## CONFEDERATON OF EUROPEAN SHIPMASTERS' ASSOCIATIONS



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## REPORT OF THE SEMINAR HOLD BEFORE 27<sup>TH</sup> AGA ON 6<sup>TH</sup> MAY 2022, AT THE NH COLLECTION HOTEL IN GENOA, ITALY

The day of AGA commenced with a seminar opened in the morning by Capt. Claudio TOMEI, President of USCLAC. He welcomed and thanked all speakers and assistance for their coming, being sure that the two parts will be very useful for all captains.

Then Capt. Dimitar DIMITROV, President of CESMA, addressed also some words, mentioned the most important problems of captains in these challenging times we are living. The pandemic and now the war in Ukraine changed our world entirely. Travel restrictions and dangerous situation in the Black Sea and Eastern Europe are affecting the world safety and security and world economy. Our maritime world bore the worst circumstances of the pandemic as the seafarers should travel to join their working place and back to their homes. Delays in contracts created fatigue and worsen social atmosphere on board the ships. Together with the increasing administrative burden on shipmasters all above mentioned made life of seafarers and especially captains more stressed and busy. The war in Ukraine additionally complicated maritime transport. As Ukraine is one of the biggest labor supplying countries in the world many Ukrainian seafarers were forced to stay on board the ships more than usual as they could not return home. Thanks to the international institutions and manning companies, many families of seafarers had been evacuated from the war area and now they are in exile all over Europe. Capt. DIMITROV also pointed out the problems in the shipping world like digitalization, cyber security, decarbonization and automation which will be discussed during the first part of this seminar.

Then there were some welcome words from Mr. Marco BUCCI, Mayor of Genoa, Mr. Paolo Emilio SIGNORINI, President of Port Authority System of Ports of Genoa, Mr. Sergio LIARDO, Coast Guard – Liguria Maritime Director.

At first, Mrs. Paola STRATA, representing Mr. Eugenio MASSOLO, President of the Italian Shipping Academy based at Genoa, made a presentation titled "The Academy's role and its offer for students". The Italian Shipping Academy was established in 2005, then became an ITS public foundation, recognized by Italian Ministry of Education and Italian Ministry of Transports in 2010. It, of course, provides educational and training services in full compliance with ISO 9001 and STCW 2010. The Academy is also seat of one of the three IMO's education and training agency (International Maritime Safety Security and Environment Academy – IMSSEA) which represents a reference body worldwide for maritime education and training.

## Seminar 1<sup>st</sup> part "Unmanned vessels: master ashore? The masters' responsibility"

First speaker Mr. Michele MARTELLI from University of Genoa spoke about the current research on autonomous vessels. After some definitions on MASS, he spoke on the ShIL (Ship-In-the-Loop) Research Infrastructure. ShIL is a project started in 2020 developed by some departments of the University of Genoa and cofounded by Regione Liguria. It is a co-simulation environment in which ship board micro grid, port, cyber range and ship dynamic behavior and autonomous capabilities can be driven simultaneously. Steps are Ship simulator, Remote Control Stations, Model Scale Ships and Sensors. He gave examples on dynamic position and auto berthing (low speed motion control), target tracking and collision avoidance (high speed motion control). Areas for test of autonomous ships: Great Lakes and Fjords.

Second speaker was Mr. Andrea LEBOFFE, RINA, on regulatory framework, master role and responsibility. Operation from shore: one e-shipmaster to command several vessels. It should be defined the minimum standard for shore based personnel. Future is 2025 for coastal autonomous ships and 2035 for ocean going MASS. The benefits of MASS: reduced operational costs (no or very limited crew on board, fleet optimization, less maintenance cost), smaller ships, self-diagnostic and remote support, on-board energy optimization (maintenance and green vessels).

There are international rules (IMO Circulars), national and jurisdictional rules (flag and port authorities' circulars) and technical rules (class requirements). Then he came back on the Circular MSC.1/1638 dated 3<sup>rd</sup> June 2021. For MASS 1 & 2, master on board is still responsible. For MASS 3 the role and responsibility of master are to be changed / amended. For MASS 4, the role and responsibility of master are to be defined. The role of master is moving from sea (ship operation by master decision making, eventually supported by shore management) to shore (ship operation by shore-based decision making). The challenges are to define a juridical status of autonomous ship, to develop training and qualification standards and to identify the technological issues and hazards (approved general arrangements, emergency scenarios, cyber security, safe operation in sheltered areas and interaction with other units and shore facilities).

Then Mr. Leendert BAL, Head of safety, security and surveillance department of EMSA came to the floor for "Recent discussion in IMO on unmanned vessels and EMSAs involvement in MASS". He came back on the outcome approved by MSC 103 and the four degrees of autonomy. About EMSA's activities on MASS, he mentioned the SAFEMASS study which was a study of risks and regulatory issues of specific cases of MASS, which can be downloaded at EMSA's website. EMSA is currently also working on appropriate digital services, on the necessary competencies for seafarers on remote control centres, cybersecurity issues and obviously regulatory issues. He focused on the Risk Based Assessment Tool (RBAT) study. RBAT is conducted by DNV and its objective is to create a tool, meaning a software tool able to assess risk whether introduction of increased or new way of automation is at least as safe as conventional shipping. There are three parts for this study: to develop the framework for the tool (till mid 2021), to develop the first version of the tool with limited functionality (mid 2021 till mid 2022), and to develop the complete version of the tool (for mid 2023). The second part of the study is to test the tool on specific use cases and functions for some vessels (see figure below).

	Short Sea Cargo	Small passenger ferry	Ropax ferry
Length	80 m	15 m	120 m
RCC	<ul> <li>Vessel Operator</li> <li>Chief Engineer</li> </ul>	- Vessel Operator	Vessel Operator
Vessel Manning	Unmanned	Unmanned (with passengers)	Reduced Manning - Bridge crew - Deck crew
Fleet size	3 sister vessels	10 sister vessels	5 sister vessels
Area of operation	Enclosed and open waters	Enclosed/sheltered waters	Short route in narrow waters (fjord)
Concept-function combination #1	Arrival in port – perform harbour manoeuvring	Transit to location – navigate through sheltered waters in high traffic	Arrival in port - perform docking
Concept-function combination #2	Transit to location – perform collision and grounding avoidance	Transit to location - perform collision and grounding avoidance	Activities in port – maintain position & charge
Concept-function combination #3	Activities in port – perform loading & unloading	Transit to location – maintain communication	Depart from port – Embark/disembark, operate ramp and manoeuvre
Concept-function combination #4	Transit to location – handle loss of communication link	Emergency response in transit – perform evacuation	Transit to location – handle blackout

His conclusion was to not go too fast, and step by step as a lot of conventions would be affected.

The last speaker of this 1<sup>st</sup> part of the seminar was Mr. Giacomo GAVARONE, Confederazione Italiana Armatori, on "the role of human factor" for unmanned vessels. He spoke about the case of the Maju 510, an autonomous tug in Singapore. This tug was the first vessel of the world to received Autonomous and Remote-Control Navigation Notations from ABB, also the first Singapore-flagged vessel to receive the Smart (Autonomous) Notation from MPA, and the first tug in South Asia that can be operated by joystick control. It is a retrofitted tug with the installation of autonomous sensor suite, the cabin room being transformed to an autonomous control room and of course a bridge with remote and autonomous control (see picture below).



Some questions arose at the end of this 1<sup>st</sup> part of the seminar.

First was "who make fast the tug?"

Then the communications between the cargo vessel and the tug was direct communications, with of course the possibility of misunderstanding of communications. With this solution, communications are multiplied by two, one by voice from the cargo vessel to the shore control room, then electronically from shore control room to the autonomous tug. Are two ways of communications creating less misunderstandings or errors than only one?

Also the question is the responsibility in case of incident. Master of the cargo vessel? Shore control room operator?

## Seminar 2<sup>nd</sup> part "LNG powered ships, what future and safety?"

First speaker was Mr. Stefano MASSINA, President Assarmatori for "The LNG solution: from transition tool to strategic fuel". Looking to the future, the time lines for expected availability of alternative fuel technologies are at best for 2030 for onboard use. Already ships in operation using LNG, methanol or battery represent 0.50% of the world fleet, but ships on order represent already 11.84% with Ammonia, Hydrogen and LPG added to LNG, methanol and battery. Solutions are electrification of ships in short sea shipping and biofuel for ocean ships.



Second speaker, Mr. Alberto BOTTAREL, from Coast Guard, Genoa Harbour Master Office, presented "The use of LNG as a fuel on board – The international rules in force". For LNG fuel, the ship has to comply with IGC Code, and basic and advanced qualification courses for crew in operation as per STCW Convention. The advanced training contains at least one month of seagoing service (with a minimum of three bunkering operations) on board ships subject to the IGF Code. The certificate of qualification / proficiency is valid for five years and can be renewed after appropriate refresher training or the evidence of having achieved the required stander of competence within the previous five years.

The third speaker was Capt. Massimo GARBARINO, shipmaster in Costa, having being in command of Aida Prima. He followed a specific training before to use LNG as fuel for ship generator. The first bunkering operation took 10 hours of which only 2.5 hours of pumping. The rest of the time was dedicated to tests of equipments and safety and administration documents filling in. He noted also that operations passing, the pumping time percentage in a complete fuel operation was decreasing, due to crew being more trained and ready for such operations.

Then was Mr. Giampiero De CUBELLIS, Wartsila, "From LNG ships to future fuels and autonomous ships". Transition to green fuels will be slow yet relentless. 2050 is a single vessel's lifespan away – customers need to invest in fuel flexibility to avoid risk of stranded assets. Fuel conversions will play a vital role in the fuel transition for both existing and new vessels built during this and next decade.



Move from a single-fuel industry to a multi-fuel one:

About the fuels of the future, it is important to stress that one is talking about Green Fuels. Green meaning they are synthetically made, based on hydrogen, and are produced by using renewable energy.

Green Hydrogen: not referring to hydrogen produced from methane as this would only increase GHG emissions. It is an essential element in most synthetic fuels. In short-sea shipping with strict emissions legislation and frequent bunker opportunities it can offer offset low energy density.

Green Ammonia: due to its relatively low energy density by volume, it will be most suitable to vessels that don't have space limitations. Toxicity may be a challenge for passenger vessels. It will be one of the main fuels that we will see in the future. Technologies for vessels that are capable of using Ammonia already exist.

Green Methanol: is also of interest for the future, mainly due to the ease-of-storage on board. It doesn't have any specific requirements, doesn't need to be stored at low temperatures or under pressure. But fuel prices may be higher due to higher production energy requirements.

Last speaker for this 2<sup>nd</sup> part of the seminar was Mr. Massimo FIGARI, University of Genoa for "Regulations and human factor". At University of Genoa, it is delivered STCW courses on Maritime Sciences and Technology. Courses are in English during 5 semesters lectures plus 1 semester training onboard, with professional support from Carnival Maritime and CNPC, on basic and advanced LNG training, with a LNG process simulator (see below). Technical challenges as well as human factors are considered in these courses.



Of course this second part of the seminar was ended with some questions. Human factors and the habits which could eventually lower the safety of operations. Also this part was focused on LNG, but there are also other new fuels such as wind and battery.

Captain Hubert Ardillon Secretary General