat cat contingency plans with your policyholders.

Communication and agreements

- [ ] Cooperate with your reinsurers on the selection of local and/or international adjusters to be contracted for major claims.
- [ ] Agree on methods of communication and minimum information requirements, on the format of a claims notification bordereau, and on ways of releasing advance payments with your reinsurer.
- [ ] The nat cat contingency plan should include details of the continual information flow to reinsurers and interaction with their respective claims departments.

Checklist 3 – Nat cat contingency planning and interfaces to business continuity management

Your nat cat contingency plan should specify how the claims department will react in the event of a natural catastrophe. Ensure coordination with those responsible for business continuity management. The checklist below defines areas that demand attention.

Business continuity management

- ☐ Establish a response in the case of own major damage to working facilities (e.g. mobile offices, move claims staff to unaffected company divisions). Announce any new locations to customers and staff.
- ☐ Stipulate alternative meeting point(s) and time(s) in case the office is inaccessible. Determine and ensure actions to be taken in case of a lack of power supply.
- ☐ Secure the availability of a standby supply of power and drinking water for offices in an emergency. Consider water purification equipment for longer supply interruptions.
- ☐ Plan the location and maintenance of an electricity generator and drinking water storage.
- ☐ Appoint a media representative; media announcements should be prepared in advance as much as possible and distributed to local media.
- ☐ Establish internal communication networks: members of the management should contact their respective teams to inform them of company procedures to follow after a catastrophic event (e.g. using a phone tree list) as well as for reporting of emergencies, warning staff of danger, keeping families and off-duty employees aware of the state at the office facility and keeping in contact with customers and suppliers.
- ☐ Prepare a courier service in case the phone system is not operating.
- ☐ Provide satellite phones, at least to senior claims personnel and the company management.

Organisational issues

- [ ] Appoint individuals and deputies to assume authority; define a hierarchy and the responsibilities of each appointee and deputies for necessary tasks in a natural catastrophe event; provide an organisational chart for nat cat contingency teams.

Claims handling

- [ ] Consider establishing two levels of escalating claims handing: level 1 for average-sized natural catastrophes; level 2 for an accumulation of natural catastrophes within a short period of time or individual catastrophes of exceptional scale.

- [ ] Define claims authorisation levels; establish guidelines and instruct personnel in procedures for fast and non-bureaucratic compensation of smaller losses.

- [ ] Secure cash outflow (e.g. claims payments) together with accounting and/or financial department.

- [ ] Prepare for rapid recording of claims notifications and extensive photographic documentation (including aerial photographs).

Experts

- [ ] Secure the services of external experts in advance; document relevant persons and contact information.

- [ ] Provide clients with contact addresses of loss adjusters for homeowners' losses.

Communication with reinsurers

- [ ] The insurance company should notify reinsurers about provisional reserves, limits, exposures, etc. no later than one week after the nat cat event.

- [ ] The insurance company should inform reinsurers about reserves on a regular basis (at least once every four weeks) after the cat event.

- [ ] Reserves should be evaluated on an ultimate-loss basis.

Communication with brokers

- [ ] Advise all brokers to submit pending applications and policy change requests, etc. to the office prior to “non-binding” notifications to be issued within a reasonable time-frame (i.e. 48–72 hours) before a storm hits, for example.

- [ ] Release a “non-binding” notification to all brokers, advising that, within a reasonable time-frame (i.e. 48–72 hours) in advance of an impending storm, coverage for new business, increases in coverage, or physical damage coverage (e.g. for vehicles) is suspended until further notice.

Further development of your nat cat contingency plan

- [ ] Cooperate with local external disaster committees on the continuous improvement of nat cat contingency plans and increased effectiveness in case of a catastrophe; identify and nominate relevant contact persons.

Checklist 4 – Nat cat contingency plan components

The list above defines clusters of components that should be integrated into your nat cat contingency plan. Below, we list examples of individual items to be included in your nat cat contingency plan bearing in mind that some of the topics may be part of a business continuity management plan already. The overall content of such a nat cat contingency plan should not be altered, but its details will need to be updated occasionally as conditions change over time.

Introduction

- ☐ Nat cat contingency team mission statement
- ☐ Definition of a natural catastrophe
- ☐ Objective of a nat cat contingency plan
- ☐ Nat cat plan overview/natural catastrophe flowchart
- ☐ Establishing a nat cat code (identifying/tracking of claims)
- ☐ Notification of the natural catastrophe and the nat cat code
- ☐ General instructions

Safety guidelines for your office buildings

- ☐ Windstorm, flooding preparation guidelines
- ☐ Earthquake safety guidelines
- ☐ Fire evacuation guidelines
- ☐ Hazardous materials guidelines
- ☐ Technological emergency guidelines
- ☐ General guidelines

Claims preparation

- ☐ General instructions to staff
- ☐ Office preparations
- ☐ Management responsibilities
- ☐ Vendor contact information

Organisation of procedures after the nat cat occurrence, guidelines and forms

- [ ] Organisational procedures for the activation of claims processing after a natural disaster (e.g. setting up a catastrophe office, nat cat teams)
- [ ] Responsibilities of teams (e.g. nat cat coordinator, claims management team, customer care centre)
- [ ] Procedures for dealing with customers after a disaster
- [ ] List of agents and brokers
- [ ] Assessment of underwriting department responsibilities after the occurrence
- [ ] Claims department responsibilities (e.g. catastrophe minimum reserves, criteria for reserving, opening/closing of nat cat claims, coverage issues, cash settlements)
- [ ] Reporting requirements
- [ ] Nat cat closing, performance analysis, audits

Appendix

- [ ] Executive contact information
- [ ] Organisational chart
- [ ] Employee contact list
- [ ] Insurance agencies
- [ ] Emergency numbers
- [ ] Nat cat scenario planning
- [ ] Forms, guidelines, notification templates

Checklist 5 – Nat cat coordinator office planning

Many tasks must be considered before leaving for a natural catastrophe assignment. For instance, severe windstorms, like hurricanes or typhoons, can occur in various regions worldwide. The office emergency action plan (business continuity management) should be integrated into the nat cat contingency plan and should consider actions to be taken before the storm season, when warnings are issued, during the event and after the storm.

Planning

- ☐ As a general and continuous underwriting procedure, estimate a storm/flood PML for every single risk, to provide reliable figures for affected regions to reinsurers as soon as possible after an event. Budget the company's own exposure.
- ☐ Carry out regular quality checks of roofing, windows, doors, fittings, decoration of the company buildings, etc. that may come loose, e.g. during a storm.
- ☐ Maintain flood prevention equipment, water pumps, dryers and emergency power generators in sufficient number and readiness for operation for an adequate time period.
- ☐ In the event of a tropical storm warning during business hours, employees should be notified regarding possible evacuation. During non-business hours, employees should contact their department manager for instructions.
- ☐ In the event of a storm warning during business hours, the office building should be closed and office preparations completed. Employees should be advised to leave the building.
- ☐ Ensure important documents (applications, policy change requests, etc.) are properly stored in specially protected file rooms or fireproof cabinets.
- ☐ Secure all claims files and the availability of forms for declaration of claims after the event; secure cheques.
- ☐ Secure office equipment including copiers, faxes, phones, printers, computers, etc. with plastic bags; remove loose paperwork and cover desks.
- ☐ Move furniture, files, books, etc. in case of a storm to a safe distance from doors and windows, and in case of a flood to elevated levels.

- [ ] Employees should monitor developments via radio, online news sources like NOAA and other media that provide the status of the natural catastrophe and advisory updates.
- [ ] Safe locations (shelter) should be provided for personnel staying at the company's offices during the event.

Ensure nat cat preparedness by answering the following questions:

- [ ] Is the alerting register of personnel up to date?
- [ ] Do all employees know what to do once they are alerted?
- [ ] Are all natural catastrophe-relevant employees equipped with company ID cards?
- [ ] Are the lists of experts (engineers, accountants, salvors, lawyers, etc.), suppliers, contractors, roofers, plumbers, electricians, etc. up to date?
- [ ] Are the contacts for acquiring information regarding local emergency laws or regulations (curfew, etc.), affected areas, damage reports, for hiring temporary clerical help, etc. up to date?
- [ ] Has all necessary information been prepared (e.g. copies of claims handling forms, copies of road maps, copies of current price guide, statement of the company's antitrust policy for review with adjusters)?
- [ ] Are communication lines to mobile phone service, satellite services and local telecommunication companies established for the supply of service and equipment, etc.?
- [ ] Are mobile nat cat offices ready for use (e.g. inventory of equipment complete, supplies secured and after-hours contacts of suppliers up to date)?

During/after a natural catastrophe

- [ ] Ensure that the alerting register of personnel is in accordance with the nat cat contingency plan.
- [ ] Estimate the number of claims expected and determine the claims staff needed (field adjusters, telephone operators, administrative, clerical, etc.).
- [ ] Estimate loss expectancy considering a worst-case scenario.
- [ ] Support press releases by providing claims information.

- [ ] Brief adjusters about damaged areas, state insurance regulations, prioritisation of claims according to the company's claims handling guidelines (review how the company receives claims, screens losses for complete coverage information, contacts the insured, documents files, handles advance payments).
- [ ] Assess adjuster workload frequently to determine need for additional resources.
- [ ] Set up loss log to track claim file status and reserves; issue claims reserving procedures.
- [ ] Implement assignment records for claim files, open and closed.
- [ ] Review the company's guidelines for natural catastrophe claims.

Checklist 6 – Loss adjusters responding to the event

Numerous tasks must be considered before leaving for a natural catastrophe assignment. This list is designed to help ensure that company loss adjusters are prepared for work in catastrophe areas.

Equipment and supplies a loss adjuster will need:

- [ ] Voltage converters available for battery chargers of all kinds of electronic equipment in mobile offices
- [ ] Operational GPS device and up-to-date road maps (printed, electronic)
- [ ] Disposable cameras and regular cameras, including extra batteries, extra memory cards, extra films. Digital cameras are able to provide GPS data for a clear localisation of photographs.
- [ ] Extra memory cards for digital cameras
- [ ] Films stored in an adequate location (cool), and not exceeding the date of expiry
- [ ] Notebook or tablet PC, printer, printer paper, voice recorder
- [ ] Mobile phone, satellite phone, phone lists, rechargeable batteries for this equipment
- [ ] Company ID card, passport and business cards
- [ ] Back office equipped with office material
- [ ] Special (protective) equipment, e.g. safety glasses, hard hat, flashlight, safety shoes, waterproof boots, gloves, raincoat and/or warm coats, first aid kit, etc.
- [ ] Nat cat coordinator contact details and nat cat office information
- [ ] Vendor lists and contact information of contracted repair and restoration companies
- [ ] Policy wordings
- [ ] Worksheets
- [ ] Unit pricing list

- [ ] Cards to leave behind in the event that the person you wish to visit is absent (“Sorry we missed you”)
- [ ] Company claims forms
- [ ] Company guidelines
- [ ] Office equipment, e.g. stapler, staples, staple removers, paperclips, pens, sticky notes, folders, labels, fasteners, hole punchers

Checklist 7 – Claims forms, guidelines, notification templates

Extra copies of relevant documents should be made available or produced to prepare for mass claims in the event of an impending natural catastrophe. The following claims forms, guidelines and notification templates are among the most useful documents to have on hand.

Claims forms

Claims forms should be available for all kinds of policies offered by insurers. Recommendable examples can be found on the FEMA website, for example. The following list is only a rough overview of possible forms:

- ☐ Proof of loss
- ☐ Loss or repair estimate
- ☐ Building evaluation
- ☐ Recorded statement summary
- ☐ Salvage removal authorisation
- ☐ Salvage condition report
- ☐ Caution notice
- ☐ Transaction log
- ☐ Expense and overtime
- ☐ Unit pricing list
- ☐ Loss description
- ☐ Simplified procedure of loss assessment
- ☐ Basic elements of an adjustment report – a questionnaire
- ☐ Inspection sheets
- ☐ Adjuster's worksheet

These forms should be part of your company's own claims management guidelines.

Guidelines

- [ ] Catastrophe adjusting
- [ ] Reserve estimate
- [ ] Salvage estimation
- [ ] Inventory listing
- [ ] Cash advances
- [ ] Issuing cheques
- [ ] Replacement cost provisions
- [ ] Wind, storm, flood and earthquake claim guidelines (property, motor, marine, etc.), for a fast and approximate settlement procedure for small mass claims (i.e. percentage of sum insured in relation to the severity of the impact, not based on actual damages).

Notification templates

- [ ] Weather disturbance notice
- [ ] Television notice
- [ ] Newspaper notice
- [ ] Notice to brokers
- [ ] Closing notice of nat cat office
- [ ] Notice to senior management
- [ ] Property, motor, marine, etc. catastrophe loss notice

Checklist 8 – Policyholder claims information package

The policyholder needs assistance to recover from the natural catastrophe, and may depend on the knowledge, skill and expertise of the insurer. The company's claims managers should be able to help the policyholder with information about many areas that are related to recovery, including topics that are beyond insurance. The loss adjuster can hand over a claims information package to the policyholder to support a smoother recovery and settlement process. This package should contain the information the insured needs to understand the situation and commence repair and rebuilding. This list indicates the typical contents of a policyholder claims information package.

- ☐ Introductory letter explaining the responsibilities of the adjuster and briefly outlining the steps required to adjust the claim and get policyholders back on their feet. It should also briefly indicate the policyholder's and insurer's respective responsibilities during rebuilding.
- ☐ Telephone, fax numbers, e-mail, web addresses of adjusters
- ☐ Rebuilding "to do" list
- ☐ Inventory book or sheets for commercial risks
- ☐ Repairing/Rebuilding information sheets, such as:
  - ☐ Getting bids, sources to verify contractors' references, selecting a reputable contractor (recommended and pre-contracted by the company)
  - ☐ Common disputes between property owners and contractors and their resolution
  - ☐ Explanation of building codes and importance of adherence
  - ☐ Building permits and inspections
  - ☐ Glossary of construction terms and materials
  - ☐ Schematic drawings of structures and parts
  - ☐ Information on building materials
  - ☐ Loss mitigation measures

Checklist 9 – Working with agents and brokers

Cooperation is essential in maintaining smooth claims processing after a natural disaster. These are a few steps to ensure all company adjusters always work at the same level.

- ☐ "Non-binding" or suspension of coverage memorandum is in force.
- ☐ Submission of pending policies to the company at a reasonable time (say no later than 48 or 72 hours in advance of severe weather).
- ☐ Finalise pending coverage.
- ☐ Prepare a list of all clients.
- ☐ Brokers and agents must communicate all policies to the company before the occurrence.
- ☐ In case of loss to an agent or broker office, the company should be contacted within, say, five working days for emergency procedures.
- ☐ If possible and useful, provide a back-up server for all brokers/agents that the company works with for safe storage of their files and pending processes.

Checklist 10 – Special earthquake guidelines

Unlike tropical storms, earthquakes do not have a lead time or warning systems. The only way to protect yourself against major earthquake losses is through pre-emptive action. Comprehensive planning, quality assurance and supervision of construction can reduce losses due to structural damage and organisational interruption.

Despite thorough pre-emptive measures, post-event claims assessment may still be challenging due to the special nature of earthquake losses. It is imperative to assess damage quickly, as structures – which may have been weakened by the initial quake – may be hit multiple times by aftershocks or other hazards. The following list offers an overview of aspects to take into consideration regarding nat cat contingency planning but also regarding business continuity management (own damage):

- ☐ Know precisely the vulnerability to earthquake and location relative to fault zones of risks in your portfolio.
- ☐ In earthquake-prone areas, it is especially critical to have back-up communication and transportation channels for both external cooperation and internal organisation planned in advance and ready to implement at a moment's notice.
- ☐ Perform routine structural integrity inspections of insured risks as well as the company's own property.
- ☐ Have old or substandard buildings retrofitted by professionals for earthquake protection.
- ☐ Explain communication procedures in advance to policyholders – for example at the conclusion of a policy – and describe how you will contact them or how they can obtain information via internet, news media, newspaper, emergency mobile office, etc.
- ☐ Designate a media liaison to announce important messages for employees and policyholders.
- ☐ In the office, consider using specialised structures such as fireproof storage to protect against damage to vital records and files.
- ☐ Emergency power systems are of critical importance, since infrastructure damage is likely; keep power generators and, if necessary, a supply of fuel accessible and well maintained.

- [ ] Cooperate with local emergency services whenever possible.
- [ ] Contact in advance earthquake experts or engineers to inspect structural damage (at own and policyholder's property).
- [ ] Provide a contact list of professionals and loss adjusters with essential specialised knowledge of earthquake losses.
- [ ] Know the quality of utility feeds into the office building (pipe ruptures can cause flooding and sprinkler system malfunction).
- [ ] Define a plan for a temporary relocation, including exactly what space you can use and what supplies you will need; it may be prudent to locate alternative sites in a different electrical grid or transportation region.
- [ ] Priority contracts with clean-up and repair companies are essential to recovery.
- [ ] Define the alert process for your partners, such as adjusters and reinsurers, through possible resources such as a news feed.

Post-event claim assessment

- [ ] Initiate appropriate loss prevention and loss mitigation measures, as structural damage could be aggravated by aftershocks as well as by wind, rain and flooding.
- [ ] Start the assessment of damage as soon as possible with an inspection and documentation of structural damage such as cracks, bent walls or frames, broken glass, misalignment of load-bearing structures.
- [ ] Assign a structural engineer if the assessment reveals damage to the load-bearing elements of the building; the building must not be put back into operation before an officially licensed expert has issued approval.

Checklist 11 – Estimation of resources and nat cat scenario planning

☐ Prepare different nat cat scenarios.

Scenario example: Super hurricane/typhoon

A hurricane/typhoon (very severe tropical storm) has made landfall north of a large capital city in subtropical latitudes. The storm headed further west to another major city *(City 2)* with wind speeds exceeding 210 km/h (130 mph) and a path 100 km (65 miles) wide. Severe damage has been reported and the affected area is expected to extend westward from the coastline to western territories for about 200 km (125 miles), resulting in a damaged area of nearly rectangular shape. Power is out in all parts of the affected region and a number of smaller islands are cut off from the outside world. Isolated outages have been reported from areas around the major cities. People are to be evacuated or are relocating to

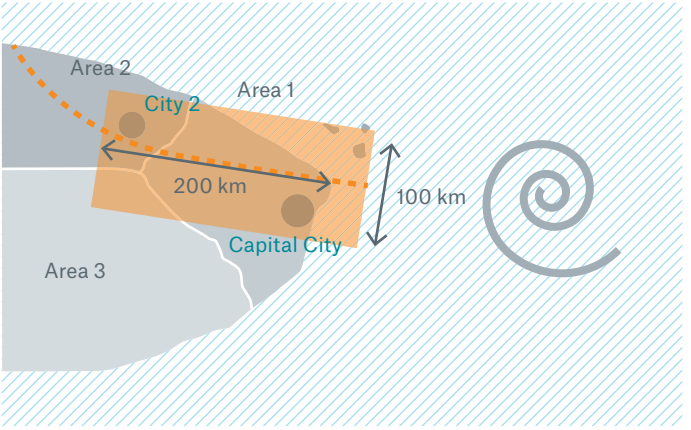

Figure 2: Nat cat scenario planning for tropical storm scenario with area affected.

Source: Munich Re

neighbouring regions. Local authorities say a large number of people may have been killed or are missing and presumed dead. Injuries and the effects of insufficient medical supplies are widespread among survivors and the death toll is expected to rise.

Major destruction due to flooding has been reported along the country's coastline, with severe flooding also affecting the bay area of the capital. Water reservoirs and levees have collapsed, resulting in further devastation. Heavy rains in the northern areas have triggered severe flooding, leaving many thousands of people without electricity. In the wake of widespread

flooding and wind damage, authorities have called a state of emergency in the capital and the second city. Access to affected areas is limited and curfews have been imposed in some cases.

Tremendous economic and insured losses are expected. Insurers want to have as many claims as possible handled by their own staff. The nat cat management team of the company is expected to provide a recommendation on claims objectives for this catastrophe, as the company has not experienced an event of this size before.

☐ Estimate claims volume based on nat cat secenario.

Wind and flood damage claims are expected throughout an area of some 20,000 km² (8,000 square miles) extending from the city of landfall – the capital city and hardest-hit town – in the south to the second-largest city, 200 km (125 miles) west-northwest, and reaching about 300 km (190 miles) inland. Insurance penetration rates of 80% are anticipated within most affected coastal regions, including the area where the storm initially hit, falling to 30% in the backcountry and 40% within City 2, an area with high population density (penetration rates and claims estimates for all lines of business, e.g. homeowners', motor, marine, should be known and attached).

Based on modelling and/or past claims experience and claims penetration rates in the territories designated to lines of business and products, e.g. an estimated 20,000 property claims (homeowners'), 3,000 boat claims, 2,000 commercial claims and 20,000 other claims (particularly motor) are to be expected. In terms of property claims, we take only homeowners' and commercial claims into account, since the management of other kinds of claims requires different amounts of manpower and time. Altogether, about 45,000 claims, including 22,000 homeowners' and commercial property, are to be examined, recorded and indemnified.

☐ Calculate staffing needs.

Anticipating 22,000 claims (homeowners'/commercial business) with a targeted time limit to perform loss inspections of 90 days after the nat cat event and an average capacity of 4–5 inspections per day (22,000 claims divided by 90 days results in about 244 claims per day; 244 claims per day divided by 4–5 inspections per day/adjuster requires about 49–61 adjusters): A minimum of about 50 field adjusters will be required, to be rotated every 21 days.

One nat cat office is manned by 3–4 loss adjusters with a capacity of 4–5 homeowners'/commercial claims per day

(around 12–20 claims per day per vehicle). In 90 days, one mobile office can manage between 1,080 (12 claims x 90 days) and 1,800 claims (20 claims x 90 days).

Based on an assumed average of 1,500 claims that can be managed per mobile nat cat office in 90 days, altogether about 15 nat cat offices (22,000 claims divided by 1,500 claims per nat cat office) will be required (e.g. mobile office, regular office, agency, depending on the degree of destruction of infrastructure). The set-up of the nat cat office staffing can consist of one senior adjuster and three claims managers.

☐ Distribute adjusters to areas affected.

Based on modelling and/or past claims experience, damage ratios and the underlying portfolios in the areas affected, a certain number of claims to deal with is anticipated:

Capital city, the place of landfall (range 1, most affected, 80 % damage), producing approx. 10,000 claims and requiring about seven mobile offices (10,000 claims divided by 1,500 claims managed by one nat cat office)

City 2 (range 2, less affected, 40% damage), producing approx. 6,000 claims, and requiring four regular or mobile offices

Area 1 (range 3, 30% damage), producing approx. 3,000 claims and requiring two regular or mobile offices

Area 2 (range 4, 20% damage), producing approx. 2,000 claims and requiring one regular or mobile office

Area 3 (range 5, 15% damage), producing approx. 1,000 claims and requiring one one agency or mobile office

☐ Estimate lodging requirements.

Accommodation needed for about 50 property adjusters, if recruited from outside areas. Hotels, rental homes, recreational vehicles, mobile homes and apartments have to be booked.

☐ Estimate transportation requirements.

Flights for home office adjusters and staff adjusters beyond driving distance/overseas are to be arranged, in addition to rental cars for home office and field adjusters.

- [ ] Hire experts and consultants.

  Structural engineers, windstorm and flood experts, marine surveyors, legal counsels, business interruption experts, environmental experts, etc.

- [ ] Provide appropriate home office support, e.g.

  - [ ] Nat cat office continuous supervision and reporting
  - [ ] Communication – mobile phones; satellite phones if the network is down
  - [ ] Training needs of internal and external personnel
  - [ ] Securing of continual delivery of data to the IT system of the company after the occurrence
  - [ ] Indemnification: Securing of cash in hand and validity of cheques
  - [ ] Health and safety: Riots, burglary; health issues due to breakdown of air-conditioning equipment, transmission of diseases due to hot and humid climate conditions have to be taken into consideration.

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