

# Agenda

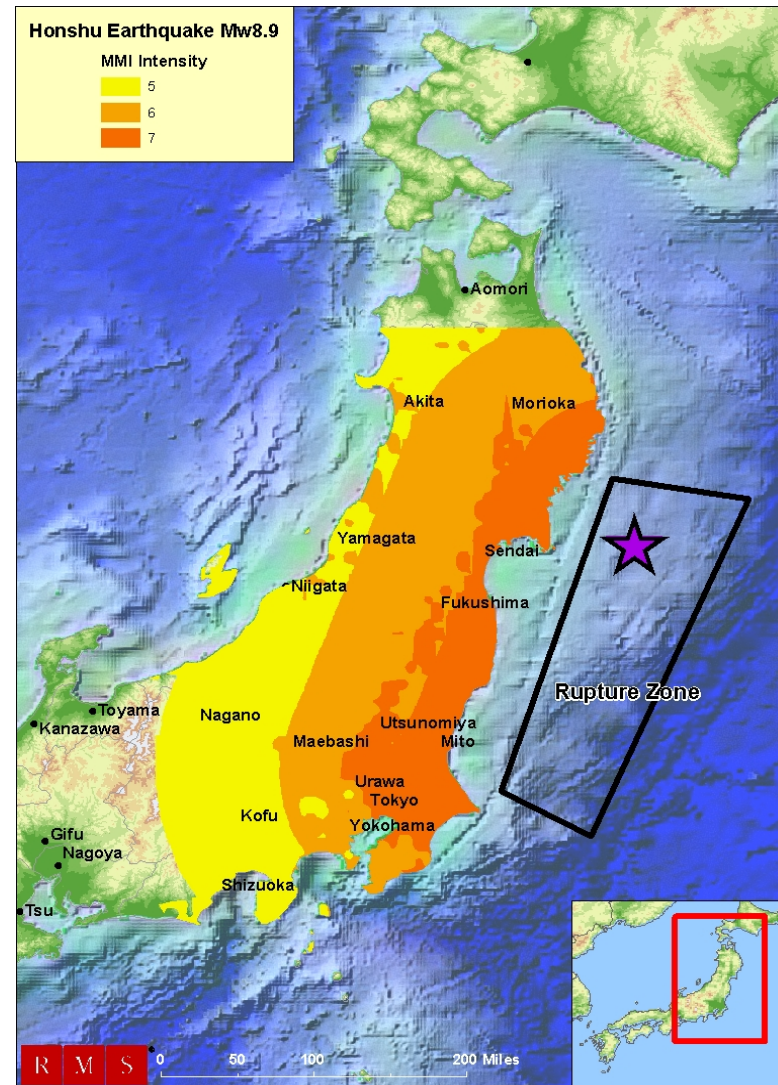
- Section 1                      Review of the Event
- Section 2                      Effect on Specific Marine Classes
- Section 3                      Historical Context and Overall Cost

## Section 1

# Review of the Event

### Summary

- At 05:46 UTC on Friday, 11 March a powerful magnitude 8.9 Mw (moment magnitude) earthquake occurred offshore the east coast of Honshu, Japan (02:46pm local time)
- The Mw8.9 earthquake appears to have ruptured a large part of the southern end of the Japan Trench, along a roughly 500km segment as a cascade of several earthquake sources that previously have generated smaller size earthquakes.
- The JMA reported a magnitude of  $M_{jma}$  8.4, with a depth of 6.2 mi (10 km) and an epicentral location of  $38.0^{\circ}N$ ,  $142.9^{\circ}E$ .
- Sea level readings confirm that a tsunami has been generated and as of 12:00 UTC a widespread tsunami alert is in affect across the Pacific Ocean.
- The Pacific Tsunami Warning Center have been reported tsunami wave activity in Tosashimizu, Shikoku, Japan, with a wave amplitude of 0.94m (3.1 ft) and Hanasaki, Hokkaido, Japan 2.79 m (9.2 ft).
- Initial reports are emerging that indicate the earthquake and associated tsunami have caused damage across a broad area of northern Japan.



Honshu Earthquake Rupture Zone (Source: RMS)

## Section 1

# CRESTA Zones

## Catastrophe Risk Evaluating and Standardized Target Accumulations

Accumulation Assessment Zones Earthquake

### Zones Affected

- The areas which took the majority of the damage are located in CRESTA zones 3 and 4.
- This is some way north of the industrial zone of Tokyo
- From a hull and cargo insurance perspective the affected areas are not major shipping lanes.
- Furthermore there are only two major ports in CRESTA zone 4 – Hitachi and Kashima.
- Total insured loss thought to be between USD 25bn – 35bn.
- Marine loss thought to be approximately USD 2bn-3bn.



## Section 2

# Marine Cargo

As far as cargo is concerned the media has focused on two locations:



- the fallen containers at the port of Sendai (which we are told has a capacity of only 2,000 containers, and normally handles lower valued cargo types), and
- 2,300 motor vehicles at the port of Hitachinaka. We understand that 1,300 of the motor cars were Nissan Infinitis for export, with a further 1,000 others. We also understand that there were 1,000 Mercedes Benz for import.

The coverage conditions in respect of EQ/tsunami on all of these motor cars is as yet unconfirmed, but it is possible that the exports carried no EQ/tsunami coverage, whilst the imports had a fairly low policy limit.

## Section 2

# Marine Cargo

### Conservative “at risk” and PML Calculations for import/export cargoes:

Using data on ports in the affected area, this exhibit shows the effect of three assumptions, being:

- 2/3rds of import/export cargo is insured by Japanese insurers
- the average dwell time at these ports would be 5 days (conservative)
- a PML of 50% of “at risk” amounts” (Shinozuka Research Institute study of Tokyo Bay PML in 1993 came to 21.67%)

Port	2009 Annual Statistics			Assumptions			JPY
	Exports	Imports	Throughput	Insured in Japan 66.67%	5/365 days 1.37%	PML 50.00%	
Kashima	334,652,164,000	914,712,381,000	1,249,364,545,000	832,951,342,152	11,410,292,358	5,705,146,179	
SendaiShiogama	238,160,592,000	354,525,631,000	592,686,223,000	395,143,904,874	5,412,930,204	2,706,465,102	
Hitachi	143,100,703,000	162,079,031,000	305,179,734,000	203,463,328,658	2,787,168,886	1,393,584,443	
Onahama	30,393,290,000	245,742,786,000	276,136,076,000	184,099,921,869	2,521,916,738	1,260,958,369	
Hachinohe	113,721,023,000	105,779,677,000	219,500,700,000	146,341,116,690	2,004,672,831	1,002,336,416	
Souma	1,642,823,000	101,377,512,000	103,020,335,000	68,683,657,345	940,872,018	470,436,009	
Ishinomaki	25,235,089,000	46,273,942,000	71,509,031,000	47,675,070,968	653,083,164	326,541,582	
Sendai Airport	17,202,584,000	34,028,140,000	51,230,724,000	34,155,523,691	467,883,886	233,941,943	
Kamaishi	4,236,864,000	9,727,593,000	13,964,457,000	9,310,103,482	127,535,664	63,767,832	
Oofunado	6,557,802,000	4,107,094,000	10,664,896,000	7,110,286,163	97,401,180	48,700,590	
Miyako	77,363,000	3,298,639,000	3,376,002,000	2,250,780,533	30,832,610	15,416,305	
Kesenuma	266,116,000	706,861,000	972,977,000	648,683,766	8,886,079	4,443,039	
<b>Total</b>	<b>915,246,413,000</b>	<b>1,982,359,287,000</b>	<b>2,897,605,700,000</b>	<b>1,931,833,720,190</b>	<b>26,463,475,619</b>	<b>13,231,737,810</b>	

Source: Ministry of Finance

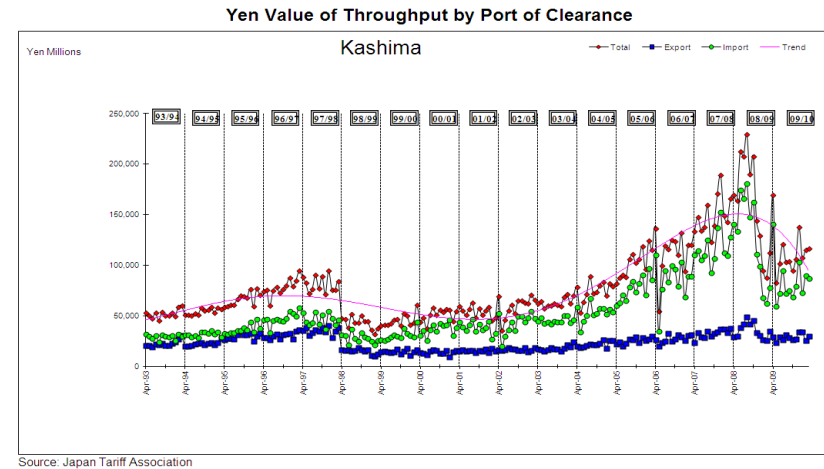
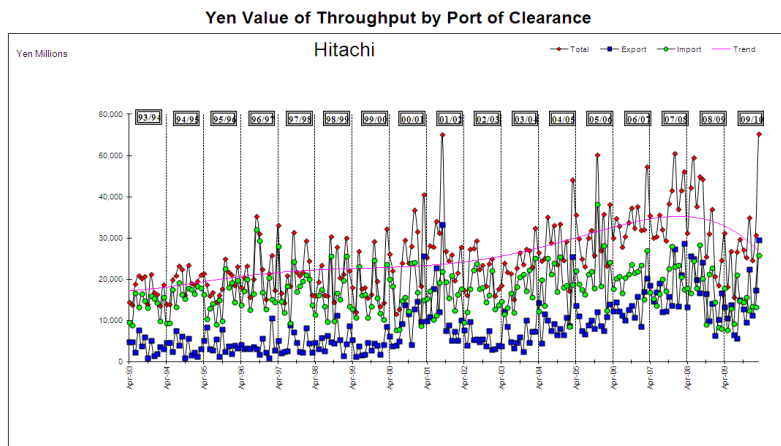
\$ 159,418,528

On this basis we come to a market Cargo loss of around USD160m.

## Section 2

# Marine Cargo

Given that the distribution data is based on annual averages, it is worth noting the seasonal variation in throughput values at each port. We show this for the two larger ports, Hitachi and Kashima.



The mathematical volatility within these charts (SD/Mean) is 33.8% and 47.6% respectively, so we could load the USD160m by, say, 50% to offer a conservative projection of **USD240m** arising from import/export cargoes insured by Japanese insurers across the Tohoku region.

In addition to this there may be a small number of inland transit policies which have been extended to include earthquake perils.

Note that these calculations are purely academic, and not based on actual claims data.

If distributed to each Japanese insurer's market share a loss of this size would have a limited effect on Cargo Cat layers purchased. Market shares in the affected region are not publicly available.

## Section 2

# Marine Hull

On the TV News channels there were numerous images of boats which were washed ashore by the tsunami. Most of these (even some of the larger looking ones) are FISHING VESSELS:



Damage to such fishing vessels has been reported as follows:

Prefecture	No of Vessels	Damaged Vessels
Hokkaido	16,293	714
Aomori	6,990	417
Iwate	10,522	Devastated and unknown
Miyagi	9,717	Devastated and unknown
Fukushima	1,068	855
Ibaragi	1,215	94
Chiba	5,640	253

These are normally ceded to a pool of mutuals in Japan (Gyosen Hoken Chuokai), which does not reinsure physical damage into the commercial market. We understand that the overall cost of these losses may be JPY100 billion (around USD1.2 billion).

## Section 2

## Marine Hull

SMALL & SPECIALTY vessels are those working boats involved in inshore construction projects and maintenance etc. COASTAL vessels are mainly ferries and local cargo boats.



These two categories are insured by the main non-life insurers in Japan. The affected ports in northeast Japan are not main shipping areas. The operators of those vessels that were locally based are very difficult to contact, so there may be some casualties, whereas those which were in the area but based elsewhere in Japan would be operated by owners whose communications are still operable, and they would have immediately contacted their insurers. At this stage we understand that very few such contacts have been received.

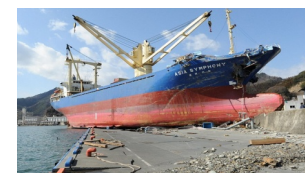


## Section 2

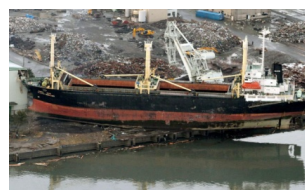
# Marine Hull

For OCEANGOING we have a list collected from multiple sources which so far includes 19 Japanese and foreign commercially insured vessels which have sustained varying degrees of damage, including two vessels under construction at Ishinomaki Dockyard:

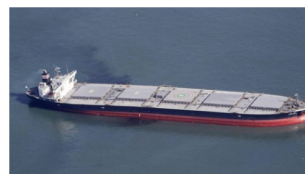
Vessel	Type	BY	Owner	Charterer	grt/(dwt)	Damage?
<b>Oceangoing</b>						
CS Victory	Bulker	2003		MOL	20,212grt	Aground at Ishinomaki Harbor
Asia Symphony	General Cargo		Mitsubishi Logistics		4,724grt	Lifted onto quay at Kamaishi, Iwate
Shiramizu	Bulker	2005		NYK	50,464grt	Grounding and flooding at Soma
Shirouma	Bulker	1998		NYK	43,434grt	Grounding at Haramachi
Coral Ring	Bulker	2006		NYK	39,659grt	Contact with pier at Onahama
Chikyu	Research	2005	JAMSTEC		57,087grt	Damaged at Hachinohe. One thruster requires repair in dry-dock.
Golden Grace	Product tanker	2005	Nissho Kisen		5,988grt	Contact with Katsura and engine room flooded at Kashima
Rokkosan	Crude Carrier	2003			160,066grt	Contact with China Steel Integrity at Kashima
Katsura	Bulker	2010	Daiichi Chuo KK		106,333grt	Swept off berth at Kashima and contacted Golden Grace/Sun Prince
Taino Maiden	Cargo Carrier	1985	TBS Ecuador		14,283grt	Sustained damage to the bulbous bow and portside hull due to the tsunami in Kashima Port, the vessel was able to navigate under its own power arriving at Tomakomai Port at 1400 hrs, Mar 17.
Koshin Maru	Cargo Carrier	2000			1,592dwt	Grounded?
China Steel Integrity	Iron Ore Carrier	2002	Taiwanese	K Line	91,178grt	Grounded at Kashima
Glovis Mercury	General Cargo	1989	Glovis, Korea		5,472grt	Washed ashore at Sendai
Long Mu Wang	Containership	1994	Chinese		42,323grt	Contacted breakwater at Kushiro. Damage to anchoring and mooring equipment, steering, propeller, rudder and hull.
Emu Arrow	Cargo Carrier	1997	Gearbulk, Norway		51,419grt	Contact with adjacent vessels/berth at Kashima
Pacific Athena			Singapore			Contacted breakwater at Hachinohe. Water ingress and 5 degree port list.
Tai Chung	Bulker	1982	Tai Shing Maritime		22,989grt	Contact with China Steel Integrity at Kashima. Arrived Yokohama 15/3.
Flanders Tenacity	LPG Tanker		Belgian		54,155dwt	Minor damage, moved to off Tokyo awaiting yard
<b>Building Risks</b>						
Sider Joy	Bulker		Siderno, Romeo Group (Italian) or Yamanishi Shipbuilding			Drifted at Ishinomaki dockyard while under construction
Toripan/Tulipan?	Freighter		Yamanishi Shipbuilding			Damaged at Ishinomaki dockyard



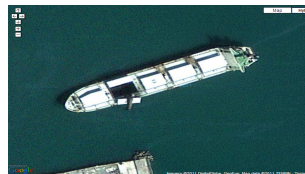
Asia Symphony



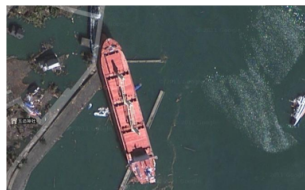
Glovis Mercury



Shiramizu



Shirouma



Sider Sun

## Section 2

# Protection & Indemnity and Specie

### Protection and Indemnity

#### Coastal:

It is considered unlikely for Coastal owners to receive any liability claims given that the cause of loss is a natural disaster.

We also anticipate limited wreck removal claims assuming that it will often not be practical separately to identify the cost to the individual owners, given that so much debris is being cleared anyway. This is very different to the typical aftermath of a major hurricane

#### Ocean-Going:

Ocean-going vessels have sustained varying degrees of damage, but we are not aware of any potential large P&I claims arising from the event.

### Specie / Exhibitions

Japan's Agency of Cultural Affairs produced some limited information on the number of "damaged" items as at 17<sup>th</sup> March 2011 as shown:

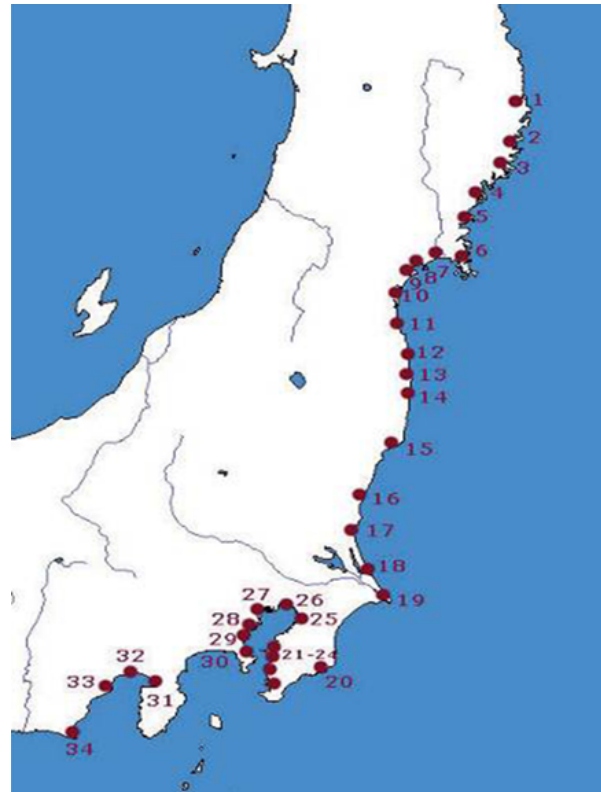
Item	Number damaged
National Treasures	2
Important Cultural Properties	74
Special Historic Sites	5
Historic Sites	39
Places of Special Scenic Beauty	4
Places of Scenic Beauty	11
Natural Monuments	9
Important Preservation District Groups of Traditional Buildings	3
Important Tangible Folk Cultural Properties	1
Others	98
<b>TOTAL</b>	<b>246</b>

## Section 2

# Ports and Terminals

We believe that most Japanese ports are normally insured into the property market.

Some major operators do buy directly in the international market, which would cross onto the Marine Liability side, but we have little information on this so far.



- |                         |                          |
|-------------------------|--------------------------|
| 1 Port of Miyako        | 18 Port of Hitachinaka   |
| 2 Port of Kamaishi      | 19 Port of Naarai        |
| 3 Port of Ofunato       | 20 Port of Okitsu        |
| 4 Port of Kesenuma      | 21 Port of Tateyama      |
| 5 Minamisanriku Harbour | 22 Port of Hamakanaya    |
| 6 Onagawa Harbour       | 23 Port of Kazusa-Minato |
| 7 Port of Ishinomaki    | 24 Port of Kisarazu      |
| 8 Port of Shiogama      | 25 Port of Chiba         |
| 9 Port of Sendai        | 26 Port of Funabashi     |
| 10 Soma Harbour         | 27 Port of Tokyo         |
| 11 Minamisoma Harbour   | 28 Port of Kawasaki      |
| 12 Namie Harbour        | 29 Port of Yokohama      |
| 13 Futaba Harbour       | 30 Port of Yokosuka      |
| 14 Tomioka Harbour      | 31 Port of Numazu        |
| 15 Port of Onahama      | 32 Port of Tagonoura     |
| 16 Port of Hitachi      | 33 Port of Shimizu       |
| 17 Port of Oarai        | 34 Port of Omaezaki      |

## Section 2

# Ports and Terminals

The following information is from a Reuters website:

Ports with severe damage that could take months, if not years, to rebuild are:

**Hachinohe** (medium-sized container and oil seaport)

- The port's fuel terminals supply the local fishing fleet and U.S. military installations in Japan, Korea and Okinawa.
- With seven fuel terminals, the port has the capacity to store more than 11 million barrels of oil products.
- The port handled more than 310 million gallons of petroleum products in 1997.
- Operates 48 container berths that operates regular international routes to Taiwan, Singapore, Korea, Australia, South America, Europe, Canada and the United States.

**Sendai** (medium-sized container, breakbulk seaport)

- Formerly one of the biggest and most efficient container and breakbulk cargo centers in northeastern Japan.
- Exported 57,000 twenty-foot equivalent units (TEU) of containerised cargo, almost half of which were rubber products, in 2005. Other cargo included machinery, pulp and paper, and marine products.
- Imported 48,300 TEUs of containerised cargo, including 6,500 TEUs of lumber. It also imported marine products, foods, sporting goods, furniture, dyes, paints and wood products.

**Onahama** (medium-sized container seaport)

- Handled over 11 million tonnes of containerised cargo in 2000, of which 7.2 million was intra-Asia trade.
- The container port is linked to vessels travelling via South Korea, China, Australia, Southeast Asia and North America.

**Ishinomaki** (medium-sized dry bulk and breakbulk seaport)

- Handles fertilizer and steel products at two piers, which can accommodate vessels between 1,000 and 2,000 TEUs.
- The Nakajima Pier handles ores and its two berths can accommodate vessels to 2,000 deadweight that carry coke.
- The South Beach Pier has two berths, which can accommodate 10,000 deadweight vessels, that handle raw wood.

Ports with less severe damage that could resume normal operations within weeks are:

**Kashima** (large-sized container port)

- The ninth largest container port in Japan, handling an estimated 82 million deadweight tonnes of cargo in 2010.

**Hitachinaka** (medium-sized container, car seaport)

- Handled 994,000 tonnes of cargo in 2001, up more than 300 percent from the previous year. That consisted of 159,000 tonnes of foreign trade.
- Cars, metal products and machine industrial goods made up more than half of all handled cargo. Other goods included sugar, non-ferrous metals, fruits and vegetables and wood products

## Section 2

# Offshore Energy

We have not received reports of any affected projects.

Japan does not have a lot of offshore resources, and we believe there are no offshore energy risks in the affected area.

One scientific research vessel, Chikyu (JAMSTEC) has some damage to a thruster, but this is not expected to cause a major loss:

17<sup>th</sup> March - The Deep-Sea Drilling Vessel *CHIKYU*, operated by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), was in the Hachinohe port in preparation for IODP Expedition 337, when the large earthquake hit the Northeast Pacific coast of Japan on March 11. In the wake of the earthquake and following tsunami, *CHIKYU* immediately evacuated the port. However one of her six thrusters suffered damage. The *CHIKYU* can still navigate herself under her own power but the dry docking of the vessel is necessary to assess the exact amount of damage. All personnel and visitors aboard including CDEX/JAMSTEC and support staff ashore, are safe and accounted for.

23<sup>rd</sup> March - Deep Sea Drilling Vessel Chikyu left the port of Hachinohe at 17:30 on March 18<sup>th</sup> and safely arrived at the Port of Muroran at 9:00 on March 20<sup>th</sup>. Divers have investigated provisional assessment of ship's damages by the Tsunami including azimuth thrusters.

5<sup>th</sup> April - The Deep Sea Drilling Vessel Chikyu left the port of Muroran at 9:00 on 31<sup>st</sup> March, and arrived at the port of Yokohama for damage assessment at 15:00 on 5<sup>th</sup> April.

18<sup>th</sup> April - Deep-Sea Drilling Vessel Chikyu, operated by JAMSTEC, will enter dry dock on April 20 for inspection and repairs.

## Section 3

# Largest Insured Earthquake losses

Earthquake Location	Year	Magnitude	Insured loss (USD m)
Japan	2011	8.8	25,000?
US	1994	6.6	20,276
New Zealand	2011	6.1	10,000
Chile	2010	8.8	8,000
New Zealand	2010	7.0	4,000
Indonesia, Thailand et al	2004	9.0	2,273
US	1989	7.1	1,662
Taiwan	1999	7.0	1,289
Turkey	1999	7.0	1,289
Ecuador	1987	6.8	1,266
Australia	1989	5.5	1,207
Japan	2004	6.9	680
US	1987	6.0	676

Largest insured earthquake losses (Source: Sigma Swiss Re, Bof A Merrill Lynch Global Research)

If the estimates are correct the 2011 Japanese Earthquake could be the most costly on record.

## Section 3

# Overall Cost Including Property

Clearly it will be a long time before the overall cost can be assessed from actual claims, so for now we are monitoring the projections given by the Japanese Government and modelling companies. An earthquake of this magnitude was not expected in this region of Japan. As a result, there is considerable uncertainty inherent in the modelled estimates.

### Japanese Government

On Wednesday 23<sup>rd</sup> March estimated the economic cost of direct damage to roads, homes, factories and other infrastructure at JPY16-JPY25 trillion (USD185-USD308 billion). These figures do not include the costs of business interruption, nor the effects of the nuclear crisis.

### AIR Worldwide

On 24<sup>th</sup> March AIR updated their modeled estimate of insured losses to a range between JPY1.5 and JPY2.5 trillion (USD20-USD30 billion). This includes buildings and contents damage to residential, commercial, industrial, mutuals and cooperatives; agricultural property damage; and losses to the Japanese Earthquake Reinsurance Corporation (JER). The estimate includes damage from earthquake shock, fire following, and tsunami.

### RMS

Have given an economic loss estimate of USD200-USD300 billion, including business interruption, contingent business interruption, power outages, port facility impacts, and nuclear, earthquake/tsunami cleanup costs.

On Monday 11<sup>th</sup> April RMS estimated that the total insured losses will reach between JPY1,750 and 2,830 (USD21-USD34 billion). This loss estimate is inclusive of post-event loss amplification, business interruption and contingent business interruption. The potential total death benefit payout is also included in this loss range, though government liability under the J.E.R. scheme is excluded. This includes USD1.2-USD2.2 billion for marine.

### EQECAT

Have estimated the total insured loss to be USD12-USD25 billion. This estimate includes tsunami, and losses to the JER, marine, auto, life and personal accident lines of business. We understand that the "marine" element comprised USD1-USD3 billion arising from fishing vessels, ports & terminals, equipment and dry bulk cargoes.