

Presentation to the British Insurance Law Association

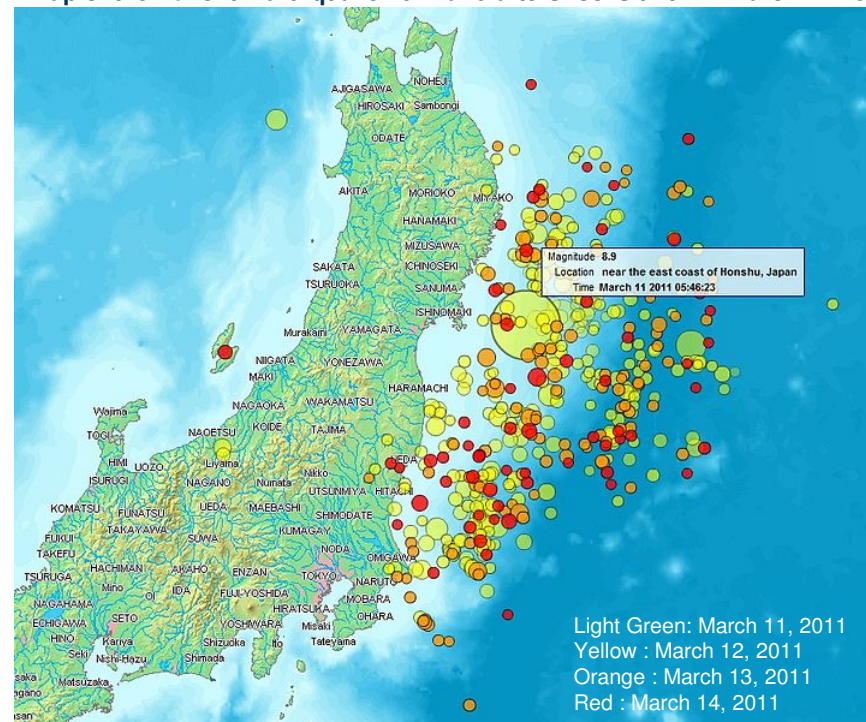
The 2011 Tōhoku Earthquake and Tsunami, Japan (11D)

東日本大震災

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Date: 20 May 2011

Map of the Tōhoku Earthquake 2011 and aftershocks until 14 March 11:20.



The size of the circles is a function of magnitude, and the colour indicates the date.

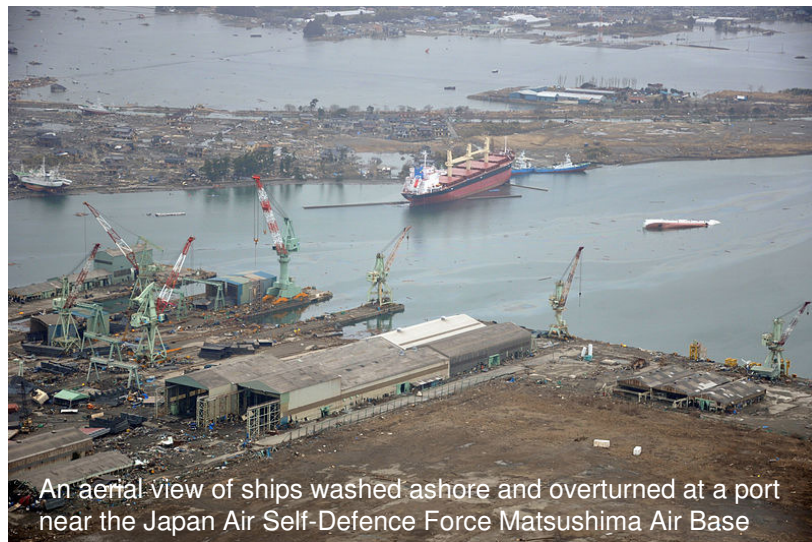
The 2011 Sendai Earthquake and Tsunami, Japan (11D)



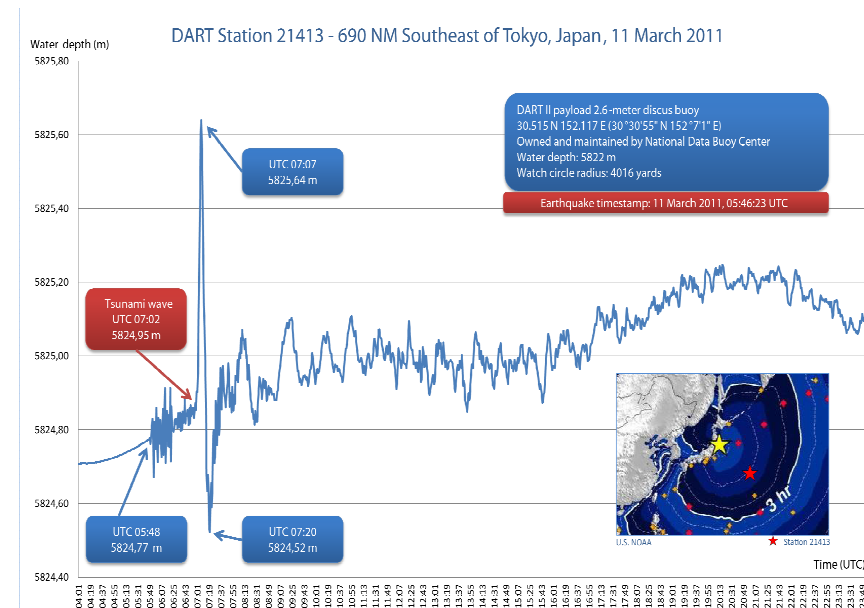
- 1 Where was it?
- 2 What Happened
- 3 Financial Exposure
 - 3.1 General
 - 3.2 JER / Kyosai
 - 3.3 Contingent Business Interruption (CBI)
- 4 Conclusions



An aerial view of the City of Sendai



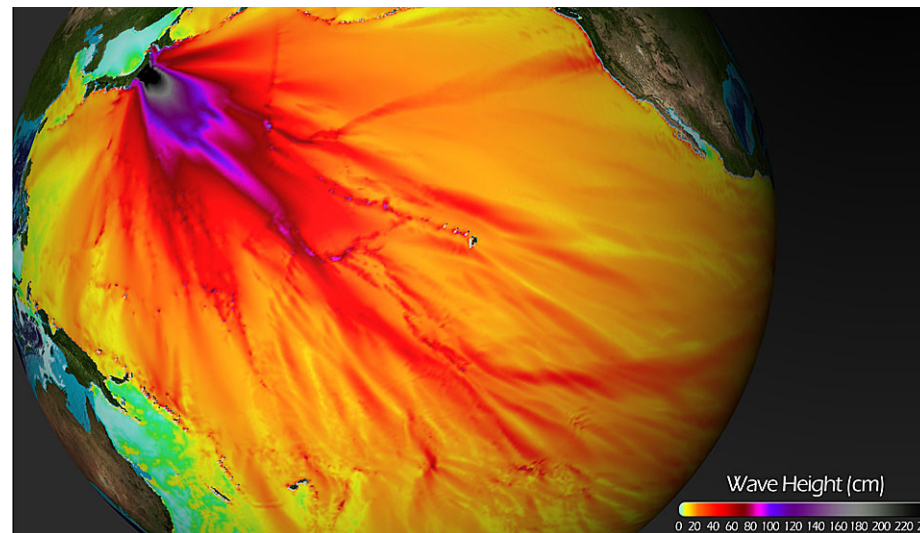
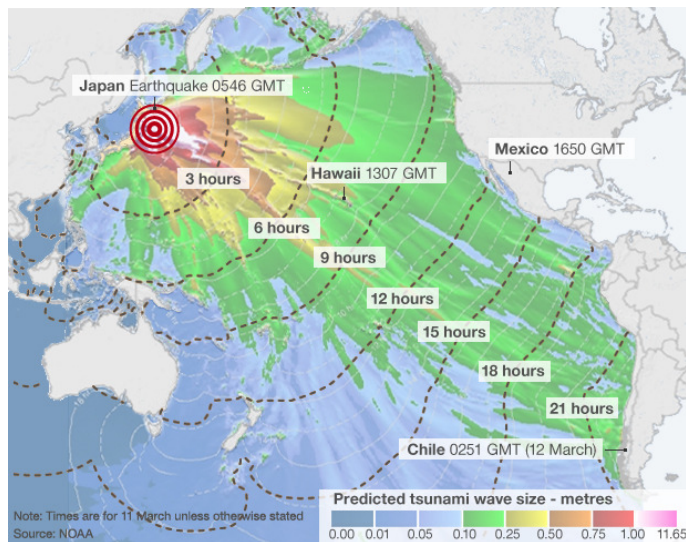
An aerial view of ships washed ashore and overturned at a port near the Japan Air Self-Defence Force Matsushima Air Base



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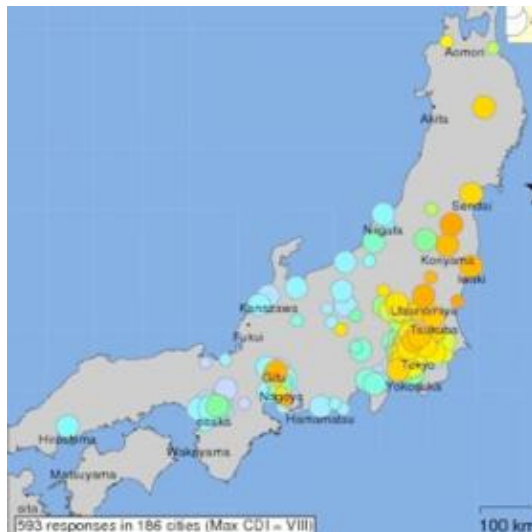
- At 14:46 JST (05:46 UTC) Friday 11 March 2011, a 9.0 MW megathrust undersea earthquake occurred off the coast of Japan.
- The epicentre was approximately 130 km (81 miles) off the east coast of the Oshika Peninsula, Tōhoku. Hypocentre was at a depth of 32 km (19.9 miles).
- Triggered an extremely destructive Tsunami with waves of up to 23.6m (77ft) moving at up to 800 km per hour in the open ocean (the speed of a cruising jetliner) that travelled as far as 10km (6 miles) inland.
- Evacuations were ordered along Japan's Pacific coast and at least 20 other countries, including the entire Pacific coast of North and South America.



The 2011 Tōhoku Earthquake and Tsunami, Japan (11D)



- This was the world's fifth largest earthquake since 1900 - with over 900 confirmed aftershocks (over 60 greater than 6.0M) and 4 confirmed foreshocks.
- Pacific Plate is moving into the Japanese island arc by 8.9 cm (3.5 inches) per year – compared to slippage in the San Andreas fault in California of about 4 cm per year.
- It is 1,200 years since an earthquake of this magnitude has hit the plate boundary of Japan.
- The island of Honshu appears to have moved 2.4 meters after the quake and length of a day has shortened by 1.8 microseconds due to the earthquake's redistribution of Earth's mass.



USGS COMMUNITY INTENSITY MAP: This map shows the intensity of shaking and damage at 14:46 local time near the east coast of Honshu, Japan's main island, on March 11, 2011. Indigo-blue represents weak to light shaking and no damage. Red represents violent to extreme movement with heavy to very heavy damage. Oranges represent very strong to severe shaking causing moderate damage. Image: USGS



The Earthquake and ensuing Tsunami caused extensive damage (especially to roads and railways). Fires broke out in many areas and a dam collapsed.



- **The town of Minami-Sanriku is missing 7,631 citizens, Rikuzen-Takata is missing 10,000, with similar figures in other towns. Potential death-toll could exceed 30,000.**
- **More than 190,000 people are living in temporary shelters.**
- **Approximately 4.4 million households in north-eastern Japan were left without electricity and 1.4 million without water.**
- **Compromised integrity of inner-core containment of TEPCO's Fukushima Nuclear Power Plant (I - IV). Evacuations of residents within a 20km (12 miles) radius (and a 30km 'No Fly' zone).**
- **Now a level 7 nuclear accident (same as Chernobyl).**

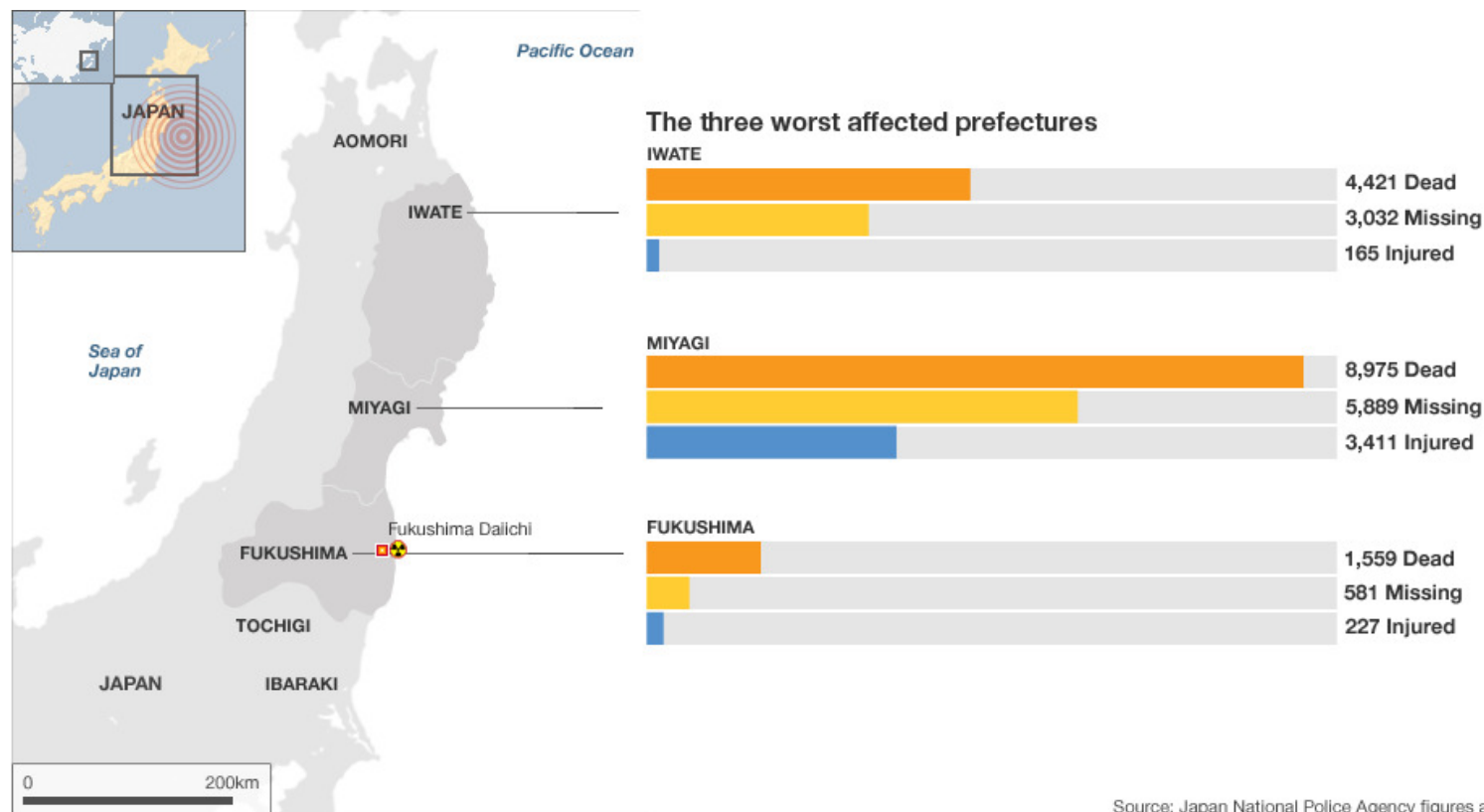


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As at 13 May 2011, the Japanese National Police Agency has officially confirmed:

| | | | |
|---------------------------|--------|--------------------------------------|--------|
| Number of people killed: | 15,019 | Number of homes damaged/destroyed: | 88,873 |
| Number of people missing: | 9,056 | Number of roads damaged/destroyed: | 3,970 |
| Number of people injured: | 5,282 | Number of bridges damaged/destroyed: | 71 |



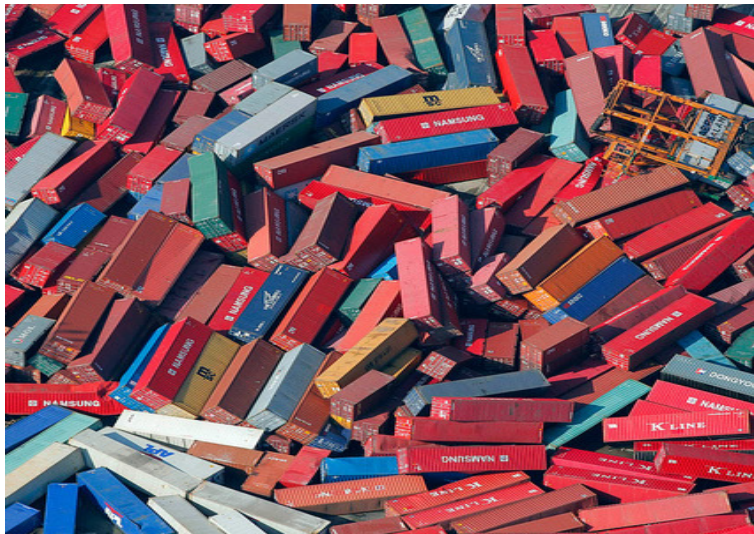
Source: Japan National Police Agency figures as of 13 May

The 2011 Tōhoku Earthquake and Tsunami, Japan (11D)



- Reinsurance treaty exposures are estimated at USD\$14bn-\$33bn*.
- However, marine, facultative, commercial and contingent business interruption lines all face significant losses.
- Nuclear Liability is unlikely to present an exposure - International reinsurers typically have legal exclusions, so will not face significant costs concerning Fukushima plant.

Japanese Nuclear Act of 1961; operators of nuclear plants are not liable for any damage arising from a “grave natural disaster of an exceptional nature”.



*cost estimate from World Bank Report



- Japanese Earthquake Reinsurance Corporation (JER) provides ¥606bln (USD\$7.4bn) claims paying capacity.
- Japan's "Big Three" insurers – Mitsui Sumitomo Insurance Group and Aioi Nissay Dowa (**MS&AD**); **Tokio Marine**; and Nipponkoa Insurance and Sompo Japan (**NKSJ**) have a 85% share of non-life insurance market and have pro-rata reinsurance arrangements in place.
- Losses will pass into the international markets but reported that the aggregate limit for this cover is approx USD\$6bn.
- 'Big Three' also buy excess of loss cover from the global market which incept at excess points approx. USD\$750m-\$1bn.
- Kyosai co-operatives will provide additional losses from their excess of loss reinsurance protections.
- Zenkyoren (largest Kyosai) has reinsurance cover of roughly US\$8bln in excess of US\$3bln.
- In 2008, Kyosai issued over 34m policies, compared to only about 10m issued by commercial insurers.
- Unlike commercial insurers, Kyosai generally include earthquake and tsunami cover as standard. They are not included in the JER scheme and reinsure into the international markets.

The 2011 Tōhoku Earthquake and Tsunami, Japan (11D)



- Unpredictable Contingent Business Interruption (CBI) losses.
Potential to bring quake-triggered claims from a number of global Cedants.
- Almost impossible to predict which accounts will make claims due to the complexity of the global supply chain.
Claims are likely from Japan, but globally as the disrupted supply chain bring a number of industrial facilities to a halt.
- Many commercial property policies include CBI protection as standard.
Contrast with BI – only indemnifies an insured against BI from own physical loss. CBI will allow the trigger to be physical damage to a supplier or client of the insured.
- High profile examples; Motor Manufacturers and Apple.
Toyota suspended production of vehicles until 22 March (although resumed manufacturing spare parts on 17 March).
Honda closed six facilities until 23 March, while Nissan shut down some of its operations.
Automobile analyst Paul Newton predicted U.S. plants could experience parts shortages by mid-April, and that automobile production worldwide could drop by 30%.
Apple: iSuppli (supply chain analysis) warned of problems with manufacture of iPad2. Production process relies on components from Japan. Some parts can be sourced from elsewhere but others (electronic compass and display glass) only from Japan.





- The Global Technology industry is also affected. Japan makes 40% of global electronic components, 19% of semiconductors, and 20% of all other technology products.
- Sony was forced to halt production at ten facilities, and only began to resume production at three of the ten this week. Volvo, which purchases approximately 10% of its components from seven Japanese suppliers based in the disaster devastated region, also halted production.
- Goldman Sachs estimates that the profit impact for one day of lost production for the world's largest automaker, Toyota, could reach 6 million yen.
- Many issues could result in disputes. For example:
 - *Are separate policies in force covering trade or supply chain disruption and contingent business interruption claims?*
 - *Is disruption of the supply chain sufficient to trigger coverage or is physical damage to a link in the supply chain required?*
 - *Is coverage provided for lost earnings, extra expenses, penalties and related costs, and extra expenses arising out of supply chain disruptions?*
 - *Is there a requirement for physical damage resulting from a covered peril that impacts a supply route, cargo or product delivery points?*
 - *What about damage to infrastructure in the absence of damage to a factory? A Texas Instruments plant, located outside of Tsuchiura, was not physically damaged; but will not resume full production until mid-July because of damage to the surrounding infrastructure.*

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- Japan may need up to five years to completely rebuild and repair the estimated US\$122-\$235bln damage caused.
- According to the World Bank, the total economic loss could be as high as equivalent to 6% of Japan's 2010 Gross Economic Output.
- Japan has said it will cost as much as 25 trillion yen (\$309bn; £189bn) to rebuild the country.
- Estimated that 0.5% will be cut from the Japan's economic growth this year; however, it expects growth to pick up again in the second half of the year.
- Too early to accurately assess the insured direct cost of the damage.
- But some analysts estimate the cost to the direct insurance industry at around US\$10bln – compared to the US\$15.3bln insured cost of the 1994 Northridge quake.
- But the cost is likely to be much greater than the 1995 Kobe earthquake that caused \$102.5bln of damage – but as only 3% of property was insured against earthquakes – it cost (re)insurers 'only' about US\$3bln.





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