Autonomous ships
What does the future hold?

Jarle Fosen - Loss Prevention Executive – Seoul 26.04.2018
Loss prevention and risk assessment
Ability to share the most relevant information

- An in-depth understanding of our Member’s and client’s business
- In house competence covering all shipping segments – in general
- **Focus on industry trends and developments that will affect safety**
- Risk monitoring of the Gard portfolio
- Publish Gard Updates, client training and tailored advice
- Report to Underwriters

“Accidents will happen, and the identification of risks, and possible ways to reduce and prevent them, are key priorities for everyone at Gard”
“I believe we are now living on the edge of a revolution, which for the maritime industry can be compared to when we went from sailboats made of wood to steamboats made of steel.”

Olav Akselsen, Director of the Norwegian Maritime Authority
Self-driving cars & trucks
Google’s Waymo vs. Uber

Rolls-Royce joins forces with Google Cloud to help make autonomous ships a reality

Tuesday, 3 October 2017

Rolls-Royce has signed a deal with Google to develop further its intelligent awareness systems which are making existing vessels safer and are essential to making autonomous ships a reality.
Norway first to announce
Dedicated test areas for autonomous ships

- Trondheim
- Storfjorden
- Horten & Grenland - vessel traffic service (VTS)
  + Yara Birkeland
"The undersigned sailing shipowners believe that one should, like the steamship owners, through co-operation protect ourselves against the same risks and liabilities...."

-- the invitation to join Gard in 1907

"Accidents will happen, but the identification of risks, and the possible ways to reduce and prevent them, are key priorities for everyone at Gard."

How Gard became actively involved
with autonomous ships

Gard invited by the Norwegian Minister for Transport to lead the support of the new Norwegian forum initiative, due to our long experience of handling risks.

INAS / International Network for Autonomous Ships
Other national initiatives
Organisations and projects

UK: Maritime Autonomous Systems Regulatory Working Group (UK)

Finland: One Sea - Innovation Ecosystem for autonomous ships in the Baltic

Denmark: Danish Technological University (DTU) and the Danish Maritime Authority

China: Unmanned Cargo Ship Development Alliance was established in June 2017

Japan: Japan’s shipbuilders and maritime shippers are teaming up to make self-navigating ships a reality by 2025.

Korea: Established a Autonomous and Unmanned Ship Forum (KAUS) that is collaborating with Norway and International forum. www.autonomous-ship.net

Comite Maritime International (CIM) non-governmental not-for-profit international organization works with maritime law and has a working group on "Maritime Law for Unmanned Craft".

In addition there are other research projects completed and underway
Insurance industry must collaborate

Framework for autonomous ships

- Vital that insurance companies collaborate with the industry and regulators on crewless ships
- Look to other industries that are being disrupted by automation

‘captain’ sitting at a remote desk in Manila or ‘engineer’ in his recliner at home legally part of ‘ships crew’?
Maritime accidents
Leading causation

Technology is driving safety improvements and can bring huge benefits; however overreliance is a concern.
Initial motivation
The limited abilities of human beings

75-96% of maritime accidents and causalities are affected by some types of **human errors**

56% of major maritime collisions include violations of the collision regulations.

**Human beings sometimes:**
- panic
- make mistakes
- act careless
- forget
- do not notice
- become emotional
- hurry
- make assumptions

We have good statistics on human factors contributing to accidents, *but not on accidents prevented by human presence*
Further motivations
Reduce cost and smart shipping

The exponentially developing nature of autonomous ships makes regulatory preparedness an ever more pressing concern.
What is an autonomous ship

Definition

Unmanned ship = ship capable of **controlled movement** on the water without seafarers onboard

- **Remote control**
  - Human in the loop
  - Computer screens and joysticks for control

- **Autonomously control**
  - Human not in the loop
  - Pre-programmed algorithms for control

Autonomous ship is a control method between these two modes of operation
Remote control
1898 – Nikola Tesla presented a drone before its time

Tesla: "You do not see there a wireless torpedo; you see there the first of a race of robots, mechanical men which will do the laborious work of the human race."
Navy drones
Designed for target, patrol, surveillance, mine detection and fleet screening
Singapore - unmanned surface vessel
22 says in the South China Sea
Surveying and environmental monitoring
Even for launching flying drones and autonomous underwater vehicles
Remote control test – spring 2017

The tug was built in in 2016 and is equipped with dynamic positioning system, which is the key link to the remote controlled system.
The platform supply vessel successfully remotely controlled from Wärtsilä's office in San Diego.

Testing was carried out using standard satellite communication.
Remote-controlled containership
Japan to North America by 2019

- **Nippon Yusen Kaisha (NYK),** Furuno Electric, Japan Radio and Tokyo Keiki, to explore autonomous shipping
- **To cross the Pacific Ocean in 2019**
- The ship will have a standby crew, for safety reasons.
- The plan comes after the fatal collision of US warship John McCain with a merchant tanker off Singapore.
Future of dry bulk shipping
BHP Billiton throwing its weight behind autonomous ships

• BHP Billiton among the largest dry bulk charters in the world

• Already use driverless trains, trucks and drones at its mines in Australia
  • reducing overhead
  • removing humans from hazardous environment

• Implementing new data analytics
  • benchmarking performance
  • facilitate cost-effective chartering decisions

Most of all improve safety standards

"Safe and efficient autonomous vessels carrying BHP cargo, powered by BHP gas, is our vision for the future of dry bulk shipping."

Vice President of Freight, Rashpal Bhatti
Yara Birkeland
The first autonomous containership with zero emission
Management of maritime casualties

Reduce the impact of large claims

Promote industry initiatives
- Relationships with authorities
- International Group information sharing

Offer the right risk transfer solutions
- Insurance products
- Claims service
- Loss prevention

Results
- Reducing consequences for society
- Reducing insurance cost for shipowners

Reducing consequences for society
Reducing insurance cost for shipowners
How will autonomous ships be regulated?

**Public**

- Already a large amount of material on regulatory matters in the public domain
- E.g. IMO, Class, Flag & Costal Administrations
- GAP analysis undertaken by various parties and academic institutions

**Private**

- Much less thought has been given to how business systems in the private domain might be affected
- Who will employ and be responsible for the people who remotely operate or programme autonomous or semi-autonomous ships
- What kind of contractual arrangements will they make?
Mass will be developed in phased manner with new and advancing technologies.

Such as:
- Remote control from shore
- Partial automation (auto berthing, etc.)
- Partial autonomy (collision avoidance, etc.)

and more...

Ref: Japan Ship Technology Research Association

Japan's perspective on regulatory scoping exercise for the use of MASS - MSC 99/5/9, 13 March 2018
How can Gard help?

- Follow the developments in all maritime industries
- Participate in industry discussions
- Cooperate with regulatory and academic bodies/studies
- Advise Members and clients on contracts and risk solutions
Future employment
The seafarer needs to be engaged
감사합니다

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