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Thought Leadership
Class Sounds Off on Future Tech

By Greg Trauthwein

Three Questions for Class

People are busy. So in approaching the 'Class Roundtable 2017', it was decided to keep it simple, asking leaders in class for their take on the industry's hottest trends. **Spoiler Alert!** *Digitalization, the Cloud and Emissions Reduction are pervasive themes. But read on for exclusive insights from ABS, ClassNK, DNV GL and Lloyd's Register on the driving trends for the coming generation.*

1. What do you see as defining the technology trend?

Dr. Kirsi Tikka, ABS

Of all the technological trends that will impact maritime operations, a dramatic increase in the connectivity of systems may bring the widest changes. The ships will become more automated and connected, with the ultimate target of autonomy. And digital platforms for trading will connect cargoes with ships.

Along with the rest of the industry, the future of classification will be based on data collection and analytics. Data will support maintenance and class decisions and survey activity will no longer be driven by calendar dates but by the condition of the vessel. The goal will be safer and more efficient shipping supported by reliable data and less intrusive surveys. To reach this goal ABS is investing in the building blocks that will take us there. Cyber safety and security, data management and data quality, condition and performance-based criteria are critical for providing improved levels of safety and reliability.

Knut Ørbeck-Nilssen, DNV GL

In terms of technology, at DNV GL we believe that we are seeing a paradigm shift due to digitalization. The way we deliver value is changing, brought on by a revolution in information technology. We are starting to rely on new networks and new ways of working. The Cloud offers limitless computing power and storage capacity. The additional power made available through the Internet of Things (IoT) and machine learning provides opportunities that were previously unthinkable. As the shipping industry becomes more connected we will see positive impacts that spread throughout the whole transport sector. With more timely and detailed information on cargo, routes, and the operation and condition of assets supply chains can be more adaptable and efficient. For example, if we can get a better picture of vessel arrival times, we could not only cut fuel consumption and lead times, but organize the port and hinterland chain to maximize efficiencies for on-shore workforce, maintenance activities, even in class inspections. The development and spread of cloud based technologies and computer power, will change not only how we manage data but how we design, build and test vessels, their systems and components.

Data platforms and digital twins, with advanced software and simulation capabilities, will give us greater control of systems – including the ability to evaluate, monitor and intervene in the operations of a vessel or fleet in near real time.

One of the ways we are addressing this is that DNV GL is creating a specialized Digital Solutions organization, consisting of 1,000 digital experts, to leverage the full potential of an increasingly digital world. This will be a new stand-alone business, but at the same time to further support DNV GL's digital transformation, a Chief Digital Transformation Officer will also be recruited.

As in the past, 5% of DNV GL's operating revenue will be invested in long term research and development and in short term innovation activities to develop and modernize our service portfolio. But going forward, more than 60% of all R&D or innovation funds will be allocated to developing digital solutions.

Nick Brown, LR

Autonomous Systems (note not Autonomous ships – although we already see examples of autonomously operating small craft for specialized local duties), greater use of technology to control systems on board, allow remote diagnostics and remote control as necessary to supplement skills and capability on board.

Alternative means of energy storage and power distribution will also be important, driven by environmental conscience and legislative pressures. The general advance in technology is all linked – for example, the all-electric ship may lend itself better to autonomous control provided the challenges of energy storage and management can be addressed. Such technologies enable performance improvements and efficiencies – cost savings for business, reduced energy consumption and emissions for the environment – but adoption has its challenges too. New roles, working practices and business models may re-

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Dr. Kirsi Tikka,
ABS Executive Vice President for Global Marine

sult. LR is investing in Thought leadership through the GMTT 2030 series of industry reports, Joint Industry projects, new rules and class notations, new skills and training.

2. What do you see as defining the legislative trend?

Nick Brown, LR
Global Fuel Sulphur cap and the move towards a multi fuel future. Some of the technologies mentioned above will contribute to addressing this challenge – alternative fuels such as LNG, methanol, LH2, energy efficient systems with reduced emissions such as battery storage, hybrid arrangements, DC distribution networks.

Dr. Kirsi Tikka, ABS
Shorter-term, environmental regulation – particularly around emissions – has the potential to be operationally disruptive if regional regulations are not globally co-ordinated and designed to meet common goals. For the past year, ABS has designed and released a suite of compliance-focused software solutions aimed at preparing shipowners to measure and submit the required fuel-efficiency/consumption metrics. Longer term, class rules and international regulations must adapt to the new technology and digital world. We are working with industry and regulators to help ensure that whatever emerges is practical, fit for purpose and safety-centric.

Knut Ørbeck-Nilssen, DNV GL
Over the next decade there is likely to be a continuous escalating pressure from regulators on owners and operators to reduce emissions to the air and water. This is an area where we, as a classification society, must respond to the needs of our customers and provide practical advice so they can comply with these regulations. Over the last 12 months, the "big three" of major environmental regulations (Sulphur cap, EU MRV, and BWMC) have dominated the regulatory calendar and supporting the industry in preparing for these pieces of legislation has been at the top of our agenda at DNV GL. On the global sulphur cap we provide a range of services to help customers choose the right compliance option, ranging from retrofitting scrubbers, exploring alternative propulsion options such as LNG or battery and hybrid solutions and carrying out feasibility studies to help our customers make the best choices for their business. DNV GL has also developed a range of apps and services to help customers prepare for the EU Monitoring, Reporting and Verification (EU MRV) regulation and achieve MRV readiness. The Ballast Water Management Convention (BWMC) is the last of these "big three" regulations. To support owners, we recently published a report on ballast water management to provide guidance on the upcoming regulations and an overview of the different types of systems.

> To provide worldwide access to class documentation, **DNV GL customers will be able to use electronic certificates starting in October 2017.** Accessible through our customer portal My DNV GL, electronic certificates will eliminate paper handling, reduce the administrative burden on all stakeholders, and a validation solution will ensure that electronic certificates are just as safe as paper.
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> **Knut Ørbeck-Nilssen,**
> CEO of DNV GL – Maritime

3. The energy market is down, technology adoption is up, political instability is rampant. How does this all affect class?

Dr. Kirsi Tikka, ABS
The fast pace of technology development requires organizations to be agile and able to adapt to continuous change. The era of smart shipping will require convergence of traditional and non-traditional skill sets with the capability for innovative and critical thinking that supports both new ideas and experience-based knowledge.

To encourage convergent thinking across our organization, ABS is actively hiring people with non-traditional skills from non-traditional sources and blending them with our traditional knowledge of structures, machinery, mechanics and electrical systems to support the next generation of safety systems.

We are changing the way we identify talent by creating a leadership culture that promotes analytical capability, fast learning, convergent thinking and the ability to manage and exploit disruptive technologies. We are creating a culture that recognizes the importance of data, one that rewards continuous adoption and relearning.

Knut Ørbeck-Nilssen, DNV GL
As the digital transformation of the industry accelerates, DNV GL must uphold the high standards we have set, but

ClassNK on …

The defining technology trend …

The smart use of IoT is going to improve and optimize numerous functions in operations and ship management. Over the next 10 years we believe that the availability of data-driven analytics will determine the future of our industry. From ClassNK's point of view, ICT will be one of the biggest drivers behind change in the industry. Advances in data transmission technology and ICT have the potential to change the way of ship surveying. For example, ClassNK has announced its R&D roadmaps, which includes revolutionizing survey process with the development of robotics instruments of surveys utilizing ICT. The aim is to develop a technology that could reduce the time for ship surveying activity relieving ship owner's burden and further improving the quality of service that we provide.

ClassNK has focused a portion of our resources on developing the latest technologies and solutions to open up the advantages of Big Data to the maritime industry. At the forefront of these efforts is the flagship project, Ship Data Center Co. Ltd. (ShipDC). ShipDC operates a land-based center collecting data from ships in operation using VDR, data logger and other sources, as well as weather information at sea. By developing a platform through which data can be centrally controlled and used at a low cost, we aim to maximize opportunities for big data utilization.

The defining legislative trend …

Environmental regulations are putting the onus on the industry to get in compliance. SOx and PM stricter regulations are coming into force in 2020, and installing Exhaust Gas Cleaning Systems, which reduce the amount of SOx and PM in ship emissions, is one method for complying with the regulations in addition to use of the compliant fuel. Another important regulation is the EU Monitoring, Reporting, and Verification of CO2 emissions. ClassNK was one of the world's first societies to receive accreditation from the UK-based national accreditation body as an EU MRV verifier. ClassNK can now assess Monitoring Plans, verify Emission Reports and issue DOCs in accordance with the EU MRV regulation. In addition, ClassNK has released "ClassNK MRV Portal," service on website, to support company's data handling/submission for MRV certification.

Now that the Ballast Water Management Convention has formally entered into force, shipowners must also focus efforts on the operational and installation aspects on the ballast water management systems to ensure successful implementation and compliance with the regulations. ClassNK developed 3D laser scanning technology ClassNK-PEERLESS, offering shipowners the opportunity to assess how to retrofit BWMS on their ships quickly, using 3D laser scanning to accurately measure available space automatically, without the time-consuming manual work. ClassNK-PEERLESS takes point data from 3D laser scanners and converts them into 3D models with in 1 to 2 days, while these procedures were handled manually taking 10 to 14 days.

The energy market is down, technology adoption is up, political instability is rampant. How does this all affect class?

As radical changes in energy markets and political instability are unpredictable and uncontrollable, it is difficult to take appropriate action beforehand. On the other hand, since technology acceleration would be made on progress and have great impact on all the industries including maritime industry and class, it could be promoted and accelerated by ourselves. Actually, ClassNK are committing to treat many kinds of new technology on its collaborated R&D with many industry partners.

During the past few decades, ClassNK has continued to develop many classification services improved using ICT. In the coming years, we are continuing promoting such kind of technologies, for example, in R&D Roadmap, detailing its vision and goals for projects in the near future, as Remote Survey Technologies (Drones, etc.), Development of Survey Robots, Rationalization of Surveys utilizing Digitalization and Safety Evaluation Technology for Autonomous Ships, etc. In others, ClassNK continuously moves ahead on technology acceleration for the benefit of customers.

Class society needs technical capabilities to realize technical innovation. ClassNK considers that technical innovation needs to be promoted to earn customer satisfaction. However, the mission of ClassNK has never been changed, that means, ClassNK is dedicated to ensure the safety of life and property at sea and protecting the marine environment.

more than that make sure that we are providing the support the industry needs to respond to the challenges of today and of the future. This is why for the last several years at DNV GL we have been working on a series of "Modernizing classification" initiatives. It is a process that goes back to the development of the new DNV GL rule set and we have been building on it ever since.

As an example, to provide worldwide access to class documentation, DNV GL customers will be able to use electronic certificates starting in October 2017. Accessible through our customer portal My DNV GL, electronic certificates will eliminate paper handling, reduce the administrative burden on all stakeholders, and a validation solution will ensure that electronic certificates are just as safe as paper. In addition, electronic certificates are easy and convenient to share.

DNV GL will also start using intelligent software agents to help customers find the best time and place to book a survey. The introduction of the Simple Survey Booking tool will simplify survey booking, fitting inspections into the customers' schedule while saving time and costs. Its features include notifications about the best time to order surveys and audits and notified shortly before the due date of the next survey. It also proposes the scope of the survey and states how long a survey of this scope would take. A list of approved service suppliers in each port will help operators to find out whether an in-water survey can be performed in a specific port.

Over the last two years our surveyors have been carrying out a number of surveys using camera-equipped drones to check the condition of remote structural components on board ships and offshore units. DNV GL has built a network of trained drone pilots based in Piraeus, Singapore, Houston

and Shanghai. This allows us to offer drone survey inspections from any of these hubs.

To help the industry address potential cyber hazards, DNV GL has also published a Recommended Practice (RP) on "Cyber Security Resilience Management." Developed in cooperation with customers, the RP provides guidance on risk assessment, general improvements to cyber security, and the verification of security improvements and management systems.

Finally, one of the most important projects for us now and in the next several years is our new industry data platform Veracity. It will bring industries together in digital eco-systems, enhancing the exchange of data, creating new insights and building new services. For DNV GL - Maritime, Veracity is a tool that will play a key role in class services, especially in terms of quality assurance. It will help us to deliver modern class services, particularly on the operational side. The key aspects of the platform are data quality assessment as well as access and security controls, and it may also give us the possibility of playing an extended third party role in the quality assurance of digital value chains.

Global Fuel Sulphur cap and the move towards a multi fuel future (is the driving legislative trend). Technologies to address this challenge – alternative fuels such as LNG, methanol, LH2, energy efficient systems with reduced emissions such as battery storage, hybrid arrangements, DC distribution networks.

Nick Brown,
LR Marine & Offshore Director

Nick Brown, LR

If anything I believe it has made the independent role of class even more important. Class needs to continue to be the custodian of safety and environmental standards and their implementation but also ensure that new technology when it is designed into future designs is fit for purpose and no less safe than today's designs. We also have new areas where we can help support the industry such as cyber security threats to operational technology.

Where new technology is inserted into the marine industry, new failure modes and threats are potentially introduced so this only increases the scope of class to provide assurance that the overall asset remains in accordance with accepted standards for safety and environmental performance. With remote operational access, the boundary of the ship system becomes less distinct so new standards addressing access to the ship have been required. Part of the challenge is also addressing the changing role of the human in the system lifecycle – not only in operation, but right from the initial design and through construction (and indeed our own interventions are changing through remote presence technologies such as sensor arrays and drones). Class needs to remain vigilant so that such intervention, in whatever form, continues to add to the overall assurance case for the asset, our clients and society in general.