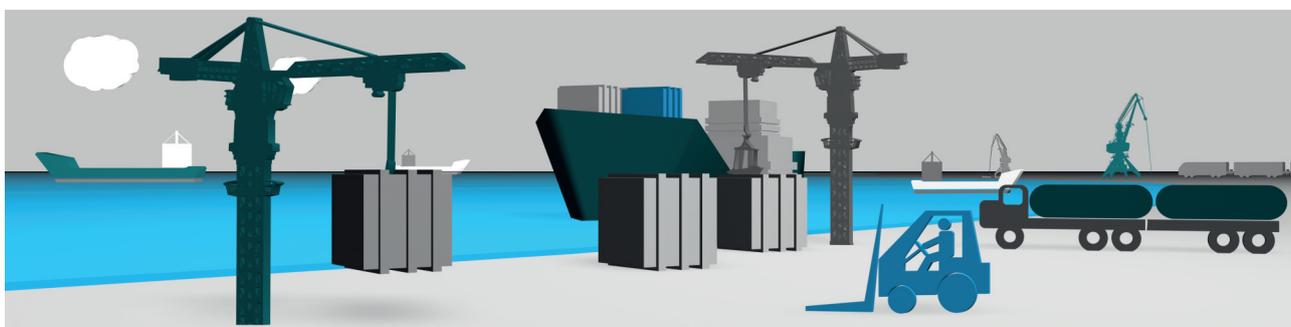


## Changes in the global marine landscape, and their impact on marine (re)insurance

*"For whosoever commands the sea commands the trade; whosoever commands the trade of the world commands the riches of the world, and consequently the world itself."*

Sir Walter Raleigh, 16<sup>th</sup> century



The evolution of global marine transport is the result of a three-variable equation: the intensification and redistribution of international trade, technological progress and its increasing respect for the environment, and the current geopolitical and security-focused context. Even though unknown factors still remain within this equation, certain concrete facts enable us to define a number of hypotheses.

The large number of infrastructure projects and new marine routes bear witness to the change of scale that has taken place in terms of transport methods, whether marine, air, road or rail. At the same time, technological progress is evolving these "marine hubs" into global industrial and logistical complexes that are creating vast trading areas between countries and regions.

The insurance and reinsurance industry is perfectly in line with the economic and commercial dynamics at work here. From the use of bottomry loans, which began in antiquity and were developed by Venice and Genoa in the 14<sup>th</sup> century, to the prevention of risks through sophisticated observation tools, there have always been links between insurance and the maritime world.

In a rapidly evolving environment, what will the marine landscape look like in 2030? What kind of issues will it raise for risk management professionals and what kind of challenges will it present for the insurance and (re)insurance industry, whose primary mission is to anticipate risks?

### ► I - Marine routes set to develop

The combination of climatic, environmental, geopolitical and security factors has had a proven impact on marine routes, implying the creation of new routes or the relocation or expansion of existing ones.

- The melting of Arctic ice triggered by climate change could open up new marine routes (northwest and northeast passages). This would enable traffic to avoid going through the Suez Canal or the Panama

Canal, and to considerably shorten journeys: for example 7,000 km less to ship goods from China to Europe, and 3,000 km less from the German port of Hamburg to Vancouver on the Pacific coast of Canada. The economic viability of this new route implies the resolution of problems of sovereignty between the Arctic countries and the international community.

- Security is also playing a predominant role

in the marine field: restricted for a long time to the Asia region, piracy has now moved to Somalia in East Africa, and more recently to the western region of Africa in the Gulf of Guinea. There have been an estimated 26 attacks in this region in the 1<sup>st</sup> half of 2011, with 15 off the coast of Benin. In order to guarantee the security of supplies, operators have not hesitated to reconsider



certain traditional passages like the Suez Canal. Diverting marine routes can limit the risks of exposure to piracy, but can generate significant additional costs: according to the latest report by the African Development Bank, if one third of the ships coming from Asia sailed around Africa via the Cape of Good Hope, additional costs relating to the extended journey to Europe would stand at about USD 7.5 billion per year.

Moreover, pirate attacks are moving away from the coast into international waters, which is encouraging operators to consider sailing at over 300 miles from the shore, i.e. in areas with no established sovereignty. It then becomes difficult for States to prevent acts of piracy in international waters. That being said, the European Union (Operation Atalanta), NATO (Operation Ocean Shield), and the United States (Combined Task Force 151 in the Indian Ocean) are already providing defensive solutions to these problems. These solutions should remain in force, given the prospective scenarios envisaged: the number of acts of piracy could double by 2016, at a total cost of between USD 13 and 15 billion as of 2014.

- The economic development of emerging countries has led to the shifting of marine routes, which are no longer just transatlantic but also South-South; moreover we are

witnessing a major concentration around Asia. Trade between Africa and China has increased, as is demonstrated by the strategy of the Chinese shipping agents China Ocean Shipping Company and CSCL China Shipping Container Lines. Africa is also reinforcing its links with South America (Angola-Brazil and Senegal-Brazil, for example). Sizeable investments in emerging countries bear witness to a global geographic transformation that has been going on for over a decade now. Megaports are shaping major trade areas illustrating the heightened profile of Asia, Latin America and Africa in terms of global trade.

- By 2014-2015, the extension of the Panama Canal, which was approved by referendum in 2006 and is in line with the twofold development of the rise in global marine traffic and the increase in the size of ships, will double the capacity of this vital canal for inter-oceanic marine traffic between the Atlantic and the Pacific. More than 14,000 ships already use the canal every year, carrying approximately 200 million tonnes of goods and representing 5% of global trade. Thus, a third, spacious navigation channel will be created, enabling the largest vessels (i.e. around 400m long and 50m wide such as Post-PanaMax, AfricaMax and SuezMax type vessels, as well as large

methane tankers) to pass through the canal. In this region, the idea of creating a Nicaragua canal, first mooted at the end of the 18<sup>th</sup> century and finally abandoned with the emergence of the Panama project, is emerging again on the initiative of the Nicaraguan president.

- The development of transport routes is not limited to the sea: in France, increased river traffic on the Le Havre-Rouen-Paris route, due to the development of intermediary logistics interchanges, lies at the heart of the Greater Paris project. Once finished, this project should achieve the vision of Napoleon Bonaparte who said that "Paris-Rouen-Le Havre should be one and the same city, with the Seine as its main boulevard".

- On a European level, major river motorway projects are taking shape with the Atlantic Arc between France and Spain. Some are still at the study stage, such as the Seine-Escaut link designed to connect Le Havre with the Benelux countries by canal, which constitutes one of the 30 priority projects of the future trans-European transport network (TEN-T). As part of this network, a new canal, the "Seine Nord-Europe canal", is planned between the Oise river and the Dunkerque-Escaut canal and will be backed by public-private financing.

## The major trends of the global marine insurance market in 2010

### Marine hull insurance

- The market continues to attract new capital, with both new investors and an increase in existing capital.
- The market remains highly competitive on an international level and the adjustment of conditions (rates, deductibles) is late in coming even though policy cover is expanding.

### Cargo insurance

- The economic recovery is generating an increase in traffic in terms of volume, com-

bined with a sharp increase in the price of raw materials.

- The competition observed on many markets is responsible for a continued fall in insurance pricings.
- Total loss experience has been rising since 2007 in most countries.

The combination of these last two factors explains the limited profitability of the sector.

### Piracy risk coverage

- Acts of piracy are on the rise, notably off the coast of Somalia.

- The total cost of losses (material damage, ransoms etc.) can be estimated at more than 6% of global annual net hull premiums.

- Hull cover for acts of piracy now tends to be included in the war risk policy, or covered by a specific policy (since 2008).

### The P&I market

- Increased need for liability cover, particularly environmental liability, anticipates sustained activity in this sector in the years to come.



## II - New technology applied to ships

With the application of new technology to marine transport, the pioneers of the boats of the future aim to create clean and intelligent constructions. At the same time, the form of marine transport vessels depends on the intensification of global trade, the increase of the volumes transported and the optimisation of costs, leading to economies of scale.

### Ships that respect the environment more

- The eco-efficient vessel is one line of thinking adopted by transporters: the partnership between the French naval defence group DCNS and the Irish company OpenHydro, which specialises in renewable marine energy, demonstrates the strategic advantages of combining the technological fine tuning of the maritime world with sustainable development. The ship of the future will operate a number of procedures designed to limit the sources of pollution: controlling and reducing ballast water, fuel used, and greenhouse gases. The current prototypes incorporate renewable energy and are “energy positive”. The Turanor PlanetSolar Catamaran, a veritable “ambassador vessel for renewable energy”, aims to make the first round the world journey fuelled by renewable energy. It is covered with 500 m<sup>2</sup> of solar panels, which store energy in mini batteries capable of propelling the ship

at a speed of 15 knots. The modular ship “Océan Vital 2” (proposed by the French Océan Vital Foundation), which is propelled by solar and wind power (for up to between 10 and 20%) and hydrogen power (90% or 80%), is an interesting prototype combining several different energy sources. The cargo ship “E/S Orcele” consists of fuel cells that can be recharged using renewable energy. Fitted with energy-capturing solar cells on its sails, the “E/S Orcele” can also transform the wind into energy. Finally, the hull is capable of using the waves as tidal power, a principle already envisaged in the 19<sup>th</sup> century by English patents of the time.

- Hydrogen-fuelled ships also represent a type of clean vessel: certain models already exist and studies envisage fitting large-capacity ships with hydrogen generators.
- The conversion of old ships to renewable energy production platforms is an option likely to be developed over the coming years, even though it is currently only at the concept or pre-industrialisation stage. Mobile power stations give rise to a multitude of possible variations. Thus, the “Physalia” project by the architectural firm Vincent Callebaut is a “self cleaning” vessel that uses photocatalysis to absorb and recycle pollution (chemical and carbonaceous residues) ejected by other ships and by industrial sites close to rivers or coastlines.

### Speed and Immensity

The reduction of transport times is a crucial challenge and one that is changing the appearance of the ships of the future. These vessels are capable of reaching speeds of around 45 knots (80 kph), compared to 35 knots for “conventional” ships. “High Speed Craft” or HSC, principally designed for passenger transport, are devoted to exceeding these performances.

Many of the futuristic projects currently underway are in the form of a trimaran, allowing air to circulate between the floats and the hull, which are the principal causes of energy loss. The two floats reduce the roll when the highly streamlined main hull lowers resistance to progress.

Increasing the volume of merchandise transported means reducing the cost of transporting a single item of merchandise. The standardisation of transport through the use of containers pursues this same objective. Thus the size of ships has progressively increased over the last few decades, as mentioned earlier. This change of scale has had a considerable impact on the structure of ports, which must now incorporate the new factors of immensity. Because not all ports can cope with extremely large vessels, “hubs” have been planned that will redirect cargo to smaller ports using smaller ships.

## III - Infrastructures of the future

### Megaports: large-scale industrial and logistical complexes

The development of flows of merchandise has led to the concentration of port operators and an increase in the size of ports, which are diversifying their activities and taking advantage of technical logistical advances. These megaports are ultimately shaping themselves into veritable logistical, financial and industrial hubs.

Port operators are pursuing a path of convergence, entrusting the management of

the most strategic terminals on the planet to a few high calibre operators. The trend towards “megaports”, or large-capacity logistical and storage sites, is reshaping the landscape of coastlines, due to a number of different phenomena:

- the increasing size of ships has led to the expansion of terminals and the space necessary for storage, which often leads to reduced storage time. The introduction of the “New-PanaMax” container ships, scheduled for 2014, will lead to costly

developments: container cranes, loading/unloading areas, storage chassis, container storage warehouses.

- the terminals themselves are taking on a new look with the development of inter-modal operations: ships, road transport via heavy goods vehicles, rail transport, combined road and rail transport. We are seeing an expansion of tidal basins and wet docks, sea and river locks, pumping stations and reservoirs. Consequently, port installations (lifting and handling equipment, floating



offloading vessels, etc.) are becoming bulkier than in conventional terminals.

Other innovations could also optimise maritime trade flows and reduce pollution. In this regard, the South Korean Advanced Institute for Science & Technology has designed the mobile port: this is a mobile platform that moves out to sea in order to unload containers and transport the cargo as close as possible to its final destination on land.

Technological logistical innovations. Logistics are beginning to resonate with several different, interconnected activities: supply chain analysis with a view towards sustainable development and in accordance with the life cycle of the product, freight security thanks to analysis of the risks and various regulations involved, and tracking via information and geolocation systems. A mindset based on flows is replacing that of static storage, assisted by remote and quasi real-time management throughout the supply chain: remote controlled cranes, radio frequency identification systems (RFID), warehouse management software, and so on, in order to limit stopping times (berthed ships, waiting cargo planes, trains, etc.).

Ports are starting to look like industrial complexes, some of them aided by the system of free trade zones, in which the fiscal and regulatory environment is more advantageous. Exemption from customs duties is turning ports not just into gateways to inland infrastructures and markets, but also into profitable and attractive areas for closely related industries and service

providers. There are now a large number of service providers located at ports: sorting, mounting, tagging, and assembling products.

### Some examples of port immensity around the world

- In Asia, the Incheon pentaport in South Korea is a port and airport conglomerate combining Incheon international airport (an airport hub for international flights and freight traffic), the maritime port of Incheon (which serves as a gateway to the metropolitan area from the Yellow Sea), a marina, a teleport dedicated to communications infrastructures and a commercial port (with a logistics zone) within the same free trade zone.

In Latin America, the Açú Superport complex project on the north coast of the state of Rio will, upon completion, include 17km of quays, an offshore structure, storage space and industrial installations. The project represents a total investment of some USD 2 billion, and will be the largest industrial port complex in Latin America.

- In the Mediterranean region, several port projects deserve a mention. The deep-water port project of Enfidha in Tunisia is designed to become a transshipment station capable of harnessing between 15% and 25% of transshipments in the Mediterranean. A multi-purpose terminal devoted to various non-containerised merchandise and bulk shipments of liquids and solids is also planned. As well as infrastructures of pharaonic proportions (3,000 hectares

of storage space), there will be a new airport and a free trade zone. In the Bay of Betoia to the east of Nador in Morocco, the future megaport Nador West-Med will house a mega platform storing petroleum products destined to supply the various countries in the region. Thus, global operators, refiners and producing countries, particularly the Gulf countries, will store goods in bulk at Nador, rather than shipping their cargo directly to each client country via giant tankers, and the countries of the region, including European countries, will be supplied using smaller-capacity vessels, which will also lead to savings in terms of time and distance.

- In sub-saharian Africa, the modernisation and extension of the current Dakar Port Authority will form the “Dakar Port of the Future”. The private operator that won the concession, Dubai Port World, will form a joint venture with Maersk, Getma and SDV as an economic interest group called MTD. The Port of the Future will be connected with the ports of Las Palmas in the Canary Islands and Tanger Med in Morocco. A connection with the Senegalese hinterland and Mali is also envisaged.

The new and future projects described in this publication, already achieved or still under consideration, will lead to more sophisticated risk management methods, different types of cover and higher insured amounts. It is already possible to pinpoint certain problems in the light of current accumulation experience.

## IV - Maritime activities, risk management and (re)insurance

The mission of insurers and reinsurers is to provide their clients with maximum security and to monitor the liabilities they have taken on. Their international experience and the global networks at their disposal enable them to provide a quality service in the transport sector, which is international by its very nature. In the risk transfer chain, certain elements and actions must absolutely be present:

### Risk management and prevention

Following the various major losses that have occurred over the last few decades, marine traffic management systems have become more sophisticated, as is the case for SafeSeaNet, the European Union’s satellite observation tool. This tool is designed to direct ships in distress towards “places of refuge” and to minimise the risk of collisions, which could lead to catastrophic levels of pollution. More specifically, the European

Union has also created the CleanSeaNet system, which aims to prevent marine pollution.

With regard to fixed installations, commercial port zones are generally overseen by large management systems. Such zones are large areas divided between several players operating different types of businesses, which therefore involve many risks and exposures. Moreover, access to and supervision of the port zone are



particularly important in order to guard against the risks of terrorism, sabotage and theft. Major ports dealing with international business apply the International Ship and Port Facility Security code (ISPS). While compliance with the ISPS is important, the management of local security by the ports themselves is crucial and is conducted by means of the following requirements: the presence of fenced perimeters and attended gates with private security guards, police or/and army forces on site, all of which ensure greater prevention of and protection against intrusion. The supervision of the various different tenants on the site is a major challenge for the port authorities. These authorities must be kept aware of all hazardous processes, hazardous materials stored and hazardous operations conducted within the perimeter. Generally speaking, the port installations belong to and are operated by the port authorities. They may also extend beyond the port perimeter, into the commercial zones or third party storage warehouses outside the site. Protection against fire at the port

is the responsibility of the port authorities and/or the tenants. Consequently, efficient coordination is a deciding factor in terms of determining the type of protection to implement in order to ensure the reliability of the systems involved and to facilitate a rapid and effective response if an event occurs. It is also worth noting that, a major event could lead to an equally serious environmental pollution situation.

From a risk control standpoint, the major issue with regard to harbour facilities resides in the concentration of risks with multiple exposures and a potential dilution of the liabilities that could arise from an improperly controlled event. This leaves the way open for accumulated losses and significant business interruption.

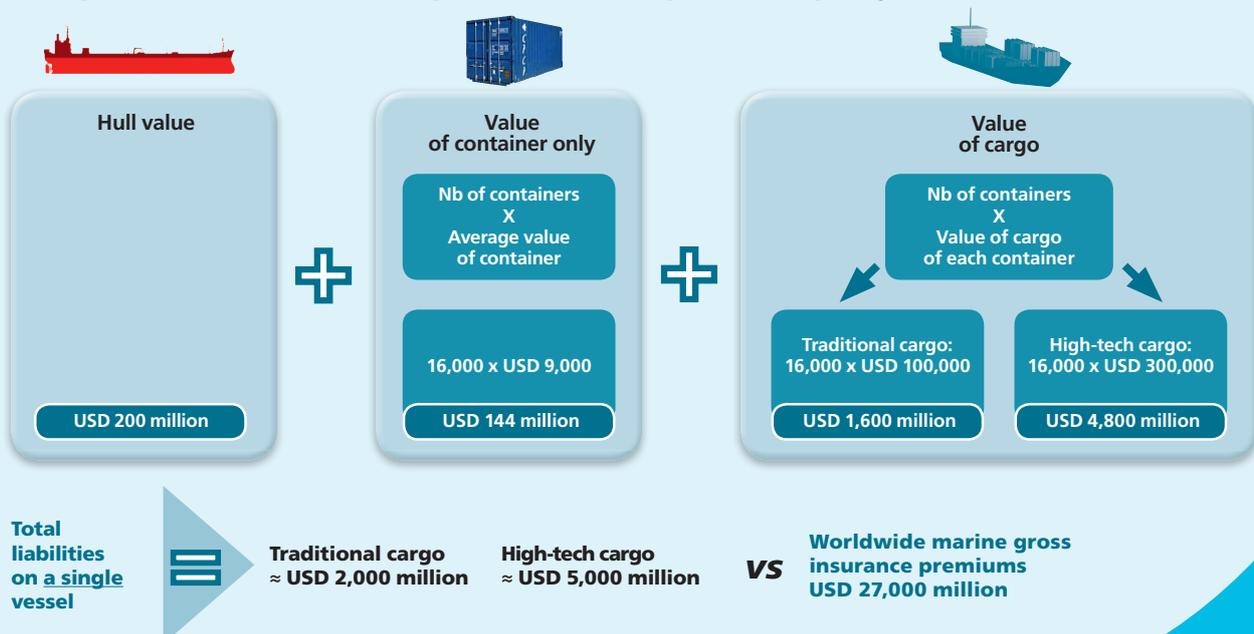
#### Accumulated liabilities on a single vessel (hull and cargo)

Is there an imbalance between the liabilities taken on per ship and the volume of premiums collected? Across all branches, the total global volume of gross premiums is estimated at USD 27 billion, representing

an average annual growth of 7% since 2001. Can the insurance capacity available cover the increased accumulation on ships, whose hull and cargo values are rising considerably? An imbalance appears between the accumulated liabilities on a single ship and the volume of premiums collected annually on a global scale, taking account of the rapid rise in the value of the ship and the value of the merchandise transported, the technological content of which is increasing.

The increasing size of ships and their cargos could also eventually impact the current concept of general average: how can the interests of multiple owners of increasingly large shipments on one single vessel be reconciled in the event of damage? The concept of general average, which is exclusive to maritime law, is designed to distribute between the ship and cargo owners the damages or expenses incurred as a result of the measures voluntarily, reasonably and usefully taken by the captain of a ship in order to save the crew, the boat or part of the cargo during a voyage.

#### Example of accumulation on a triple E container ship (with a capacity of 16,000 containers)



## Accumulation by event

The accumulated liabilities to which reinsurers expose themselves when they take on “multi-line” risks are difficult to quantify, due to the natural mobility of the portion of goods being transported. Because of the

large number of risks that may be present at one or more port sites or sites close to ports, it would be a good idea for insurers to be able to assess their maximum liabilities per port and per coastal area, in order to define their capital needs and to tailor

their protection programmes accordingly. The global economic approach proposed below can be applied to all categories of ports.

### Hull



In a scenario whereby the commercial port operates at 100% capacity, the potential value of the hulls should be calculated in the first instance in accordance with the reception capacity of the port (number of basins, length of the wharves, type of vessels, etc.) and on the average value of the berthing ships part units.



### Cargo



The values at risk may be estimated on the basis of import/export statistics for each port and on the value of this merchandise, taking into account the average time the merchandise remains on the quay or in port warehouses. Then, a possible destruction coefficient just needs to be applied to these amounts, before accumulating the risk amounts across the entire loss-exposed zone. A penetration coefficient for the insurer's or reinsurer's markets in the countries concerned should be applied to these calculated amounts, adjusted according to the insurance uses in the zone (e.g. the placement of insurance contracts with players from exporting countries).

## Conclusion

### A prospective view for the optimisation of risk cover linked to maritime transport

The examples mentioned in this publication illustrate the change of scale and the legis-

tical complexity with which insureds, their insurers and reinsurers are confronted. We need to understand the environment and its current and future developments in order to form a global view. SCOR will accompany

its business partners by offering them high value added services, thereby helping to face up to these technological and strategic challenges.

### Jean-Marc Szmaraqd

Maritime and Energy  
Senior Underwriter

[jszmaragd@scor.com](mailto:jszmaragd@scor.com)

### SCOR Global P&C

1, avenue du Général de Gaulle - 92074 Paris, La Défense Cedex France  
Editor: Dominique Dionnet  
Tel.: +33 (0)1 46 98 74 00 - Fax: +33 (0)1 46 98 84 49 - [ddionnet@scor.com](mailto:ddionnet@scor.com)

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