



# AIMU MARINE INSURANCE ISSUES SEMINAR

## *CARGO MODELING UPDATES*

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# AGENDA

- Background
- Latest Cargo CAT Model developments
- Lessons learned from recent Marine Cargo CAT events
- Discussion



# RMS BACKGROUND

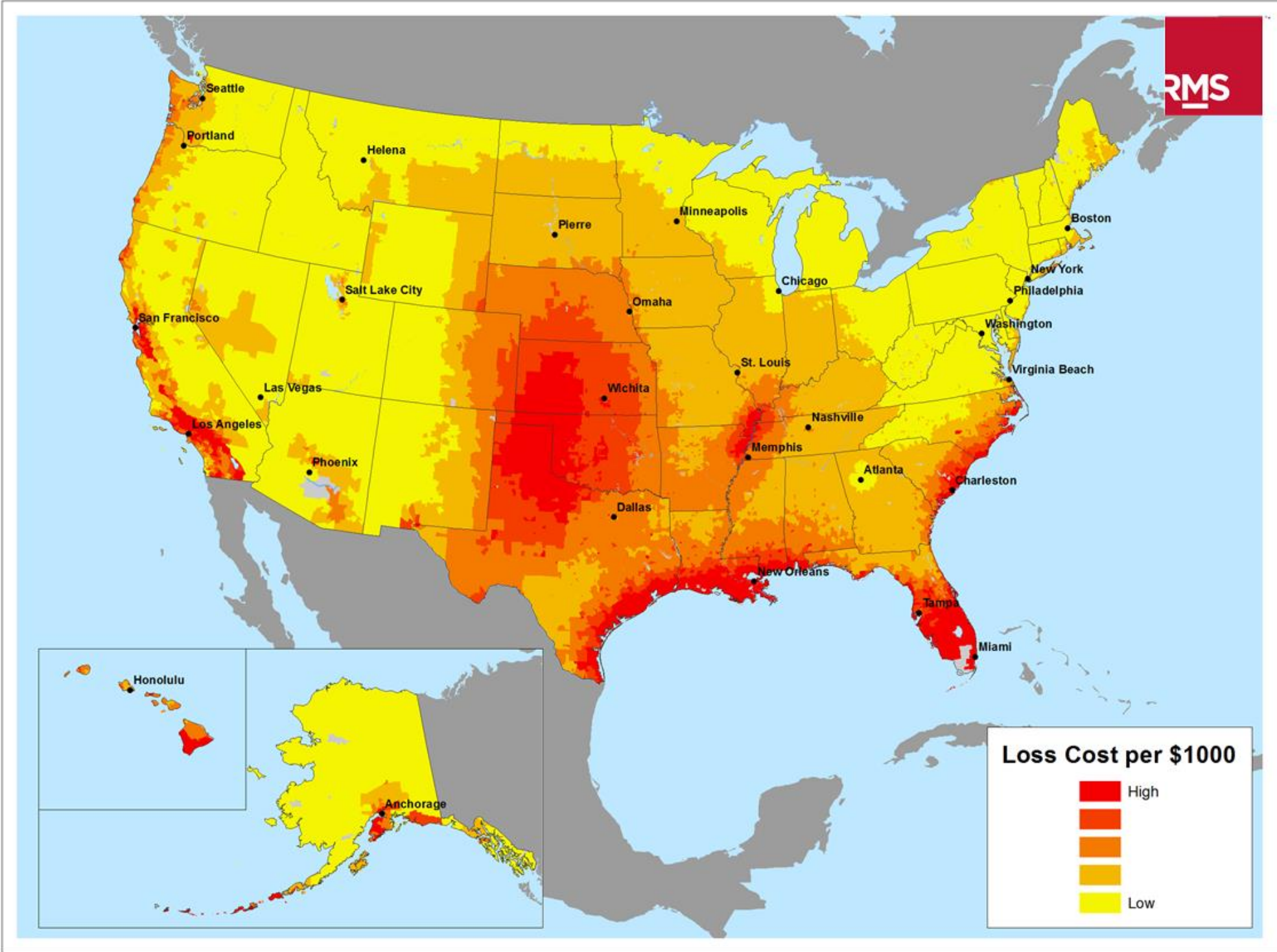
RMS is the world's leading provider of products and services for the quantification and management of catastrophe risk

- Work with most major insurance and reinsurance companies in **US & Europe**
- **\$2 trillion** worth of insurance and capital markets transactions based on RMS Risk Models
- Trusted by regulators and rating agencies for **over 25 yrs**
- RMS catastrophe risk models used for **rated capital market transactions**
- First company to develop a **Cargo & Specie Cat Model**

# SCOPE OF THE CARGO CAT MODEL

- **CAT Perils** modeled for Cargo & Specie:
  - EQ: 76 Countries
  - Wind (and surge): 63 Countries
  - Severe Convective Storm: United States & Canada
  - US Flood (**new addition in 2019**)
  - ***Perils Coming Soon:***
    - EU Flood (15 countries)
    - EU SCS (15 countries)
- **Port Exposure Databases:** 51 Hi-resolution, 134 Standard-resolution (representing 80% of global tonnage)
- **Cargo & Specie modeled:** 100% of Cargo bucketed into 18 categories, 12 storage types: over 200 vulnerability curves per peril PLUS secondary modifiers
- Other Marine Lines modeled: Offshore Platforms & Yacht
- **Question for potential future development**, do you have significant interest in any of the following:
  - Terrorism
  - Fire & Explosion
  - Hull: Attritional risk and/or Builders Risk
  - Offshore Platform (other than Gulf)

# NATURAL CATASTROPHE RISK IN THE US



Perils modeled shown: HU, EQ, SCS



# MARINE CARGO IS HIGHLY DIVERSE



<http://www.crowley.com>



## Cargo & Specie Risks

**What is being shipped?**



Public domain photo



Getty Images



# SAME PERIL – DIFFERENT DAMAGE



Damage to bottom level container mostly

<http://www.crowley.com>



Some of it may be washed away

<http://www.nskcontracting.com>

- If a Hurricane causes storm surge of 3' at the same port



Degree of damage depends on storage, packaging and protection

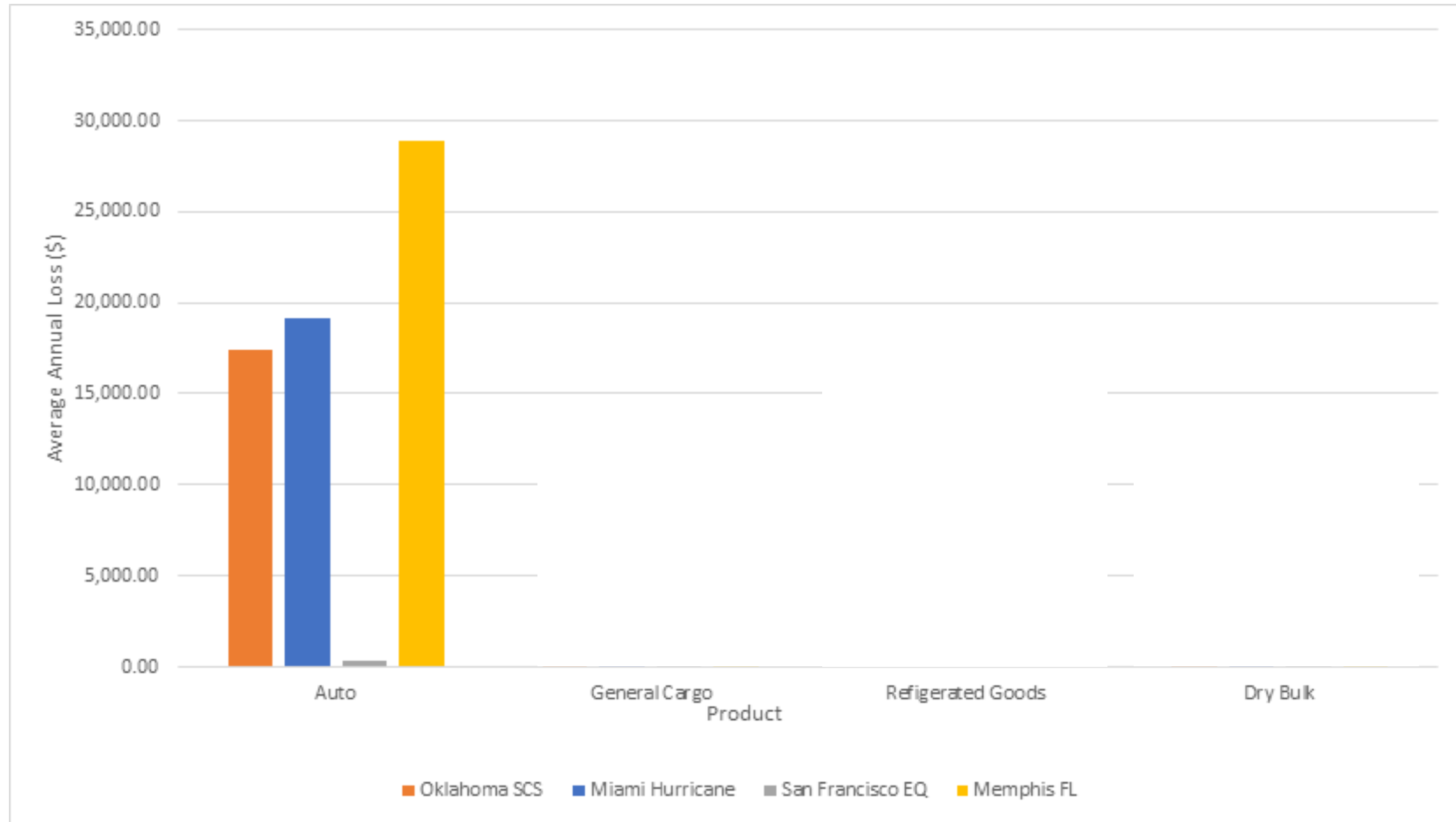
Public domain photo



Significant Damage

Getty Images

# RELATIVE AAL BY CARGO TYPE AND BY PERIL

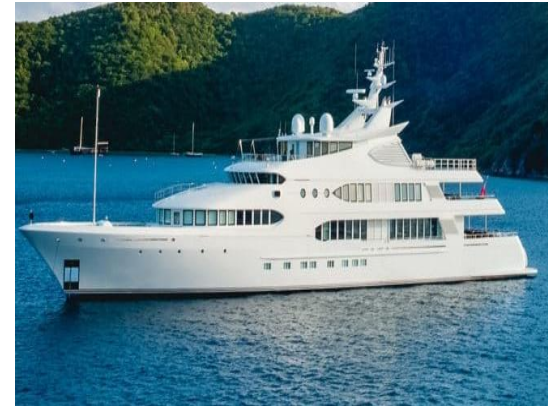




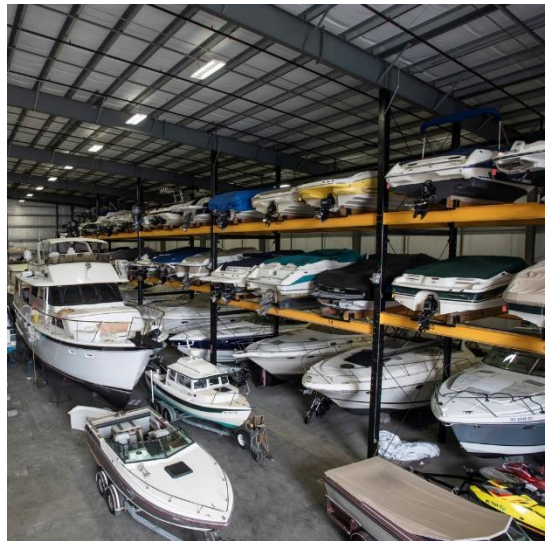
# MODELING HURRICANE RISKS TO WATERCRAFT

## Boat Length – Small vs. Medium vs. Large

## Motor vs. Sail



## Inside Building vs. Outside





# WATERCRAFT DAMAGE IN HURRICANES



- Watercraft losses driven by **Storm Surge** & less so by Wind
- **Anchoring, Tie-downs, Clearance above ground** for boats stacked onshore affect loss potential
- **Haul away** likelihood influenced by Captaincy & Warranty requirements



# Offshore Platform Modeling

## **Andrew** (1992) ~\$3bn industry loss

- Andrew caused severe damage - triggered design code improvements

## **Lili** (2002) ~\$2bn industry loss

- Exposed newly developed deepwater structures and mobile rigs

## **RMS Offshore Platform Model first released 2003, updated in 2006 and 2011**

## **Ivan** (2004) ~\$2bn industry loss

- Submarine landslides in Mississippi Delta region drove loss of production losses

## **Katrina & Rita** (2005) ~\$15bn industry loss

- Record-breaking activity – affected almost the entire Gulf of Mexico exposure between them with unprecedented damages

## **Gustav & Ike** (2008) ~\$9bn industry loss

- Significantly affected almost all GOM exposure once again; Ike brought high waves as well as winds



*Hurricane Ike*



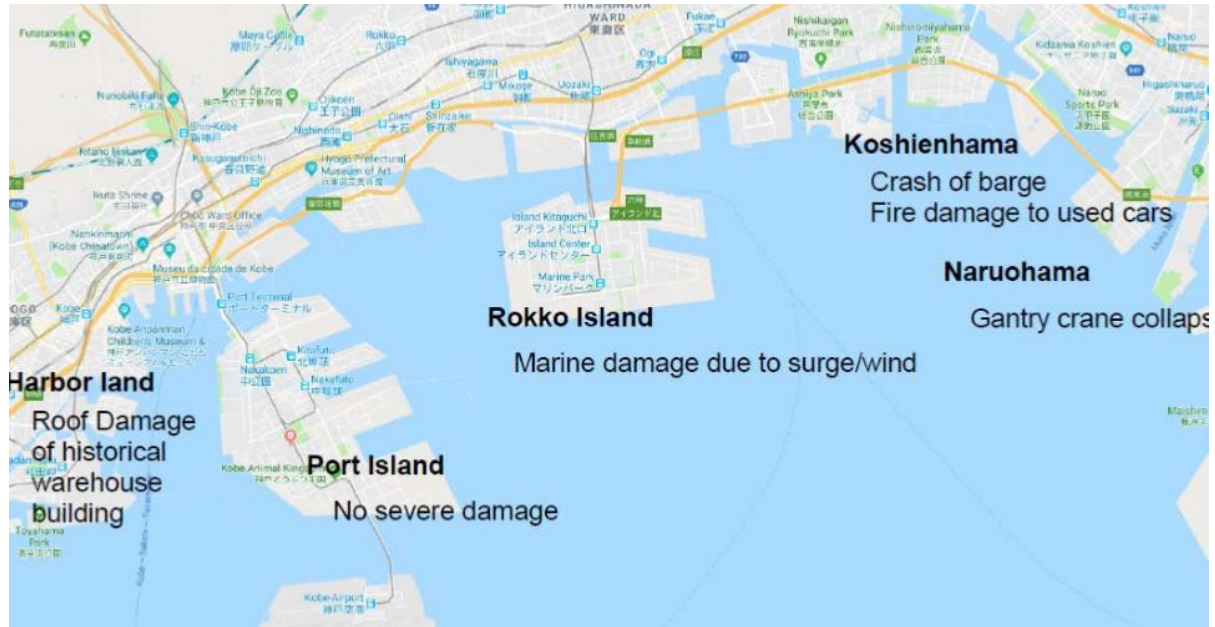
*Damage from Hurricane Katrina*

# LESSONS LEARNED FROM RECENT MARINE CATASTROPHES



# SUPER TYPHOON JEBI: JAPAN SEPTEMBER 2018

## Kobe City

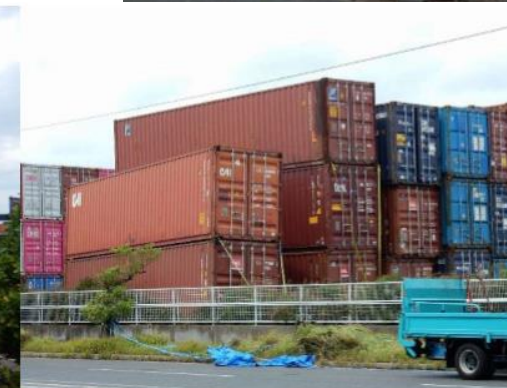


### Port Island:

- Flooding reported, no visible damage

### Rokko Island:

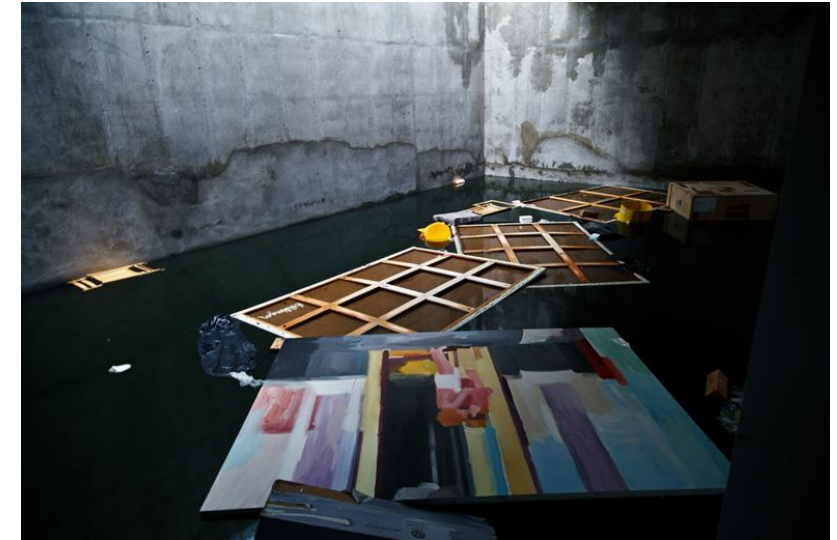
- Containers damaged due to surge and wind
- Containers washed away by surge (some empty?)
- Severe auto damage
- Nearby Ferarri dealer: 51 autos damaged





# CORRELATION ACROSS LINES OF BUSINESS MATTERS

- In a major CAT event, Marine Cargo losses can be highly correlated with other lines
  - Property
  - Liability
  - Workers Comp
  - .....
- Marine Cargo losses (\$3B) from HU Sandy added over 15% to the Property losses of \$18B
- Water can cause as much, or more damage than wind in a hurricane

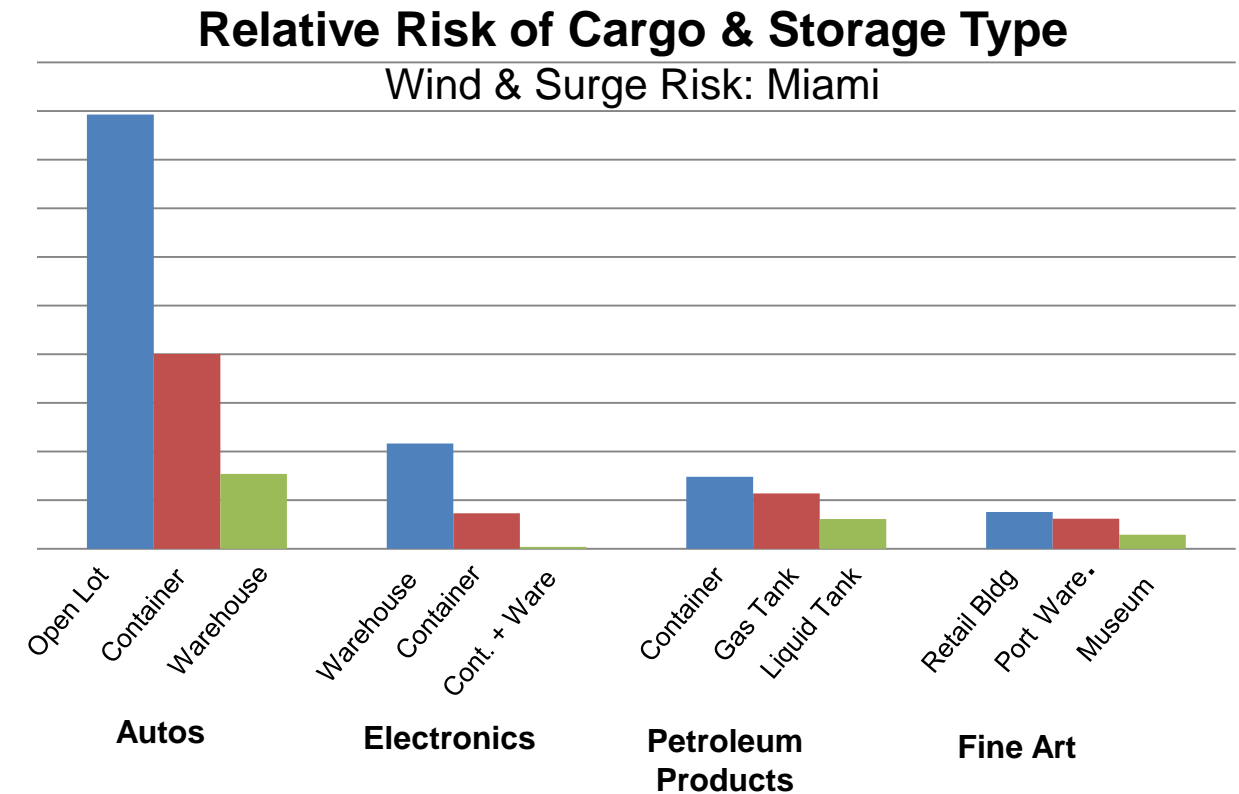


***Marine Cargo Cat risk needs to be managed in conjunction with Property CAT risk and other lines***



# DATA, DATA, DATA

- Understanding your Cargo exposure is essential to understanding and managing your risk:
  - **WHAT** type of Cargo is it
  - **HOW** is it stored
  - **WHERE** is it Stored
  - **VALUE** of Cargo
- For some types of Cargo you need to understand some secondary characteristics: eg Fine Art & Specie (protection, sprinklers, packaging....)



***Cargo CAT risk can vary wildly based on what kind of cargo it is, how its stored and where its stored***

# NEXT FRONTIER OF CARGO MODELING....

- Cargo in transit remains a “known unknown” for exposure aggregation
  - Ports
  - Free Ports
  - Container ships
  - Warehouses
- Marine industry’s greatest exposure aggregations are often NOT quantified
- Cargo can face a spectrum of risks over the course of shipment

**Sharing of shipping information would improve Cargo Risk Management**





# “STUFF” HAPPENS

- Some Major Ports hold over \$10B of Cargo on a given day
- Ports are sometimes used for “convenient storage” (eg autos)
- The close proximity of Cargo storage makes it susceptible to CAT events: Quake, Wind, Hail, Flood, Liquefaction, Fire & Explosion.....



***Can Cargo handling processes be improved to reduce risk at major ports***



# CARGO CYBER RISK IS REAL!

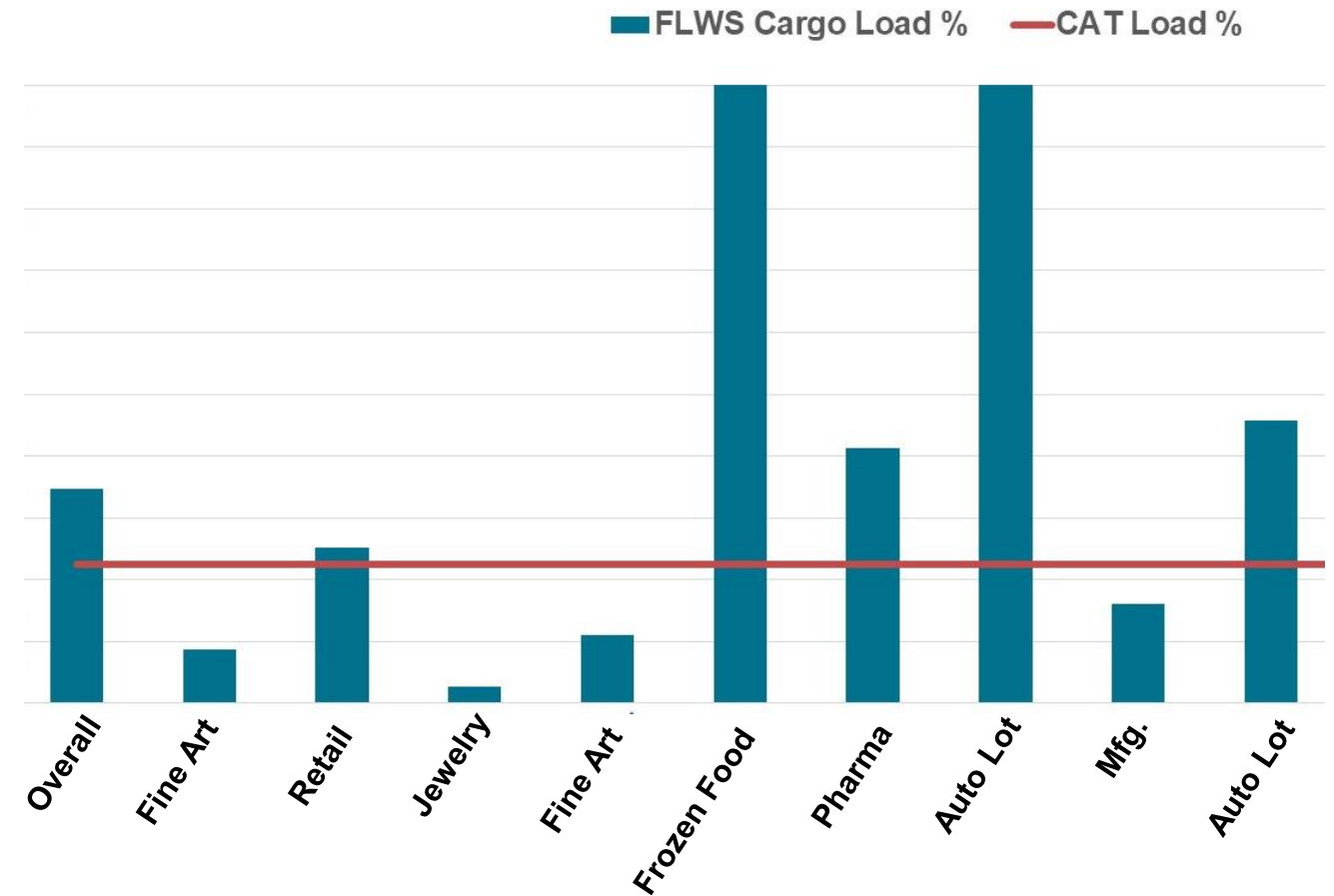
- NotPetya Malware Attack
  - Maersk forced to shutdown operations in 76 ports
  - Business interruption loss > \$300M
- Drug ring hacked into Antwerp & Rotterdam shipping systems to re-route containers with smuggled drugs
  - Phishing and malware attacks aimed at Port employees to gain system access
  - 2 Tonnes of Cocaine & Heroine captured
- RMS model scenario: Hackers re-route valuable cargo could cause up to \$5B+ in stolen cargo and perishable goods (delay in delivery)



**Marine Cargo is susceptible to Cyber attack resulting in material theft loss and immeasurable Port BI**

# CARGO CAT UNDERWRITING VARIABILITY....

- In areas of high CAT risk (eg CA EQ, FL HU), the CAT component of Cargo risk is material and can vary widely across geography
- Applying a uniform CAT load may price you out of certain business and/or cause you to be adversely selected against
- Risk-Specific underwriting will greatly improve risk selection and/or pricing in such areas



**Marine Cargo Cat risk needs to be managed in conjunction with Property CAT risk and other lines**



# DISCUSSION