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Natural Disasters Management For Marine Risks

A ship swept up by the tsunami in Kamaishi City in Iwate Prefecture, Japan, March 2011.
Source: www.stuff.co.nz/

Responsible for carrying 90% of the world's trade, the shipping industry is the backbone of the global economy. Research shows that the international marine cargo industry transports goods with an estimated value of $4.5 trillion annually. Between 1980 and 2016, the deadweight tonnage of container ships—a measure of how much weight a ship carries—grew from 11 million metric tons to 244 million metric tons, and between 2016 and 2019, global container market demand is projected to increase by about 4.7%.

The 1997 Economic Benefit Study of California Ports and Harbours found that the closing of even one port or harbour out of California's system of over forty ports and harbours " would overload other ports and harbours and would significantly diminish the Pacific Coast's capacity to move goods and make productive use of ocean resources."

Recent disasters have showed how badly Marine Risks are exposed to Natural Disasters. An earthquake or a tsunami can potentially cripple a seaport located in a seismically active region. Damage to port structures that reduces their functionality will limit the capacity of a port which will result not only in monetary losses attributed to replacement cost of the structures, but will also result in losses due to down-time. Since estuaries and river deltas are often ideal sites for a port (easy connection to inland waterways), many major ports are located in such places. Additionally, many major ports use reclaimed land for seaport facilities. The combination of all these factors makes seaports extremely susceptible to liquefaction and landslides due to seismic events.

For example, in 1999, the Hyogo Prefectural Government reported that the Port of Kobe in Japan, which suffered near complete devastation as a result of the 1994 Hanshin-Awaji Earthquake, had only recovered 80.4% of its monthly amount of exports and imports as compared to before the earthquake. This permanent loss of business occurred even though the port had recovered majority of its cargo-handling capacity within one year of the earthquake.

Like geophysical hazards, meteorological events impact sea-ports and economy equally bad. For example, Hurricane Irma in 2017 significantly disrupted gasoline markets in Florida, first by prompting increased demand and then by disrupting the supply chain needed to deliver the fuel. The evacuation of people in anticipation of Hurricane Irma led to higher demand for transportation fuels and created logistical challenges in supplying fuel to Florida that began before the hurricane made landfall.

Because Florida is largely dependent on marine transport of gasoline from the Gulf Coast, any disruption to supply sources and shipping routes can affect gasoline markets. When Hurricane Harvey made landfall in Texas, retail gasoline prices in Florida and Miami increased 10 cents and five cents per gallon, respectively.

More recently, severe cold in the northeast United States led to heavy ice conditions, impairing barge deliveries of home heating oil. The cold weather, which extended as far south as the Gulf of Mexico, also resulted in supply shortages around the country and increases in both natural gas and heating oil prices, leading to record energy costs in the first quarter of 2018.

During Hurricane Sandy in 2012, At the Port Newark-Elizabeth Marine Terminal in New Jersey, USA, more than 16,000 vehicles were damaged by Sandy's tidal surge. Nissan had to scrap 6,000 new cars and trucks.

As a result of natural disasters, export might decrease whereas imports increase. The reason for the rise in imports could be required materials for rebuilding affected areas. In addition to its impact on trade, natural disasters such as earthquakes, tsunamis and hurricanes cause damages to public infrastructure, limits production, disrupts the supply chain and distribution. It also affects production in other countries. Exchange rates and the competitiveness of the affected country is also impacted. Due to hurricanes or other natural disasters, energy shortages and infrastructure damage on production and supply chain could harm companies and also affects consumers abroad.

During a natural disaster, damage is most likely to befall shipments whose commodities, packaging, or storage is susceptible to wind, rain, and flood water contamination. This includes automobiles (most vulnerable in open lots); pharmaceuticals — where any contamination can result in total loss; consumables and temperature-controlled goods (perishable); electronics — particularly those without water-resistant packaging, and bulk cargo in open area.

During Hurricane Harvey, despite minor flooding, the container terminal at Houston did not incur heavy damage. However, the port employees and truckers had to wait for floodwater to subside.

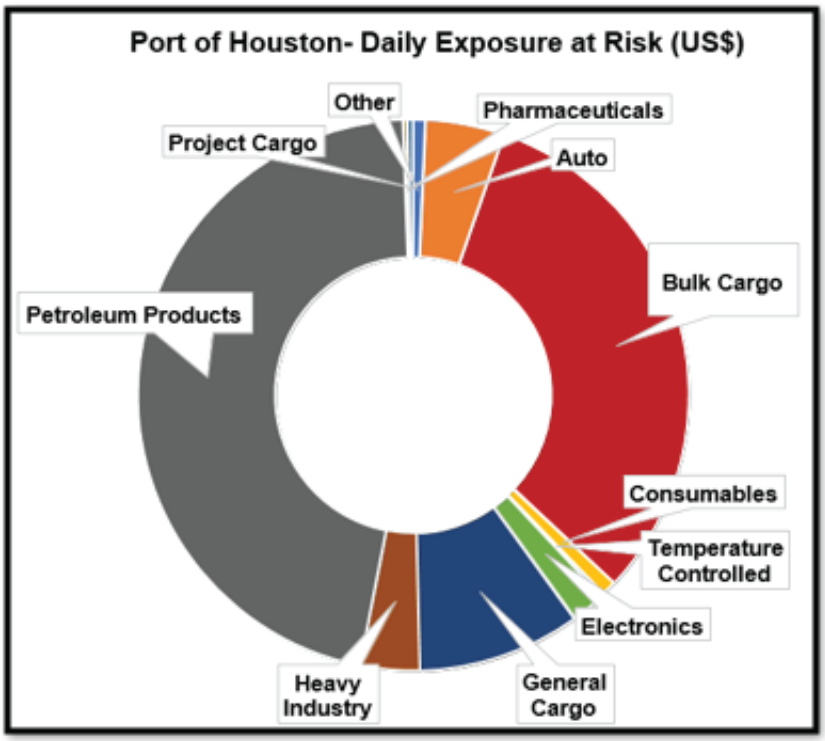
Moreover, it was found that the floodwater deposited tons and tons of silt into the Houston Ship Channel and throughout Galveston Bay which needed dredging of channel to resume normal business of port.

At times, the government authorities ensure that shipping channels can allow entry of large ships safely or the hazardous materials are transported properly. Though part of risk management process, such actions can increase loss.

Damage of hurricane Irma wrought on a shipping yard in the Dutch Caribbean island of St. Maarten
Source: Dutch Department of Defence

How to minimize impact of natural catastrophes?

Thanks to analytical tools and models, companies and port authorities, nowadays, can analyse port exposure of various ports on daily basis and device the risk management plan according to different types of cargo and also to compute impact of any peril viz. earthquake, hurricane/ cyclone, or tsunami on a specific port.



Source: RMS

As the direction of hurricane Harvey was known, the Maritime officials diverted the traffic bound to Houston to other regional ports and processing facilities away from the storm's path; thus, reduced possible losses.

References:

- AGCS
- Audigier M et al, "Risk Analysis of Port Facilities"
- Hyogo Prefectural Government, 1999
- RMS

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