



# ESTIMATING LOSSES FROM THE 2004 SOUTHEAST ASIA EARTHQUAKE AND TSUNAMI

RMS SPECIAL REPORT



Risk Management Solutions

# INTRODUCTION

On Sunday, December 26 2004, the world witnessed one of the largest earthquakes recorded in the last 100 years – a magnitude (moment magnitude,  $M_W$ ) 9.0 earthquake on the interface of the India and Burma plates just to the west of northern Sumatra. At a depth of 10 km (6 miles) approximately 1,000 km (620 miles) of fault ruptured to the north of the main shock, although almost all of the slip was concentrated in the first 400 km (250 miles). The resulting large-scale, rapid disturbance of the sea floor triggered a devastating tsunami that propagated east and west of the main fault rupture into the coastal regions of Sumatra, Thailand, Myanmar, southern India, Sri Lanka, and the Maldives. Further west it caused damage in the Seychelles and eastern Africa. The tsunami was even detected in New Zealand and along the west coast of South and North America.



Figure 1: Site of the main shock and immediate aftershocks show the source of the earthquake and rupture zone – coasts affected by the tsunami are delimited in blue

Primarily, the 2004 disaster has been a humanitarian one, and is expected to have only a modest impact on the insurance industry, especially compared to the sequence of hurricanes and typhoons that affected the U.S. and Japan during the summer of 2004. However, the earthquake and tsunami do have the potential to impact a wide variety of different lines and also highlight the vulnerability of coastal exposure to sea flooding. This paper sets out the main lines of business that will be affected by the 2004 Asian tsunami, identifies the key drivers of insured losses, and estimates their magnitude.

## AFFECTED LINES OF BUSINESS

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Although the impacted region is characterized by low insurance penetration, there are several lines of business that will be affected both locally and globally. Two agents of damage are also involved: the effect of the earthquake itself on property in northern Indonesia, the Nicobar Islands, and the Andaman Islands and the damage caused by the associated tsunami and flooding.

### PROPERTY

Several forms of property have been affected by this disaster; mainly local housing, motor, local fishing boats, yachts and cargo ships in harbors, industrial plants, coastal tourist hotels, and resorts. The key exposure concentrations of Kuala Lumpur and Singapore were unaffected by the earthquake, although building occupants in these cities felt the shaking.

In India, Sri Lanka, and northern Indonesia insurance penetration in local housing and locally-owned business property is extremely low. In addition, earthquake and associated tsunami insurance is usually available only as an additional policy to the standard fire coverage. Its penetration is also significantly lower because it can double the premium cost. In Sri Lanka it is estimated that less than 1% of the affected population had property insurance, and therefore few of the 93,000 destroyed houses would result in a claim. Almost all manufacturing plants are located inland and were consequently not affected. Coastal hotels and resorts are therefore the most likely source of insurance claims. In total, 62 out of a total of 244 hotels on the island have been affected, closing approximately 25% of the available rooms, mostly in the Galle and Kalutara districts on the southern coasts. None of the major international hotels in Colombo, such as the Hilton chain or Holiday Inn, were affected. As most of the affected properties are locally owned and uninsured, the insurance total could be less than \$100 million. Damaged hotels are expected to re-open within several weeks to months.

In the worst affected country of Sumatra, the Indonesian General Insurance Association (AAUI) recently reported that the estimated total risk value of insurance policies covering earthquakes in Aceh and North Sumatra stood at Rp 16.8 trillion (\$1.9 billion). This consists of 22 properties insured against earthquakes in Aceh valued at Rp 796 billion (\$86 million), and 429 in North Sumatra, worth Rp 16.1 trillion (\$1.7 billion). Only 6% of all insurance policies in the northern two provinces have extra coverage against natural disasters, according to Jasindo, one of the largest general insurance companies operating in the area. Much of the loss will go to facultative reinsurers, as the local insurers tend to retain relatively small amounts on a per-risk basis.

One of the main policyholders, the state telecoms company Telekomunikasi Indonesia, reports mixed operational status – with some areas of northern Sumatra maintaining 100% coverage (overall 75% is still operational). This indicates that damage to its infrastructure is limited, although it is estimating losses of Rp 162 bn (\$17 million).

Of other large risks, the Lafarge cement plant in Aceh, a complex of 35 buildings, was destroyed, and many employees were killed. This is likely to be one of the largest losses in the region. One report put the claim at approximately \$100 million, although this is more than the AAUI have estimated the total exposure to be across the province. Oil and gas production facilities were spared any damage – only a brief interruption to supply was reported by ExxonMobil Oil Indonesia, Inc. The major fertilizer plants Asean Aceh and Iskandar Muda, as well as the pulp and paper mill – Toba Pulp Lestari – are also believed to have escaped damage. Due to the low insurance penetration in the affected region, and reports that suggest most industrial risks have been spared, it seems likely at this time that the insured losses in Indonesia will be less than \$500 million.

In southern India, some ships in the port of Chennai were damaged by the waves, and the port itself is reporting Rs 12.6 crore (\$2.8 million) damage to its facilities with an additional Rs.10 crore (\$2.2 million) for repair and dredging. Port operations, however, were restored within 48 hours of the event. Three ships were nevertheless damaged in a collision, including the Gem of Tuticorin, which was loading sugar and sustained heavy damage. The ABG Kesava and Canadian Express vessels were also damaged. Around 1,200 Hyundai cars that were being loaded for export were drenched, with approximately 15 of those sustaining physical damage as well. Other ports along the coast sustained more minor damage.

Another large risk, the Kalpakkam nuclear power station on the Tamil Nadu coast was shut down safely after some water entered the site, though not the buildings themselves. The plant had been designed with cyclone-related storm surges in mind and was operational again after 7 days.

Most claims that have been received by local insurers have been for auto losses. Ten days after the tsunami struck, local companies were reporting claims totaling just Rs 50 crore (\$11.4 million). Very low insurance penetration and little damage to those risks that are insured means the insured damage is likely to be less than \$100 million, as in Sri Lanka.

In Thailand, however, property coverage more commonly involves all-risks including earthquake related cover since it had not previously been considered to be a risk. In addition, there is relatively high penetration compared to other countries in the affected region. Consequently, the majority of the 50,000 policies in the six most seriously affected Thai provinces would be covered. Within a week of the disaster, 539 claims amounting to nearly 1 billion baht (\$25 million) had already been filed. Approximately 27 insurers provide property insurance – with motor cover of about 10 billion baht (\$255 million) and property cover of about 37 billion baht (\$946 million) in the affected areas. The Thai Insurance Department estimated in early January that insurance claims from property, including hotels damaged in southern Thailand, will amount to between 10 and 15 billion baht (\$255 million - \$385 million). Local insurers are expected to pay about 10 to 15% of that as most of the risk is re-insured on the international market.

About 20% of Phuket's 36,000 hotel rooms were affected by the disaster, most of them not damaged by the water itself, but closed because water, sanitation, and electricity systems in basements or buried underground were damaged. Most of Krabi's coastal hotels were also unaffected, although those that were could be closed for up to 9 months. Unlike the major international hotel groups, however, many small and medium businesses have no insurance cover.

Phi Phi Island and the mainland coast to the north of Phuket Island were the worst affected areas, with at least 40 to 50% of hotel rooms destroyed in these areas. None of the international Hilton or Shangri-La chains' properties suffered any serious damage. Accor and InterContinental operate properties in Thailand that were severely hit by the disaster, but will more than likely have all-risks insurance coverage for both buildings and business interruption. Greater insurance penetration and the large impact upon many tourist hotels and businesses means that the insured losses from Thailand are likely to be between \$0.5 and \$1 billion.

Recovery in the Maldives is expected to be relatively quick, as each self-contained island's infrastructure is restored separately. The island chain has deliberately been developed so that each island consists of one resort with its own power supply, sewage system, water supply, and other support facilities – fewer dependencies mean facilities can come back online quicker. Nineteen resorts out of the 87 had to be closed due to the damage caused by the tsunami; 6 are badly damaged and it is expected to take at least six months for these resorts to be back in operation. Club Med and the Four Seasons' properties are among those affected. Business interruption will be a significant component of the loss. Reconstruction costs could be much higher on the Maldives than other affected places due to the scarcity of local material, and because transport is largely restricted to boat. Traditionally, the islands import much of their building materials from the U.S. and Europe rather than Asia. Despite these difficulties, the limited number of resorts on the islands will restrict insured losses – which in mid-January were estimated to be less than \$500 million.

#### LIFE AND HEALTH INSURANCE

There are two main elements which could give rise to life insurance claims – local populations and the tourists. The total claims from local populations are likely to be small, due to low penetration. Less than a quarter of the Indian victims are estimated to have had a formal income from employment, and only a low percentage of these are expected to have had life insurance. In fact, across the entire country only about a tenth of the billion-strong population has life insurance, and these people are concentrated in the cities and higher income demographics. Fishermen belonging to the National Federation of Fishermen's Co-operative are likely to be covered under the Janta Personal Accident Scheme, operated by Oriental Insurance. Under this scheme each fisherman will receive compensation of Rp 50,000 (\$1,140) with total claims potentially reaching Rp 4bn (\$91 million).

Life insurance penetration is even lower in Sri Lanka, resulting in very few local claims. Around 12% of Indonesians have life insurance. AIG Lippo (the market leader in Indonesia's life insurance market) has issued 2,100 life insurance policies worth Rp 105 billion (\$11 million) in Aceh and North Sumatra. Few of the residents of the devastated Aceh province, near the epicenter of the quake, are included in these policies.

The largest insurance losses from life, health, and travel insurance claims are likely to arise from foreign tourists affected by the event. Of the 5,000+ estimated deaths in Thailand (estimated 2 weeks after the earthquake), approximately one half are estimated to be of foreign tourists.

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The consequences of this are likely to be felt more by western and international insurers than local insurance companies. Tens of thousands of European nationals, in particular, were vacationing in the region, including 20,000 Swedes, 10,000 British nationals, and 4,000 Germans, although not all of these would have been directly affected. Each country is currently tallying the number of deaths, injuries, and missing among its own nationals. Casualties among U.S. citizens are likely to be low, with 18 confirmed deaths as of January 13.

Life insurers could see some accumulations, given the concentration of certain nationalities. The highest may be in Sweden. After the sinking of the ferry 'The Estonia' between Finland and Sweden in 1994, with the loss of around 500 Swedes, the industry did witness a significant accumulation, and much of this was passed on to the reinsurance industry. The impact on life insurance companies internationally from the tsunami could reach several hundred million dollars. The World Trade Center disaster resulted in an estimated \$1 billion life insurance claims from 2,749 confirmed deaths (according to the Insurance Information Institute, 2004) a figure likely to represent the upper bound of claims from the tsunami disaster.

<b>Country</b>	<b>Confirmed Deaths</b>	<b>Missing</b>
Germany	60	668
Sweden	52	1838
United Kingdom	51	981
Switzerland	23	
France	22	74
Italy	20	310
United States	18	473
Norway	16	908
China	15	29
Australia	13	349
South Korea	11	
South Africa	11	4
Japan	8	
Singapore	8	31
Denmark	7	
Austria	6	500
Belgium	6	
Netherlands	6	30
Finland	5	214
Canada	4	87
Israel	5	5
Taiwan	3	45
New Zealand	2	64
Czech Republic	1	7
<b>Total</b>	<b>373</b>	<b>6617</b>

\*Data valid as of January 13 (CNN and National Agencies)

*Table 1: List of Casualties and number of missing nationals for countries outside of the disaster region*

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## TRAVEL INSURANCE

On average, 30% of European travelers vacationing overseas have travel insurance, but it is possible that the income and demographics of people visiting the affected areas parts could have higher than average insurance coverage. Swedish travel cover is often included in standard homeowners' property insurance, though accidental death and disability cover is very restricted. In the U.K., approximately 50% of travel policies are issued by tour operators, and the rest consist of a standalone policy from an insurance company. Many of the tour operators do not insure their policies outside of their companies. Accidental death cover of between £10,000 (\$18,700) and £50,000 (\$93,400) is most common. In Germany, travel insurance is of a similar style to the U.K.

Many travel insurance policies include limited cover for accidental death, but more extensive cover for medical treatment and repatriation. Injuries are consequently more costly to travel insurers, and initial reports suggest that there are high numbers of people injured relative to the number of deaths.

Medical claims and repatriation are potentially more significant – in addition to the several thousands of slightly injured, an estimated 400 Swedes are in Thai hospitals with more severe injuries. Reports suggest that a high proportion of those injuries are trauma and pulmonary injuries. Additional costs to travel insurers will be caused by claims for cancellations and lost belongings, though these will be for relatively small amounts. Globally, there may well be a large number of relatively small claims on travel insurance policies, with a smaller number of large claims for medical costs. One of the biggest unknowns at this time is how many claims will be filed and what the average claim size will be. However, if an estimated 25,000 tourists were affected in the region, and the average claim is \$5,000, total claims could reach \$125 million.

## SUMMARY OF INSURED LOSSES

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Based on the information available within the first three weeks after the disaster, the upper end of the total insured damage to property across all the countries is in the order of \$2.5 to \$3 billion, This total is derived from several lines, as discussed above, although it is primarily damage to tourist resorts and business interruption rather than industrial or manufacturing installations. After combining the potential Life and Health insurance costs together with Travel Insurance claims, the total insurance loss from this event is likely to be less than \$4 billion.

<b>Country</b>	<b>Insured Loss Estimate</b>
Indonesia	<0.5 \$bn
Thailand	\$0.5 - \$1 bn
Sri Lanka	<0.1 \$bn
India	<0.1 \$bn
Maldives	<0.5 \$bn
Other affected countries	<0.5 bn
Life and Health	< \$1 bn
Travel	<0.1 bn
<b>Total Losses</b>	<b>&lt;\$4 bn</b>

*Table 2: Summary of Insured Loss Estimates as of January 17, 2005*

Depending upon how the claims play out, the final bill could in fact be considerably less than this. Many months, if not years, may pass before the actual number is known. However, like the World Trade Center attack of 2001, this disaster reveals how many lines of business can be affected by a single event, and also highlights the importance of exposure accumulation management. In addition, due to European travel preferences in particular, the geographic and financial impact of this event has spread beyond the countries physically affected, and indeed, across the globe.