Accumulation, Modelling and CAT Management in the Marine Market

November 29, 2016
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Agenda

- Review of Large Marine Losses involving accumulation of interests
- Who pays for these? What is the impact on results?
- What to do?
- Usage of tools, models and data
- CAT Modelling
- RMS Cargo Model
- IHS Markit
- Applications of CAT Modelling in Marine
- Other accumulation concerns
- Next steps
- Q & A

Large Marine Losses involving accumulation of interests

2011 Tohoku Earthquake and Tsunami

- March 11, 2011

- Magnitude 9.0 (largest earthquake recorded in Japan)

- Massive human toll

- Insurance Loss USD $ 36 billion

- Economic Loss USD $ 211 billion

- Combination of events including aftershock, liquefaction, tsunami, nuclear plant accident, power outages, massive supply chain impact.

Marine Impact

- Ports of Hachinohe, Sendai, Ishinomaki and Onahama severely damaged. Other damaged ports included Kashima, Hitachinaka, Hitachi, Soma, Shiogama, Kesennuma, Ofunato, Kamashi and Miyako. Collectively these ports handled up to 7% of Japan's industrial output.

- Marine insurance loss estimated at USD $ 1 billion to $ 3 billion comprised of commercial hull, cargo, and yacht losses including over 18,500 fishing vessels.

Large Marine Losses involving accumulation of interests

2011 Thailand Floods

- Severe Monsoon Rains made worse by La Nina conditions. Precipitation was well above normal.

- Flooding is a regular occurrence in Thailand but as population and number of exposed properties grow losses from this peril grow.

- Losses driven by Property, Contingent Business Interruption (CBI), and Supply Chain.

- Insurance loss estimate USD $ 15 to $ 20 billion.

Marine Impact

- Cargo Losses (Goods in Storage / Stock Thru Put)

Large Marine Losses involving accumulation of interests

2012 Costa Concordia

- Vessel ran around January 13, 2012

- 3,206 passengers and 1,023 crew and personnel

- Loss of 32 lives, 64 persons injured

- Ship was wrecked in the environmentally sensitive Tuscan Archipelago National Park

- Captain Francesco Schettino was found guilty of manslaughter and sentenced to 16 years in prison.

Marine Impact

- $ 2.5 billion Marine Market Loss

- Hull & Machinery $ 513 million+

- Protection & Indemnity $ 1.44 billion+

- Largest and most expensive wreck removal operation in history

Large Marine Losses involving accumulation of interests
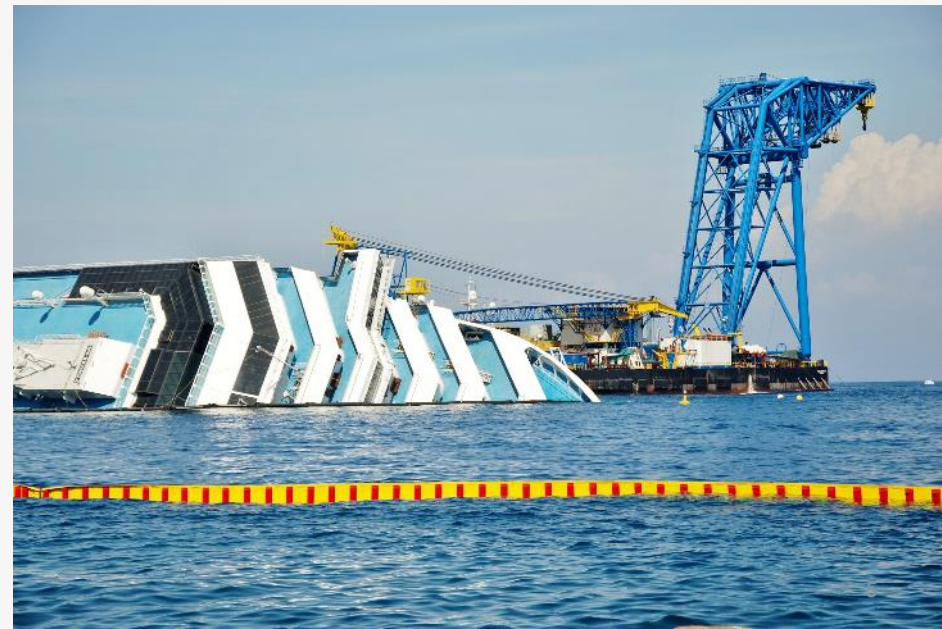
2012 Superstorm Sandy

- October 29, 2012 storm moved ashore near Brigantine, NJ as a post-tropical cyclone

- 233 people killed

- Estimated economic loss $ 75 billion

- Record Storm Surge (13.88 feet at battery Park), 32.5 foot wave height at buoy near entrance to NY Harbor

- Port of NY / NJ completely submerged

Marine Impact

- Estimated insurance loss $ 29 billion+

- $ 2.5 billion to $ 3 billion+ Marine Insurance Loss (Marine is 1% of P&C Premium but suffered 10% of Loss)

- 65,500+ yachts lost or damaged $ 589 million+

- 16,000 new vehicles insured in Cargo Market were total loss $ 400 million to $ 640 million+

Sources: Advisen February 2013 Paper Marine Insurance Market and the Lessons Learned from Superstorm Sandy

Large Marine Losses involving accumulation of interests

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2015 Explosion in Port of Tianjin

- August 12, 2015: fire followed by two massive explosions in in port and warehouse district of Tanggu / Tianjin

- Explosion with strength of 450 tons TNT (ground shakes of up to 2.9 on Richter Scale were recorded)

- Explosion crater of more than 100m diameter

- 175 fatalities and about 800 injuries

- 2 to 3 billion Euro Market Loss

Marine Impact

- 70,000 damaged / contaminated cars (estimated loss 1.6 billion Euro)

- 10,000 containers affected (estimated loss 400 million Euro)

- Buildings and other assets (estimated loss 500 million Euro)

- Auto losses complex (brand protection and tariff / tax implications)

Large Marine Losses involving Container Ships

Sources: VesselFinder Update on MOL Comfort's Accident June 2013

- MOL Comfort Loss (June 2013 $ 500 million+)

- MSC FLAMINIA (July 2012 1,200 of 2,876 containers destroyed)

- MSC RENA (3,351 TEU capacity $ 443 million loss)

- MSC NAPOLI (4,735 TEU capacity)

- HYUNDAI FORTUNE (5,551 TEU capacity)

- APL PANAMA (4,038 TEU capacity $ 68 million+ GA, largest ever)

- SVENDBORG MAERSK (lost 500 container off coast of France February 2014)

Large Marine Losses involving Car Carriers / RoRo

- HOEGH OSAKA (2015 - 1,400 cars $ 60 million)

- MV COURAGE (2015 – 800 cars)

- ASIAN EMPIRE (2014 - 4,600 cars $ 130 million)

- BALTIC ACE (2012 – 1,400 cars $ 50 million)

- COUGAR ACE (2006 – 4,812 cars $ 117 million)

- HYUNDAI 105 (2004 – 4,190 cars $ 81 million)

- HUAL EUROPE (2002 – 4,000 cars $ 80 million)

- TRICOLOR (2002 – 2,871 cars and trucks $ 60 million)

Who pays for these? What is the impact on results?

Who pays for these losses?

- Insureds (uninsured loss, retention / deductible, captives, etc.)

- Insurers

- Reinsurers

What is the impact on results?

- Increase in Losses and LAE

- Reinsurance costs and reinstatement premiums

- Outsized losses relative to Property

- Credibility and scrutiny of Marine Underwriters

What to Do?

- Chalk it up to "Shock Loss" or "Black Swan" type event?

- Bad Luck?

- Recognize the business is changing?

- Learn from prior events and improve our business?

- Resist or embrace new tools and technologies?

Tools

What possible tools are available for the job?

What is the best tool for the job?

If the best option was not available what are some other viable choices?

What if we adapt or modify tools to suit marine?

CAT Modelling

- RMS - http://www.rms.com/

- AIR Worldwide - http://www.air-worldwide.com/

- CoreLogic (former Eqecat) - http://www.corelogic.com/

- Professional Reinsurers, Reinsurance Brokers

RMS Cargo Model

- RMS solutions for Cargo & Specie Cat risk

- Cargo type (e.g. autos, bulk grains, electronics, specie)

- Precise storage location (e.g. coastal, estuarine, waterside or within dock complex)

- Storage type (e.g. open air, warehouse, container — stacked or ground level)

- Dwell time (which can vary due to port automation, labor relations and import/export ratios)

Source: RMS

How damageable is it?
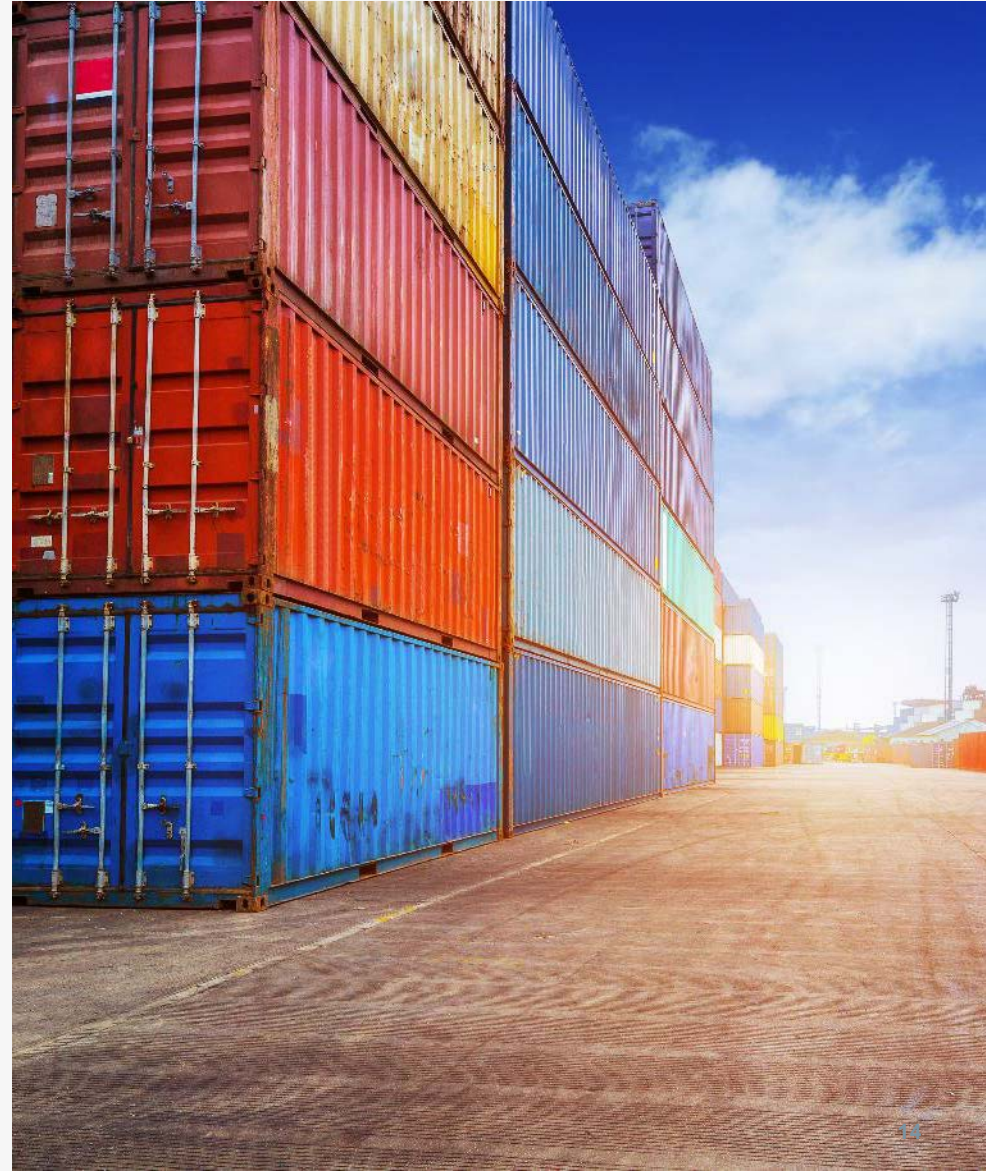
Cargo & Specie Specialized Vulnerability Curves

- **RMS has developed 500+ distinct custom vulnerability curves:**

- 18 Cargo & Specie types (auto, electronics, break bulk, consumables, general specie…)

- 12 Storage methods (container, warehouse, tank, outside…)

- Factoring in potential salvage value

- 10 Damage mechanisms modeled (wind, water, volume loss….)

- Consideration of damage reduction measures (movability, storage in safe….)

Model losses at key locations and analyze correlation with property losses

Vulnerability differentiated by peril

- Wind

- Surge

- Earthquake

- Future release: Hail, Flood & Terrorism

Source: RMS

Marine Product Categories / Occupancy

OCC_SCHEME	OCC_TYPE	Occupancy Type
	0	Unknown
	1	Automobiles
	2	Break Bulk
	3	Dry Bulk
	4	Liquid Bulk
	5	Consumables
	6	Temperature Controlled
	7	Electronics
	8	Explosives
RMSMARINE	9	General Cargo
	10	Heavy Industry
	11	Petroleum Products
	12	Pharmaceuticals
	13	Project Cargo
	14	Livestock
	15	General Specie
	16	Fine Art & Collectibles
	17	Cash In Transit
	18	Jewelers' Block

Source: RMS

Storage Configuration (Construction Class)

BLDG_SCHEME	BLDG_CLASS	Construction Class
	0	Unknown
	1	Special Design Facility
	2	Silo
	3	Liquid Tank
	4	Gas Tank
	5	Inside Warehouse at Port
RMSCGSPEC	6	Containerized - Inside Warehouse
	7	Containerized - Stacked Outside
	8	Open Lot or Stockpiled Outside
	9	At Destination - Warehouse
	10	At Destination - Retail
	11	Museum or Institution
	12	Retail or Private Building

Source: RMS

Product Specificity and Packaging

Specificity of product (e.g. fishmeal vs. canned food, both "consumables")

Packaging – better or worse than average

Loss mitigation measures of warehouse, storage facility, or port terminal – better or worse than average.

Contents Grade	Damageability
1	High Damageability
2	Moderate Damageability
3	Average Damageability
4	Low Damageability

Source: RMS

Sample Cargo Vulnerabilities

1. Robust Risk Differentiation
   - 18 cargo types

2. Determines susceptibility to damage
   - Movement
   - Rain water
   - Flooding
   - Contamination
   - Power loss
   - Port Delays

Risk by Cargo/Category

Source: RMS

Trade Data

- IHS Markit - https://ihsmarkit.com/

- Datamyne - http://www.datamyne.com/

- Panjiva - https://panjiva.com/
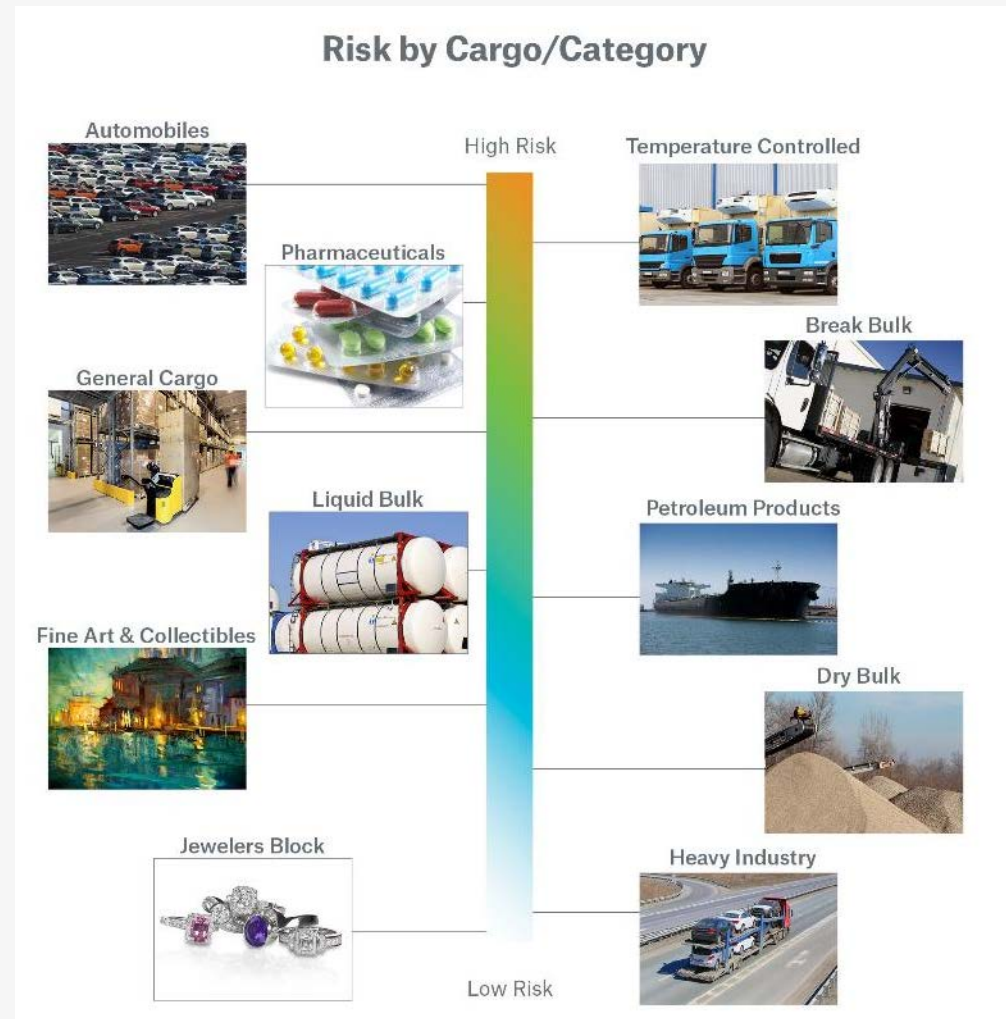
Benefits of Trade Data

- Supplemental information that is not provided by insured and / or broker

    - Enables underwriters to make better decisions

    - Helpful in quantifying exposures

- Cross-sell / marketing

- Portfolio management

- Increases risk awareness

Use of Global Trade Data and US Bill of Lading Information

What can we tell from this data?

More accurate estimate of total cargo on board a vessel

- By aggregating US bill of lading information and combining it with officially reported government trade statistics, we can apply a monetary value for each commodity traded.

Port cargo accumulation

- Using US bill of lading details we can see cargo that's offloaded on each port throughout time.

Total value of trade by commodity

- Aggregating global trade data allows us to see the total value of commodities that move across the world.

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Benjamin Franklin Cargo Accumulation

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Applications of CAT Modelling in Marine
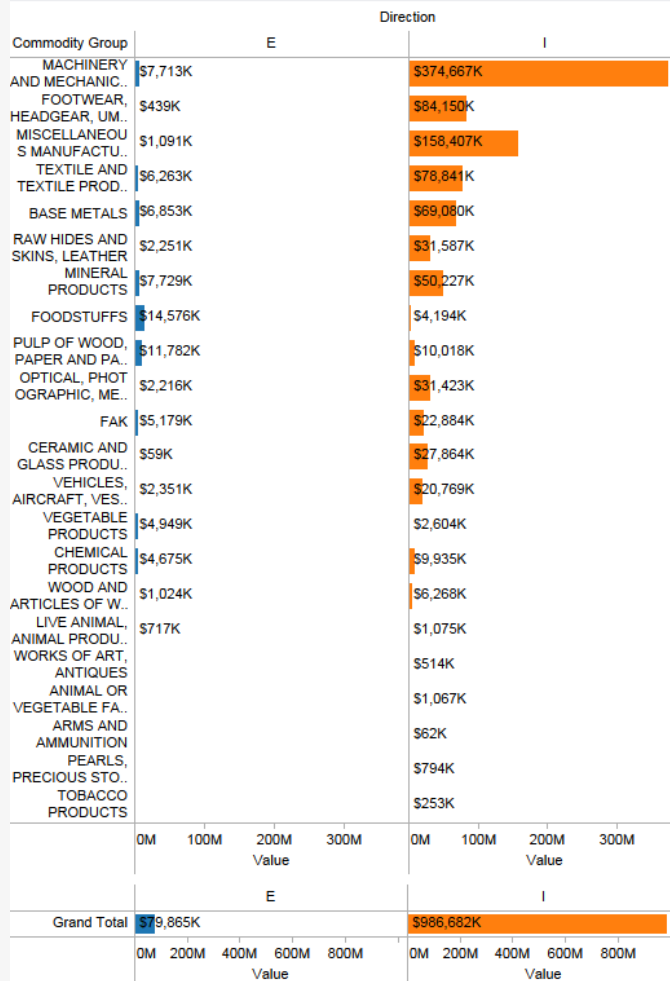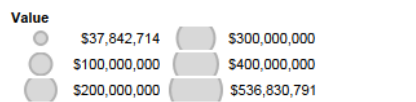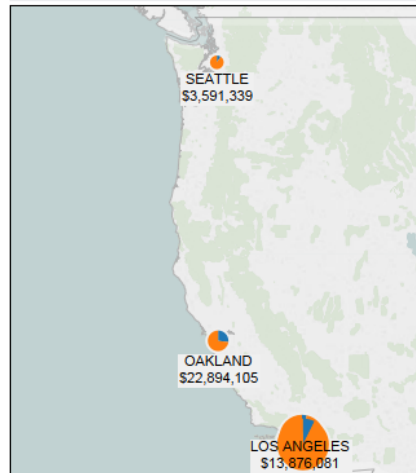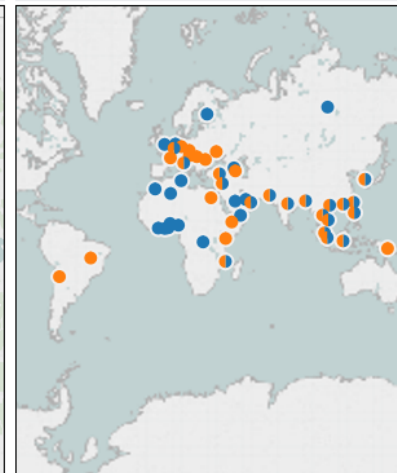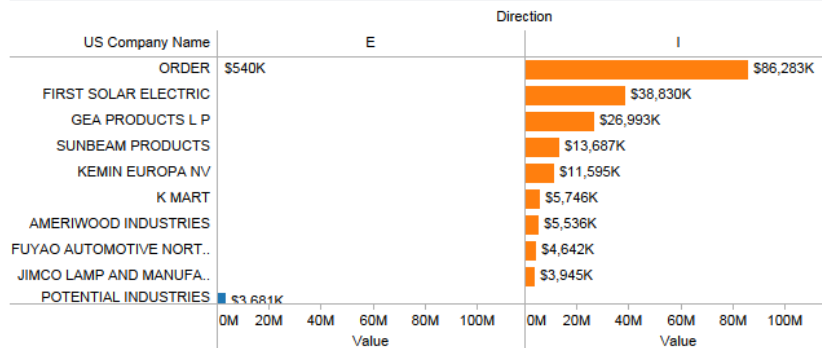
Risk	Known location	Address	Lat / Long
Cargo (In transit)	X	X	X
Cargo Storage (named locations / schedules on file)	☑	☑	☑
Cargo (in ports)	X	X	X
Commercial Hull	X	X	X
Yacht (mooring/marina location)	☑	☑	☑
Mega Yacht	X	X	X
Marinas / Boat Dealers	☑	☑	☑
Ports / Terminals	☑	☑	☑
Shipyards	☑	☑	☑
Marine Builders Risk	☑	☑	☑

Other Accumulation Concerns

- Carrier Insolvency

  - Hanjin

- Misappropriation Claims

  - Commodity Traders

  - Policy Construction, Definitions, Exclusions

Next Steps

- Use all the tools / approaches available that are appropriate for your portfolio

- Accumulation / aggregate management

- Risk selection criteria (yacht age, elevation in flood zone, construction type)

- Clash exposure

- Line size

- Retention / reinsurance

- Policy wordings (limits, definitions, extent / scope of coverage)

Questions?

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