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*The **Global Maritime Weekly Digest**, based at **Southampton SOLENT University**, provides a regular flow of maritime news and analysis, of significance in a global context.*
Topics covered include shipping fleets and management, seaborne trade, ports, shipbuilding, ship recycling, maritime policy and regulations, and seafarers' labour.

Contents

Editorial comments

- In current markets, ***ship scrapping (recycling) trends*** are being watched especially closely to see how much these can contribute to reducing overcapacity. As shown in item 1, the volume sold for scrapping globally in the first half of 2017 was well down, compared with the same period last year, but remains high when seen in a longer term historical context.
- Among the largest national fleets of merchant ships, the ***China-owned fleet*** has been a strong performer this year, boosted by many new vessels delivered from shipbuilders (item 6).The brisk upwards trend looks set to continue for some time, as shipowners based in China have numerous tankers, bulk carriers and container ships on order.
- Other significant influences on China's fleet are subject to greater uncertainty. Recycling sales, also purchases and sales on the secondhand market can be only broadly estimated and, usually, that is predominantly guesswork. However, the recent purchase of a major Hong-Kong privately owned container shipping line will further expand the nationally-owned fleet of China.
- A wide variety of ***maritime activities with a UK location*** is visible, including equipment design and manufacture, where technical innovation is at the forefront (item 8). Extensive research and development is supported by top class capabilities of UK universities and research institutes.

Richard Scott MA MCIT FICS
editor (email: bulkshipan@aol.com)
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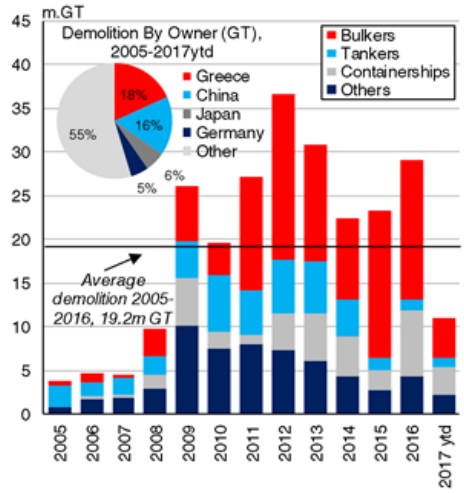
(1) Clarksons Research, 28 July 2017

Demolition Trends: Global Fleet Ups Its Game

Demolition is a key determinant of the size of the global fleet. Typically, vessel recycling volumes are low when the shipping markets are strong and vice versa. Over the last decade firmer levels of demolition have been encouraged to address overcapacity across the shipping segments and scrap volumes have been historically high. This, along with lower newbuild activity, has helped curb fleet growth.

Graph of the Month

Demolition: Who's Faced Up To A Date With Destiny?



The bars on the graph show demolition by vessel sector between 2005 and 2017 year to date in terms of GT. The inset pie chart illustrates the share of demolition by owner country over the same period in tonnage terms.

Source : Clarksons Research

The Demolition Game

In 1H 2017, 11.0m GT was recycled globally. On an annualised basis this is equivalent to 2% of the start year fleet in GT terms but represented a decline of 25% year-on-year. Global demolition volumes have been historically strong since the onset of the financial crisis and subsequent drop in vessel earnings, with an average of 26.9m GT recycled annually between 2009 and 2016. The average age of ships demolished has steadily declined over this period, from 33 years in 2008 to 26 years in 2016. Alongside lower levels of newbuild ordering and shipyard deliveries, higher scrap volumes have slowed fleet growth to 3% in 2016 compared to a CAGR of 6% between 2005 and 2016. Looking forward, demolition activity is projected to remain at elevated levels as owners face up to greater regulatory requirements related to ballast water and vessel emissions (including the 2020 global sulphur cap).

Depends On Your Type…

Bulkcarriers accounted for 45% of tonnage recycled between 2009 and 2016; however, a record level of bulker demolition in Q1 2016 was followed by some improvement in sector conditions and this saw bulker demolition volumes fall 63% year-on-year in 1H 2017 to 4.5m GT. A record 0.65m TEU (7.5m GT) of boxship tonnage was scrapped in 2016 with vessels below 10 years old recycled as owners disposed of ships of 'old Panamax' design. This activity has continued, though at a slower pace, with 3.1m GT of containerships recycled in 1H 2017. Meanwhile, weaker earnings in the tanker sector has seen tanker demolition pick up in the year so far after two historically low years. Tanker recycling volumes in 1H 2017 already match those of full year 2016 with 1.2m GT reported demolished.

…And Who You Are

Greek, Chinese and German owners account for 35% of tonnage recycled in the year to date and 40% of global demolition since the start of 2005 in GT terms. This reflects their large fleets though other prominent owner countries such as Japan seemingly prefer to dispose of older ships on the secondhand market. Greek and Chinese owners have been active in renewing their fleets and account for 46% of bulker tonnage scrapped since the start of 2009. Meanwhile German owners have been divesting out of

the containership sector and account for 36% of boxship capacity recycled since the start of 2013 in GT terms.
So, despite a slight slowdown, global demolition activity remains relatively strong in the year to date. Leading owner countries continue to be active, and while bulker scrapping has slowed, recycling volumes in other sectors are firm. With impending environmental regulation expected to support further recycling, demolition looks likely to continue to help limit fleet growth into the future.
Source: Clarksons
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(2) Hellenic Shipping News, 31 July 2017/ DNV GL

Maritime training in the 21st century

“21st century students are being taught 19th century methods using 20th century tools,” Prof. R. Pawling of University College, London. Digitalization is radically changing our business models. It is also impacting our approach to training, reflecting both changes in the attitude of learners and the available technology. All of which is enabling the growth and acceptance of the principle of life-long learning.
In the future, training will increasingly mean shorter courses or e-learning. We have seen course durations contracting from one week to one day and demand increasing for 5 to 45 minutes e-learning solutions to respond to demands for continuous professional development. Units of learning are consequently getting shorter. Similarly, customers are demanding courses on new topics very fast: “Can we have training on the latest XYZ developments next week?”. “Edutainment” requires more frequent changes of media (especially video) and subject matter than traditional teaching.
Until recently, DNV GL’s Maritime Academy training experience was based on classroom courses, where frontal teaching is interspersed with tasks to involve the learners. Courses were limited to 15- 20 people to allow small-group interaction. Over the past few years, our Academy has responded to the increasing demand for “e-learning”, a term used frequently which means: “something on the computer where my employees don’t have to travel and sit in your classroom”. Often the real training needs and most suitable form of delivery require further elucidation through lengthy discussions to clarify the available options and constraints.
We discuss our experience with the various options below.

Classical e-learning courses

In 2013 DNV GL’s Maritime Academy developed its first e-learning course to support energy efficiency in ship operation. The course was rolled out via USB sticks since the focus was on a training solution to be used anytime and anywhere, for ship crews who would not have (easy and cheap) access to the internet. The course was subdivided into modules of typically a few minutes duration with small tasks or quizzes to keep the participants’ attention and to provide feedback on achieved learning goals.
Since then, platforms have progressed with web-based solutions and more user-friendly software to create small cartoon-type videos. We have seen an exponential growth in demand for e-learning solutions for training, the goal always being to cut costs. But e-learning is neither cheap nor fast to produce. Costs for e-learning production vary globally, but transposing 40 slides of presentation into a good e-learning solution will cost 7500 – 15000 € as a rule of thumb. E-learning is an unlikely candidate for one-off courses, as the initial development investment can rarely be recovered. It is also not suitable when a fast response to a new training need is called for.

Virtual Reality based training

Gamification of teaching has attracted a lot of attention. Video game technology (Virtual Reality) is seen as a useful technology for (maritime) training. However, having a ship modelled over several decks, along with equipment, interactivity, etc., may cost tens or hundreds of thousands of Euros.
Some years ago, DNV GL developed a Virtual Reality-based training solution for ship inspections, called SuSi (Survey Simulator). SuSi provides realistic and cost-efficient 3D training software for survey inspections. The virtual inspection gets trainees exposed to deficiencies that would take years for a surveyor to experience in real life. An inspection run can be recorded and discussed in a debriefing with an experienced supervisor/trainer, pointing out oversights and errors by the trainee.
The designers of the software envisioned trainees working in self-study mode but practice revealed that to be too optimistic. The user interface was intuitive for digital natives, but “digital immigrants” struggled

with the video gaming controls and navigational concepts and got lost in the virtual world, often leading to frustration and missing the training goals. The solution has been to adopt a pragmatic approach where a trainer guides the class collectively through the ship (with a single PC and a data projector) and trainees call out when they spot a deficiency which is then discussed.
Such a blended approach of classroom instruction and Virtual Reality tour may be frustrating for the video game programmer, but achieves the training goal for all trainees. The lesson learnt in this case is that less is sometimes more. Never fall in love with technology, always check it makes sense from a pedagogical perspective.

Webinars

These are ideal to respond rapidly to new requests. Domain experts are rare (perhaps 1-2 key experts in the company) and their time is precious. Customers need training quickly so traditional classroom or e-learning are out. Webinars are an attractive addition to our toolbox in this respect.
Maritime Academy's first webinars were christened "Smart-Ups" in 2016 and we delivered 10 of them, reaching out to customers across the globe. Webinars are also used internally to support the training needs of our colleagues, for example, with new software tools, with the new DNV GL Rules or to conduct cyber-security awareness training. Our challenges included the following: Maritime experts are generally not communication experts, so presentation material often needs extensive reworking for use as a webinar; domain experts require both technical support and coaching on how to deliver their information to an invisible audience; limit presentation time to a maximum of 45 minutes to maintain audience attention, interactive elements are vital to stimulate the audience and keep them focused on the topic.

E-Learning, Virtual Reality based training or webinars?

To conclude, there are many solutions available under the broad umbrella of "e-learning". Training needs and available resources determine the most appropriate one in each case.
Source DNV GL (By Tracy Plowman and Volker Bertram, Maritime Competence & Learning and Academy, DNV GL Hamburg)
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(3) Lloyd's List, 7 August 2017

Fair treatment of seafarers can be a reality

Change is in the air regarding the fair treatment of seafarers, says **Hilton Staniland**, professor of maritime law at the Institute of Maritime Law, University of Southampton and member of the Seafarers' Rights International Advisory Board

THE most recent major survey carried out regarding the fair treatment of seafarers and recently republished by Seafarers' Rights International found that the rights of seafarers are often subject to violation and that there is widespread concern among seafarers about criminalisation.
These rights are enshrined in the guidelines on fair treatment of seafarers in the event of a maritime accident, adopted by the International Maritime Organization and the International Labour Organisation.
Over 81% of seafarers questioned said that they had not been treated fairly when facing criminal charges, and 46% said that they would be reluctant to co-operate fully and openly with casualty inquiries and accident investigations.
The survey was conducted in 2012, six years after the drawing up of these much-heralded guidelines in 2006.
Fast forward five years after the survey to today and it would appear that the message is starting to hit home, at least to an estimated two thirds of member states of the IMO.
A second survey concerning implementation of the guidelines into national law sent to every member state of the IMO fell into three broad categories of roughly equal size.
The first group said they had given effect to the guidelines explicitly in their legislation, and when you look at how these states have implemented the guidelines, there is a surprisingly large degree of commonality in the type of legislative techniques used.
The second group of countries said that they had not explicitly given effect to the guidelines because they felt that their laws already adequately protect seafarers. Many quoted their membership of Human Rights

Conventions, the Maritime Labour Convention, as well as their adherence to relevant provisions in Marpol, as proof.
The third group said that, while they were still studying the guidelines, they found aspects of the guidelines ambiguous, difficult to interpret, and were not sure how to implement them into their national law.

Asking for assistance
While countries in the first two groups — effectively two thirds of respondents — have either implemented the guidelines, or feel they do not need to because their laws already give effect to the essence of the guidelines, it is the third group which is of immediate interest, as they are effectively asking for assistance in implementing the guidelines, and want to benefit from best practice, in particular from other IMO member states who have already given effect to the guidelines.
In our recent work, no state has spoken against the implementation of the guidelines; we have two groups of states saying either that they have already implemented the guidelines, or that they do not need to implement them.
But no group is saying they reject the guidelines or that the issues in the guidelines are not of importance.
We also have a group of states asking for assistance in implementing the guidelines.
Sharing practices among states gives those countries asking for assistance some assurance that this is not a theoretical exercise, but a practical demonstration of how implementation of the guidelines can be achieved.
It would also lead to more international harmonisation, uniformity of interpretation and application, and would give rise to greater reassurance that the guidelines would be applied in particular ways.
This point was recently raised at the international workshop of representatives of over 50 member states at the IMO.
A workshop that was addressed by key speakers including IMO secretary-general Kitack Lim, International Transport Workers' Federation general secretary Stephen Cotton, ILO director of labour standards Corinne Vargha, and ITF maritime co-ordinator Jacqueline Smith.
A panel chaired by IMO legal committee chairman Dr Kofi Mbiah discussed guidance for states on implementing or reviewing their implementation of the guidelines.

Stern challenges
Drafting guidance on implementation of the guidelines presents some difficulties because you are writing for a notional state, not a particular state. And that notional state could have any one of a number of legal systems and any combination of legal rights enshrined in its system.
The resolutions accompanying the guidelines, agreed by the Assembly and other bodies at the IMO, speak of the guidelines not interfering with the criminal and civil laws of the country concerned.
That immediately throws up very stern challenges.
In many respects, giving effect to the recommended guidelines is technically more challenging than drafting legislation that will give effect to a mandatory instrument because there the tramlines are laid down for you.
But in this case, the guidelines are recommendations and it is clear they should not interfere with existing laws in the country.
A recommended approach discussed by the panel, however, is to say that a public authority or investigating authority conducting an investigation following a maritime casualty shall take into account the relevant provisions of the guidelines in accordance with national legislation.
Although this does not in all cases ensure the application of the guidelines, it does ensure that the guidelines must be brought to the attention of the court and the lawyer concerned can argue that the guidelines should be observed by the court provided they do not interfere with the other laws of the state.
The guidelines are essential in advising what port or coastal states should do to ensure that an investigation undertaken to determine the cause of a maritime accident in their jurisdiction is conducted in a fair and expeditious manner.
They also outline what steps flag and seafarer states should take to achieve the same aim as well as assist shipowners in what action they should take in such a situation.
As the guidelines clearly state, “shipowners have an overriding duty to protect the rights of the seafarers employed or engaged, including the right to avoid self-incrimination and to take steps to ensure their fair treatment”.

More importantly, the guidelines also offer guidance to seafarers to ensure they are adequately protected. So, what is the hope ahead for ensuring the fair treatment of seafarers?
Keeping the issue at the top of the industry's agenda is crucial if owners, managers and seafarers are to fully understand the role they play, and if port and coastal states and flag states are to be fully resourced to ensure observance of the guidelines.
I would hope that the third group who have spoken about the difficulties in giving effect to the guidelines may find some assistance in the panel discussion. In theory, this could encourage 100% of countries to pay attention to the guidelines in one way or another.
Our work in this area will continue building on the work already done and advancing the work at regional and national level where more concrete recommendations can be given on how best countries can implement the guidelines and have the right laws in place in the event of a maritime casualty investigation occurring in their jurisdiction.
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(4) Clarksons Research, 6 August 2017

Can You Feel The Beat Of The Decade Of Swing?

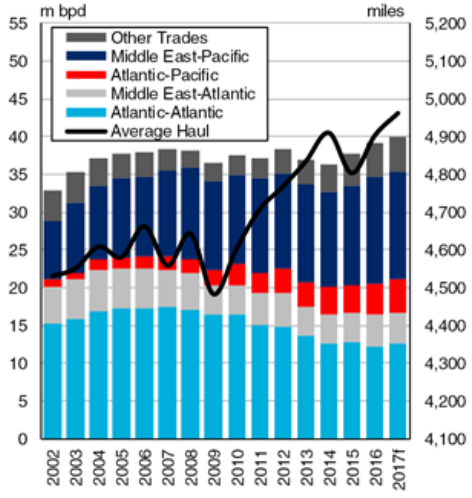
The Wall Street Crash in 1929 marked the onset of the Great Depression in the US. Times were tough, but jazz music, which had taken off in the 1920s, endured and evolved into the era of big bands and swing music now synonymous with the 1930s. The crude tanker sector is having a tricky time of its own at present, but over the last decade, crude trade patterns have seen their own evolutionary swing…

New Rhythm
A lot of things can happen in a decade. The economic gloom of the early 1930s in the US marked a sharp change from the Roaring Twenties, whilst in the music world, traditional New Orleans jazz began to evolve into the heyday of swing. The last ten years have not been lacking in dramatic economic events either, and at first glance, crude oil trade today appears little changed from ten years ago, with global seaborne volumes totalling 39.2m bpd in 2016, just 2% larger than in 2007. However, there have been major shifts in trade flows in this period, giving the crude tanker sector a new underlying beat.

Graph of the Week

Step To The Beat: Crude Oil's Swing Dance

The graph shows estimated seaborne crude oil trade flows in million bpd between the Middle East, Atlantic and Pacific basins. 'Atlantic' includes the Americas, Europe and Africa. The line shows the estimated average haul of crude oil trade each year (right hand axis). 2017 data basis latest projections. 'Other Trades' principally includes intra-Pacific trade. Timeseries of seaborne crude oil imports and exports are available on an individual country basis on the *Shipping Intelligence Network*.



Source : Clarksons Research

In The Mood
One of the most significant developments has been further growth in Asian demand, especially in China and India. Asia accounted for 55% of crude imports in 2016, up from 40% in 2007. In large part, this

reflects the fact that Asia has driven over 80% of expansion in global refinery capacity in the last decade, but just 8% of growth in oil production. Over the same period, crude imports into the Atlantic (see graph description) fell 24%, with higher oil production in the US reducing crude imports by 43%, whilst in Europe, oil demand remains below the 2007 level.
Meanwhile, the recent turbulence in Nigeria and Libya, combined with lower output in mature oil producing regions such as the North Sea, Mexico and Venezuela, saw the share of crude oil shipments accounted for by Atlantic exporters fall from 50% in 2007, to closer to 40% in 2016, whilst the Middle Eastern share rose from around 40% to nearly 50% last year.

Getting Into A Groove
The net result of these changes on crude trade has been significant. Intra-Atlantic crude trade fell 30% between 2007 and 2016 to around a third of global volumes, with lower US imports from West Africa, the Caribbean and the Mediterranean accounting for most of this fall. More of the Middle East's exports are now heading East, with Middle East-Pacific crude trade rising 29% to account for 39% of trade. And despite the fall in overall Atlantic exports, the drop in demand in the region has seen Atlantic-Pacific crude trade double since 2007, to account for 11% of global volumes in 2016. Overall, these shifts helped the average haul of crude oil trade to reach 4,900 miles in 2016, with crude oil trade in terms of tonne-miles 10% larger than in 2007.

Sing, Sing, Sing?
So, whilst crude oil trade is generally mature, it has not been immune to the power of swing, with the last ten years witness to a considerable shift in trade patterns. Whilst long-haul trade may not be growing quite as quickly as needed to keep in time with crude tanker fleet growth right now, it will be interesting to see what tune tanker trade flows dance to over the next decade. Have a nice day.
Source: Clarksons
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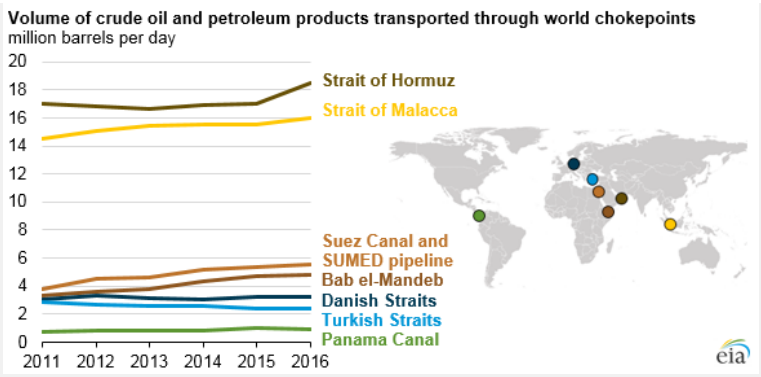
(5) US Energy Information Administration, 1 August 2017

Maritime chokepoints are critical to global energy security

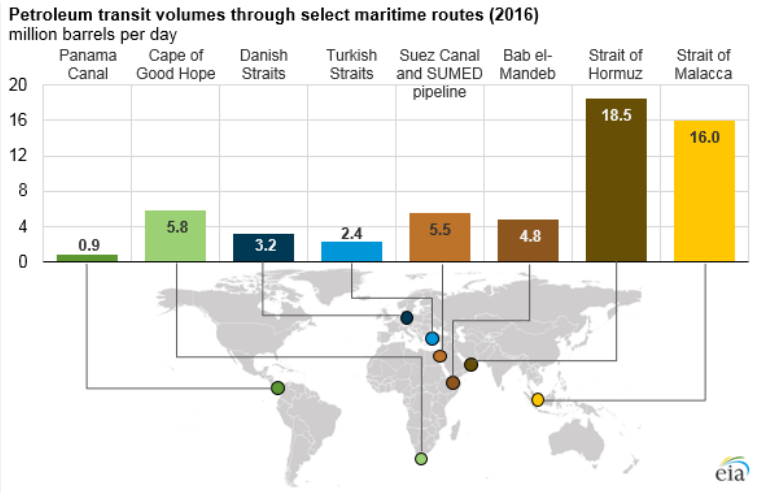
The U.S. Energy Information Administration has released its 2017 World Oil Transit Chokepoints report. Chokepoints are narrow channels along widely used global sea routes for oil transport, with some so narrow that restrictions are placed on the size of the vessel that can navigate through them.



Source: U.S. Energy Information Administration, 2017 World Oil Transit Chokepoints
Note: Includes crude oil and petroleum liquids.

The inability of oil tankers to transit a major chokepoint, even temporarily, can lead to substantial supply delays and higher shipping costs, resulting in higher world energy prices. While most chokepoints can be circumvented by using other routes that add significantly to transit time, no practical alternatives are

available in some cases. Chokepoints may also expose oil tankers to theft from pirates, terrorist attacks, political unrest, and shipping accidents.
By volume of oil transit, the Strait of Hormuz (leading out of the Persian Gulf) and the Strait of Malacca (linking the Indian and Pacific Oceans) are the world's most important strategic chokepoints. The Cape of Good Hope, near the southern tip of Africa, is a major oil trade route and potential alternate route to certain chokepoints.



Source: U.S. Energy Information Administration, 2017 World Oil Transit Chokepoints
Note: Includes crude oil and petroleum liquids.

Ships carrying crude oil and petroleum products transiting certain chokepoints are in some cases limited by size restrictions. The global crude oil and refined product tanker fleet is typically classified using the Average Freight Rate Assessment (AFRA) system that was first established by Royal Dutch Shell many years ago and is now overseen by an independent group of shipping brokers.
The AFRA system classifies tanker vessels according to deadweight tons—a measure of a ship's capacity to carry cargo. The approximate capacity of a ship in barrels is determined using an estimated 90% of a ship's deadweight tonnage, which is multiplied by a barrel-per-metric-ton conversion factor specific to each type of petroleum product and crude oil, because liquid fuel densities vary by type and grade.
Long Range (LR) class ships are the most common ships in the global tanker fleet, as they are used to carry both refined petroleum products and crude oil. These ships can access most large ports that ship crude oil and petroleum products. An LR1 tanker can carry between 345,000 barrels and 615,000 barrels of gasoline (14.5–25.8 million gallons) or between 310,000 barrels and 550,000 barrels of light sweet crude oil. An LR2 tankers can carry 600,000 to 900,000 barrels of a petroleum product like gasoline, diesel, or light sweet crude oil.
Additional ship categories, including the Very Large Crude Carrier (VLCC) and the Ultra-Large Crude Carrier (ULCC), were added to the AFRA classification system as larger vessels with better economics for crude oil shipments were deployed to serve expanded global oil trade. VLCCs are responsible for most crude oil shipments around the globe and can carry between 1.9 million and 2.2 million barrels of a West Texas Intermediate-type crude oil.

Some chokepoints, such as the Strait of Hormuz, are sufficiently deep and wide to accommodate all sizes of vessels. However, ships transiting the Panama and Suez canals are subject to depth and width restrictions. Tanker traffic through the Bab el-Mandeb and Turkish straits do not face specific size restrictions, but they must deal with relatively narrow, difficult-to-navigate sea lanes.
Source: EIA
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(6) Hellenic Shipping News, 8 August 2017/ article by **Richard Scott**, Solent GMWD editor

Vigorous expansion in the China-owned fleet

Expectations of robust growth in the China-owned merchant ship fleet this year have been reinforced by expansion during the first half. Additional container ships, tankers and bulk carriers contributed a large increment. The trend looks set to continue, as many new vessels are on order for delivery over the next few years.

Further reorganisation progress among Chinese state-owned shipping companies seen in recent months is another aspect. Changes under way are designed to improve efficiency and boost competitiveness, enhancing financial performance amid difficult global circumstances in the main market sectors.

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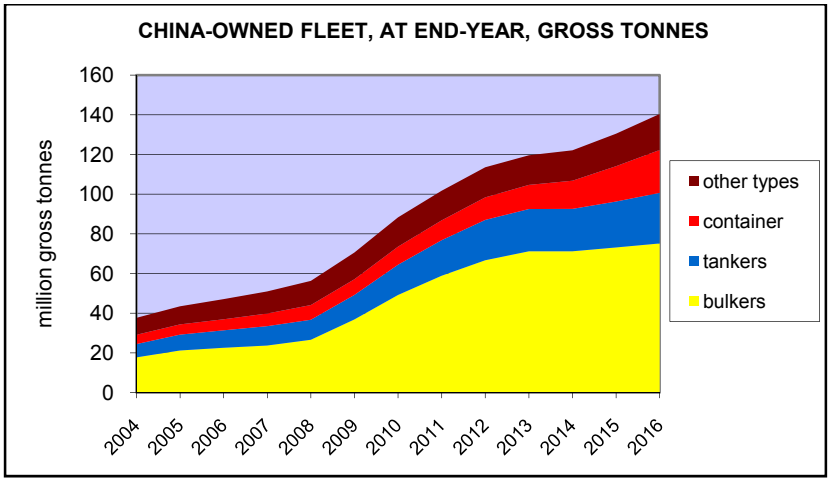
An enlarging fleet

In the past two years, stronger fleet growth returned to the China-owned fleet. After a previous deceleration, increases of 7 percent in 2015 and 8 percent in 2016 were seen, measured in gross tons capacity. Based on provisional Clarksons Research calculations, the first half of this year saw an increase of 5 percent (comparing the fleet at the end of last year with the total at end-June 2017).[1] Numerous newbuilding deliveries were recorded.



tankers includes all sizes; bulk carriers are 10K dwt & over;
excludes Hong-Kong owned ships source: Clarksons Research

At mid-2017 the entire China-owned commercial fleet, excluding Hong Kong-owned vessels, reached 147.2 million gross tonnes. This volume comprises the world's third largest by owner nationality, at 11.5 percent of the global total. Greece is the biggest, and Japan is number two.

During the first half of this year bulk carriers, the largest part of the fleet, increased by 3 percent, reaching 77.5m gt. Tanker capacity was up by 8 percent to 27.4m gt, while in the container ship segment a 9 percent rise to 23.5m gt occurred. Gas carriers, liquefied natural gas (LNG) and liquefied petroleum gas (LPG), experienced an 18 percent increase to 2.6m gt.[2]

Ships' cargo carrying capacity (or, more correctly, total lifting capacity) is expressed here in gross tonnes, because this is a common measurement. Usually, bulk carriers and tankers are measured by deadweight tonnes, container ships by the teu (twenty-foot equivalent unit) and gas carriers by cubic metres. Another

[1] Clarksons Research (2017), *China Intelligence Monthly*, July, 3
[2] Clarksons Research (2017), *China Intelligence Monthly*, July, 3

statistical point is that vessel ownership nationality is defined by the country where the parent owning company is located.

Additions and employment

Among notable changes in the China-owned fleet during the 2017 first half, newbuilding deliveries of large ships were prominent. According to reports, six tankers of between 308,000 dwt and 319,000 dwt, in the very large crude carrier (VLCC) size category were delivered. Two LNG carriers of 174,000 cubic metres were completed. A number of new 9,400 teu container ships joined the fleet, while numerous capesize bulk carriers in the 180-210,000 dwt size group also were delivered. Further units may be added when more complete information is available.

Where are these and other ships employed? Many new vessels, as well as a large portion of the existing fleet, participate on routes connecting China with import suppliers or, in some cases, export markets. Some are employed in international 'cross trades' where China is not involved. Yet other, often smaller, vessels participate partly or wholly in the Chinese coastal trade, a huge protected market limited mainly to Chinese registered, owned and operated tonnage.[3]

An analysis published several weeks ago by Clarksons Research revealed that the China-owned fleet frequently visits ports in China. Currently as much as 74 percent of port calls by ships in this fleet (based on tankers and bulk carriers only) are at domestic ports. The result contrasts with employment of these vessels by some other top shipowning countries. Japan-owned ships home port visits comprised about 53 percent of the total while, for the number one owning country Greece, a low 9 percent was observed.[4]

Further consolidation

Organisational changes are also prominent. As well as the mega-merger between COSCO and China Shipping Group last year, another large merger of state-owned shipping companies was arranged but not fully implemented. During the first half of 2017 reports suggested that the Chinese government was applying pressure for China Merchants Group, and Sinotrans & CSC Holdings, to completely integrate their businesses, signs of which later emerged.[5]

What can be achieved by such amalgamations? Consolidation is widely recommended as a necessary step towards competing more strongly and achieving greater market share, an especially valuable attribute when over-capacity prevails and markets are weak. Increasing efficiency, reducing costs, benefiting from business 'synergies' and leveraging economies of scale are all seen as useful advantages of this process. But historical examples show that the improved financial performance anticipated sometimes proves difficult to attain.[6]

The China-owned fleet is now dominated by the two new groupings, COSCO and China Merchants. Numerous other companies also own ships, some of which are leasing and financing businesses connected with Chinese and foreign operators.

Another consolidation of great significance for the global shipping industry has begun, involving a state-owned Chinese company and a foreign ship operator. In mid-July this year the Hong-Kong owned Orient Overseas Container Line (OOCL), the world's seventh biggest container service operator, with 66 owned ships totalling about 440,000 teu, agreed a $6.3 billion takeover by China's COSCO.[7]

Analysis by Drewry Maritime Research characterises OOCL as being 'a very well-run company'. The combined COSCO-OOCL operation is placed in the number three position among container lines, after leaders Maersk and MSC. Based on June 2017 data, calculations showed an existing COSCO-OOCL

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[3] Scott, Richard (2016), 'China-owned ships: fleet expansion accelerates', *Hellenic Shipping News*, 15 March
[4] Clarksons Research (2017), *Shipping Intelligence Weekly*, 7 July, 20
[5] Lloyd's List (2017), *China Merchants and Sinotrans & CSC to consolidate mega fleet*, 11 May; *CMES to acquire Sinotrans & CSC shipping assets*, 25 May
[6] Essential features of successful consolidation in the container shipping sector are listed in Drewry (2016), 'Consolidation in the liner industry' (White paper), *Hellenic Shipping News*, 24 March
[7] Lloyd's List (2017), *Cosco Shipping to take over OOIL for $6.3bn*, 9 July

fleet totalling 2,185,000 teu capacity, equivalent to an 11 percent share of the world container ship total.[8] Both COSCO and OOCL are members of the Ocean Alliance of container shipping lines which, it is suggested, will be beneficial in facilitating the merger.

A possible obstacle is foreshadowed by a comment that the takeover is likely to prove 'tricky and sensitive'.[9] The deal is subject to approval by various regulators in Europe and the USA as well as China, who will consider competition aspects.

Orders imply fleet growth

China's merchant ship fleet capacity will be greatly determined by many new vessels ordered from shipyards for delivery in the remainder of this year and 2018, as well as later. However, capacity expansion will be affected also by scrapping of older ships and by second-hand purchases and sales, influences which are not straightforward or easy to predict.

As calculated at mid-2017 orders at shipbuilding yards placed by China-based owners, for all vessel types and sizes, comprised 405 ships amounting to 24.2m gt, according to Clarksons Research. [10] The total was equivalent to just over 16 percent of China's existing fleet. Within this total, 6.8m gt or 28 percent was scheduled for delivery in second half 2017 and 55 percent next year. The actual timing of newbuilding deliveries may differ from that scheduled, however.

Among notable vessel types on order, container ships in the 19-21,000 teu ULBC (ultra-large box carrier) size group, and 9,400-14,500 teu range, are prominent.[11] Tanker newbuildings for the China-owned fleet include VLCC 300-319,000 dwt orders. Also, a second phase of the valemax 400,000 dwt ore carriers category is approaching, with a further thirty ships ordered for Chinese shipowners. Additionally, numerous bulk carriers in the capesize category have been ordered.

Shipowning intentions

Perceptions of robust future fleet enlargement are reinforced by an underlying theme. A long-stated Chinese government aim is to ensure that a greater proportion of the country's vast seaborne trade is transported in ships owned and controlled by companies based in China. The extensive container ship, VLCC tanker and valemax ore carrier newbuilding programmes are consistent with this broad objective.

The leading tanker owning company, China VLCC, in May this year was reputed to control the world's largest fleet of VLCCs. This operation is a subsidiary of China Merchants (it was originally jointly owned with Sinotrans & CSC, which has merged with China Merchants), controlling 41 ships and having placed orders for 12 newbuildings to be delivered during the remainder of this year and 2018. Reports suggested that additional acquisitions were being considered, intended to further enlarge fleet capacity.[12]

Noteworthy also was a report indicating that Chinese owner Shandong Shipping had been looking at possible secondhand VLCC purchases, adding to its involvement in the bulk carrier and gas sectors.[13] A key motivation for buying large tankers appeared to be to provide extra, more economical transportation for crude oil imports by small private independent refiners. These refiners, known as 'teapots', many of which are located in Shandong province, have seen a great expansion of their imports after receiving larger allocations of government quotas.

In the container sector one commentator has suggested, perhaps controversially and apparently based on supposition, that China's target is to achieve the number one position in the container ship operator world ranking.[14] Both commercial and geopolitical logic, it is argued, point in this direction. That

[8] Drewry Maritime Research (2017), 'Takeover of 'perfect bride' OOCL takes container industry one step closer to liner paradise', *Hellenic Shipping News*, 11 July
[9] Lloyd's List (2017), *Cosco steps into the consolidation fray with $6.3bn bid for OOCL*, 20 July
[10] Clarksons Research (2017), *Shipping Intelligence Weekly*, 7 July, 15
[11] China Daily (2017), 'Cosco's container fleet to get $1.78bn upgrade', *Hellenic Shipping News*, 23 June
[12] Lloyd's List (2017), *China Merchants boss: 53 VLCCs is not enough*, 9 May
[13] Lloyd's List (2017), *Shandong Shipping mulls VLCC acquisitions*,19 May
[14] Merk, Olaf (2017), 'The geopolitics of container shipping alliances', *Hellenic Shipping News*, 11 July

contention is based on an impression that China is anxious to protect supply chains, while strengthening its defence and security presence. It is suggested that a much larger container shipping involvement can assist in attaining these objectives.

An elevated role

Other aspects relevant to the upwards fleet trend are visible. How does China's Belt and Road Initiative (also known as 'One Belt, One Road' or OBOR) relate positively to the China-owned merchant ship fleet? The BRI's main physical feature is a planned huge scheme of infrastructure projects intended to improve trade connectivity across a wide geographical area. The 'Road' part of the title represents the '21st Century Maritime Silk Road' concept, a sea route pattern stretching from the South China Sea and South East Asia, through the Indian Ocean and Middle East area, into the Eastern Mediterranean.

Port developments progressing in a number of foreign locations link the Road's sea routes with elements of the land routes in the 'Silk Road Economic Belt', the second portion of the grand scheme. China's merchant fleet expansion can be related in part to this scheme, although actual shipping services on the sea routes or associated with these have not been accorded as much attention as the improvement of port facilities.[15]

Illustrating how shipping services are evolving, recent news highlighted COSCO Shipping Specialized Carriers Company, which operates 120 ships including multipurpose and heavy lift tonnage. These vessels are often employed beyond BRI countries, to many destinations in Africa and South America. Cargoes of construction materials needed for building power plants, factories, roads and railways are carried, as well as a wide range of heavy plant and machinery and manufactured goods.[16]

Attention has been drawn also to a category of the China-owned fleet where ship employment is fully controlled by foreign companies. This feature occurs where vessels are bought by Chinese companies for leasing to foreign operators. Prominent providers of this type of lease finance are International Commercial Bank of China (ICBC), Minsheng Bank, and Bank of Communications (BoCom). Many container ships have been financed. A total $11.5 billion was reportedly invested in shipping by Chinese leasing groups during 2016.

One news item suggested that, if future market weakness resulted in foreign companies defaulting on payments due to Chinese financiers under leasing arrangements, potentially China could gain a more powerful influence over the global shipping industry.[17] In response, a leading shipbroker contended that such an opinion appeared to be an exaggeration.[18]

Adopting a broad viewpoint, strong evidence points to the China-owned merchant ships fleet experiencing further substantial growth in the years ahead. Partly this may reflect more financing of vessels, leased to foreign shipping companies, which have full long-term operational control. Mostly, however, shipping companies based in China seem likely to be the operators of additional tonnage joining the nationally-owned fleet. Although some uncertainty surrounds the exact pace, a solid upwards fleet trend can be predicted.

source: Richard Scott, associate, China Centre (Maritime), Southampton Solent University and managing director, Bulk Shipping Analysis

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[15] Scott, Richard (2017), 'China's Belt and Road Initiative: rearranging global shipping?', *Hellenic Shipping News*, 6 June
[16] China Daily (2017), 'Niche carriers cruise into new export markets', *Hellenic Shipping News*, 23 June
[17] Financial Times (2017), *Leasing deals highlight China's clout in shipping*, 13 March
[18] Milner-Barry, Philip (2017), Letters, *Financial Times*, 16 March

(7) Hellenic Shipping News, 27 July 2017/ Fathom Shipping

Three technology trends transforming shipping

New technologies are continually being developed to improve industrial and business operations. In shipping the aim is that they also make the industry safer and reduce its environmental impact. Increasingly, tasks are being carried out remotely, with robotics doing jobs humans once used.
There is not one particular technology that has or will transform the way the shipping industry operates, but there are an increasing number of technologies and solutions that look set to make significant changes to commercial shipping in the near future. Here are three technologies that we see as transforming the future of shipping.

Sensors

Sensor technologies are well developed but they are becoming increasingly intelligent. They are found in many forms of autonomous operations and more recent focus has been on looking at how different sensors can be combined to optimise their output.
Developers are maximising their ability to read more and more complex information generated by ships. Sensors can process huge quantities of information and digest it into a readable format to give humans an insight into why a ship is behaving in a particular way. By doing this it gives the human better situational awareness and provides it with the power to carry out better decision making.
Sensors have and will continue to transform shipping by providing a communication platform between different equipment, but also between the ship and the human. Today, sensors are becoming more closely integrated, giving them another level of intelligence that means they can see far deeper into a ship's behaviour than a human could ever do. Sensors are an enabler and will be used as a platform to continue to develop the communication abilities between a crew and its ship. By connecting artificial intelligence and machine-learning to sensors, they will ultimately be able to provide more insight into how and why a ship will operate most efficiently than ever known before.

Robots

Robots are used on different levels to control, inspect, communicate and even carry out maintenance work or assist with firefighting onboard ships. They can operate both via remote control and autonomously and their capabilities are advancing both inside and outside the maritime industry.
Robots have and will be used to improve safety of shipping, carrying out tasks that are dangerous to humans and increasing production as they work faster and longer without breaks. They will not be used to replace humans, but to aid them. One such robot is the Shipboard Autonomous Fire Fighting Robot (SAFFiR), developed by Naval Research Laboratory with Virginia Tech and other US universities. It is capable of finding fires onboard, use fire suppressors such as nozzles and autonomously navigate the ship with a sensor suite.
Robots may even be used to help pirate and hostage situations. Recon Robotics' Throwbot XT is a throwable device at just 540g. It can be directed by the operator to move through a structure and transmit video to the operator. Recon Robotics claims it can be used to locate armed subjects, confirm the presence of hostages or innocent civilians, listen in on conversations, and reveal the layout of rooms.
In a Global Marine Technology Trends 2030 report by the University of Southampton, Lloyd's Register, and QinetiQ, experts see advances in motion control, cognition, sensing, miniaturisation, and robot-to-robot communication, that will advance robotic capabilities and stimulate market prevalence worldwide.

Advanced materials

Transportation of 90% of world trade by ships means that the maritime industry faces some challenges when it comes to reducing the environmental impact of its operations. To combat these concerns, a number of advanced materials are being deployed and developed to ensure the transformation of shipping includes making its impact on the environment less and less.
According to the Global Marine Technology Trends 2030 report, materials will continue to accelerate to develop structures that are made from refined and reliable properties. Environmental sensing, self-cleaning, self-healing, enhanced electrical conductance and shape modification, are expected through the development of nano-materials to deliver better performance and environmental benefits.
The Ocean Cleanup Technology, developed by 23-year old Boyan Slat, consists of advanced materials to combat the ocean garbage problem. A hard-walled pipe made from durable and recyclable high density

polyethylene with a fibre reinforced thermoplastic polyurethane screen (made to last decades in the ocean) catches concentrated plastic. This ocean plastic will then be recycled.
Another example is the Oleo oil soaking sponge, developed by the Argonne National Laboratory, Illinois. In trials it has shown to absorb 90% of its own weight in spilled oil before being squeezed out and reused. It is made from a foam consisting of polyurethane or polyimide plastics and coated with oil-loving silane molecules that like to capture oil.
Both the Oleo sponge and the Ocean Cleanup Technology show how the use of different materials combined with innovative thinking is leading to technologies that have the potential to transform shipping's impact upon the natural ocean environment.
Source: Fathom-Shipping
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(8) Maritime UK, 24 July 2017

World-Class Innovation

Many of the world's leading maritime industry research and training institutions, manufacturers and service providers are located in the UK. The sector features globally recognised and industry-leading brands that drive forward key developments in equipment, product design and technical innovation. Research and Development in the maritime sector is extensive, supported by the world-class capabilities of UK universities and research institutes. The UK's maritime research landscape is further enriched as a result of the large numbers of small and medium-size enterprises (SMEs) at the forefront of R&D and innovation.
The UK's maritime equipment designers and manufacturers are behind some of the world's most advanced and ambitious global maritime projects, delivering cutting-edge products – from classic ship and boat mechanical systems to electronic, optical and IT equipment. Underpinned by a highly advanced product-research base and innovative designers, UK companies supply the tools, plants and equipment for boat manufacturing and shipbuilding, plus the essential equipment needed for maintenance and repairs.
The UK's maritime manufacturing sector exports to all of the world's major markets for maritime products. From complex merchant and naval shipbuilding to ship's chandlery and nanotechnology, the sector produces high-quality products used at every stage of the supply chain.
It is a sector that is thriving, with a clear course to deliver growth in the years ahead by building on competitive strengths that have been developed over many years. Businesses are able to tap into the innovations of the sector and benefit from the cutting-edge design and technological advances made here in the UK.
Source: Maritime UK
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