The Changing Face of Shipping

The maritime industry does not have the luxury of standing still.

Challenges placed on our industry come from a multitude of areas. Positive drivers like the growing green agenda driving fuel efficiencies, emissions target setting and the developments of Maritime Autonomous Surface Ships (MASS) promise to assist shipping meet environmental goals and a reduction in seafarer injury/death claims. Negative drivers at the other end of the spectrum provide additional pressures, such as the novel coronavirus COVID-19 and the current global geopolitical tensions and conflicts with their obvious risks to life, the environment and property. All these drivers, for good or bad are disruptors resulting in a tough operating environment for our sector.

It is indisputable that technology is developing to deliver a solution to these challenges and many more beside. Alternative fuels, automation of systems and tracking of vessels are just three examples that spring to mind.

Since its formation in 1855 the Shipowners' Club has insured the smaller and specialist vessel sector. But what actually qualifies as a "specialist" vessel? Is it a type of vessel like MASS, seismic vessels or energy generating vessels harnessing kinetic energy from waves? Is "specialist" simply a function of the technology that is in use on board? Or does system automation, the use of alternative fuels or the application of blockchain solutions qualify as "specialist"? At the Club we think "specialist" applies to all these vast, and developing areas, that is why we embrace all areas equally, after all how long will it be before these new technologies become mainstream and the "new" traditional?

In this series of articles, we will be inviting specialists and innovators to discuss new developments and new technologies. MASS, blockchain and decarbonisation are just some

topics that will feature as we hear from experts in the field and explore where we are now, the pitfalls, the solutions and most importantly the future. In our first instalment, we invited Robert Merrylees, Policy Manager at the UK Chamber of Shipping, to share his views on the role evolving technology plays in today’s shipping environment.

> How long will it be before these new technologies become mainstream"

Britt Pickering

By its very nature the shipping industry is far-reaching and globally significant, enabling 90% of world-trade to be carried, increasing connectivity, and acting as a catalyst for economic growth worldwide. Global cargo volumes continue to grow, in 2012, global seaborne trade exceeded 10 billion tonnes for the first time and is forecast to reach 12.1 billion tonnes in 2022, equivalent to 1.5 tonnes of cargo transported for every person on the planet. The world fleet continues to grow in step, with the number of merchant vessels surpassing 100,000, among them cruise ships, tankers, container ships and offshore support vessels. The shipping industry generally is inherent to much of modern life, from world trade to recreational activity, to offshore energies, research, and exploration.

While the shipping world has been through various transformative periods, the scale and pace of the transformation presently seen may be considered unprecedented. Innovative technologies are proving to be a catalyst for transformation, whether through emission reduction, increased autonomy, or other forms of smart maritime technology, yet their adoption will certainly prove complex. New infrastructure, understanding of the risks of an increasingly digitalised world, legal and regulatory frameworks, education, training and certification are all needed to enable the industry and its workers to operate new systems and technologies in safe and efficient ways.

The COVID-19 pandemic, while undoubtedly disruptive, has accelerated the adoption of various technologies across the world, no more so than in the shipping industry. Whether through e-certification, remote drone survey and inspection or increased simulator use and automation, the period provided a move towards remote communication and learning, but also demonstrated the fragility of a global network that is not prepared for disruption.

Decarbonisation

It has been said that decarbonisation may lead to greater innovation than the industry has seen over the last century, if not longer. Decarbonising the shipping industry will be as technically challenging as the transition from sail to steam 200 years ago. It will, however, prove more challenging due to being driven by societal need, not economic opportunity.

Whilst the need for decarbonisation is clear and urgent, it also presents a huge challenge regulatorily, both for the ports and shipping industry, which must develop rapidly to facilitate the transition. Each new technology must be certified case by case and the creation of new correlating regulation is needed. For example, crucial work is underway at the International Maritime Organization (IMO) to develop guidelines for the safety of ships using alternative fuels, with draft interim guidelines being developed for products like ammonia which have unique risk profiles.

International multi-lateral and domestic initiatives are also helping spur the development of alternative fuels, enabling easier adoption of new technology. The Clydebank Declaration, launched by the UK in November 2021 at COP26 is an ambitious global initiative to establish maritime green corridors as a “living lab” to accelerate decarbonisation and inform international regulatory discussion. The 24 signatories intend their actions to complement the IMO by establishing at least six green corridors by 2025, before scaling up activity to support additional longer routes and more ships.

Similarly, the UK established a Shipping Office for Reducing Emissions (UK SHORE), provided with £206 million of funding to accelerate research and development (R&D) of clean maritime technologies across the sector (including operators, yards, ports, and manufacturing) to match-fund the development and operation of zero-emission new and retrofitted vessels and necessary infrastructure. As such, in the UK, the domestic shipping sector is well placed to accelerate decarbonisation, with vessels acting as test-beds, scaling up the adoption of innovative green technologies and supporting demand for shoreside infrastructure.

The need to decarbonise is reflected in the orderbook, with over 40% of tonnage on order in September 2022 alternative fuel capable. Energy saving technologies provide numerous opportunities to increase efficiency, according to Clarksons Research Services there are more than 5,000 such installations across the world fleet currently, including Bow Foils, Air Lubrication Systems, Wind Kites, Flettner Rotors, Propellor Ducts, and Waste Heat Recovery System to list but a few. All purport fuel savings and show that the adoption of new technological solutions, as well as the reinvention of existing ones, is well underway.

Autonomy

Decarbonisation efforts and the adoption of new fuel technologies may be seen as the top priority for the shipping industry at present, but new digital technologies also offer solutions to other issues, as well as further opportunities.

The development of Smart Shipping, through technologies which control or influence the operation and security of vessels, through increased usage of data, automation, and systems

integration on board and ashore, including Maritime Autonomous Surface Ships (MASS), will revolutionise the shipping industry. MASS can offer widespread opportunities including safety improvement, efficiency gain, reduction in human error and novel vessel design but with the development of MASS comes a wide range of challenges too. MASS require an international regulatory framework to operate globally, and the IMO has, through an approved road map, set out to develop a goal-based non-mandatory Code, which aims to keep pace with the rapid technological developments.

When considering charting for example, navigational products have always historically been created for human navigators, with content filtered and portrayed in a way that is accessible and understandable for a ship's crew. MASS can consume and interpret far more data than a human could, without detail becoming blurred or cluttered, but concerning point to point navigation, MASS situational awareness needs development to comply with the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs). Concerns remain regarding the risk of autonomous vessel development outpacing regulation and standards, particularly around safety of navigation, where manned and unmanned vessels will be sharing the same space and sea area.

Digital Trade

Shipowners principle commercial concern is the efficient movement of goods. As the demands of moving goods have become increasingly complex, the need for efficiency has increased. Delegates at the G7 Digital and Technology Ministers' meeting in 2021, concluded that paper-based transactions are "a source of cost, delay, inefficiency, fraud, error and environmental impact." Electronic trade documentation provides one possible solution to such inefficiencies, with nine jurisdictions, including the maritime hub of Singapore, having already enabled electronic documents to be used in the same way as their paper equivalents.

The International Chamber of Commerce (ICC) estimates fewer than 1% of trade documents are fully digitised globally – with a typical transaction requiring the exchange of 36 documents and 240 copies in hard-copy. ICC forecast full digitisation could increase the flow of global trade by US$ 9 trillion on 2019 values by 2026.

Following a 2021 consultation, the Law Commission in the UK, presented a bill to the UK parliament with the main objective of ensuring that electronic and paper trade documents have the same effects and are subject to the same treatment, both practically and legally. The Bill, if passed into law, would facilitate the use of electronic bills of lading and other documents of title to goods, mate's receipts, cargo insurance certificates, blockchains, marine insurance policies, promissory notes, sea waybills, ship's delivery orders, and warehouse receipts. BIMCO has already developed and published an electronic bill of lading standard (eBL Standard) for the bulk shipping sector, which gives charter parties signed electronically the same effect as paper.

Digital Charts

This year, the UK Hydrographic Office (UKHO), the primary hydrographic office for 70 territories and coastal states announced its goal to begin a phased withdrawal of paper charts from production and is anticipated to conclude in late 2026. The action, decided in response to the increasing importance of using digital products and services for navigation instead of paper indicates the future for charting. Few would argue against the considerable benefit of digital charting, but with the decision, comes a necessity to develop and approve secure digital solutions for the market where ECDIS systems are not required. For cargo vessels of 3000gt or less where paper charts are the primary means of navigation, new digital solutions will be required with the requisite certification and type approvals should they not wish or not be able to install ECDIS. It is incumbent on the UKHO, in collaboration with the International Hydrographic Organization (IHO), shipping industry stakeholders and the regulatory system to arrive at solutions which work for all.

Cyber Security

The increased digitalisation of the shipping industry and world enables many new efficiencies, safety enhancements and benefits to be realised. However, with greater connectivity between ships and shore, and an increasing number of systems and the Internet of Things (IOT) being connected on board, cyber threats and vulnerabilities are increasing and need to be addressed. The shipping sector is an attractive target for malicious and disruptive cyber-attacks given its increasing reliance on technology.

The internet of things (IoT) describes equipment or appliances that can connect and exchange data with other equipment, systems or appliances over the internet or other communications networks, using software to interact and perform analysis or eporting or other actions.

Data flows from ship to shore via VSAT and other methods are increasing rapidly making the need for secure and stable connection of paramount importance. Numerous systems of a vessel’s operation can be vulnerable to cyber risk, including bridge navigation, cargo handling

and management, propulsion, machinery and power control, access, passenger servicing, administrative and crew welfare, and communications.

With increasing automation and enhanced control from shore-side operations providing new opportunities, the resilience of systems is essential, and cyber security must be considered holistically throughout a ship's life, with potential impacts and risks to safety, operations, the environment, and the reputation of an operator all considered.

The IMO has addressed cyber risk through the ISM Code. Under IMO Resolution MSC.428(98) ships over 500gt are required to address cyber risks via their Safety Management System.

The International Safety Management or 'ISM' Code is a set of standards published by the IMO to ensure that management systems are implemented internationally to ensure the safety of life and property at sea and to protect the marine environment from pollution.

Skills & Training

Whilst ensuring the technology itself is developing, it is imperative that the human element is central to the introduction of new technologies and increased digitalisation. The core functions and competencies required for seafarers for navigation, engineering, and propulsion systems have changed considerably, and will continue to do so as new technologies are introduced.

The IMO Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) provides the global shipping industry with the internationally recognised regime for determining competence standards and certification requirements for seafarers. The pace of current innovation means industry must ensure that STCW remains fit for purpose and the globally accepted standard. This has led the IMO to agree to a comprehensive review and revision of the STCW starting in 2023. The revision of the Convention needs to enable the industry to adapt and adopt new rapidly developing technologies at pace. Including the use of difficult to handle alternative fuels, increased automation and development of seafarer skills and training to stay up to date and allow for the changing nature of seafarers' work.

The use of simulators and virtual reality for cadets and experienced crew alike can provide decision making scenarios and present challenges in a safe and controlled environment. Role playing scenarios with high traffic density, restricted visibility, heavy weather conditions are impossible to replicate safely on board a vessel, yet a rapidly maturing technology can be implemented to enhance training and safety.

Conclusion

The above cases indicate the breadth and depth to which technological advancements are impacting the shipping industry, and the numerous challenges associated with their development whether from a technical, safety, regulatory or certification standpoint. What is abundantly apparent is the need for regulation to be agile and flexible to enable innovation and neither stifle progress, nor hold it up. But it must also act as a stabiliser to ensure a safe and sustainable future. Forward leaning and active collaboration from the industry, parts of the supply chain, and whole economy both domestically and internationally are vital to realise that potential.