

## **HOW COULD WE TEACH CASUALTY MANAGEMENT FOR MASTERS IN MODERN SIMULATOR ENVIRONMENT? – COMBINING THE LEGAL ISSUES WITH PRACTICAL SKILLS**

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**Abstract** Simulation of the catastrophes is not the core task of the simulation environments - But avoiding them is. Therefore the simulation environment, although they are highly developed, are not yet fully ready for practicing how the casualties are taken care of. STCW has diminished the Curriculums in Maritime Universities in a way that many topics previously taught to students are now neglected. The simulator manufacturers should become interested in development of also casualty simulation in their simulators. General average situations could be taught to master through simulations if the Maritime Universities would work together with the simulations developers. The time has come to modernize the teaching in this respect. The teaching of the casualty management in general average situations like vetting the cargo, casting containers, stranding the vessel etc. is a topic, which could be combined with a modern simulator environment, if there would be interest from the manufacturer's side to hear the wishes of the training institutions. The law of general average is a legal principle of maritime law according to which all parties in a sea venture proportionally share any losses resulting from a voluntary sacrifice of part of the ship or cargo to save the whole in an emergency - For instance, when the crew throws some cargo overboard to lighten the ship in a storm. This, for example, could be simulated and practiced in the simulator environment. The next generation simulation environments for casualty management should also be generated to make it possible to train masters and crew to act according to planned scenarios. When the STCW convention does not mention it specifically, teaching GA rules has been neglected by many Maritime Universities in last decades. Bringing it back to curriculums as a practical skill of a master and crew is possible through developing the simulator environment, which makes the skills practicable instead of just theory. The article presents some ideas how this could be achieved.

**Keywords:** Casualty management, Maritime accident, Simulator teaching, Technical development

## **Introduction**

Simulation of the catastrophes is not the core task of the simulation environments - But avoiding them is. Therefore the simulation environment, although they are highly developed, are not yet fully ready for practicing how the casualties are taken care of. STCW has diminished the Curriculums in Maritime Universities in a way that many topics previously taught to students are now neglected. This issue was taken up in IAMU conference 2016 in Haiphong. This article initiated from these discussion in the conference.

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The law of general average is a legal principle of maritime law according to which all parties in a sea venture proportionally share any losses resulting from a voluntary sacrifice of part of the ship or cargo to save the whole in an emergency. The New York - Antwerp Rules on General Average (later YAR Rules), which have now been accepted by the both sides of the industry (both the ship owners and Marine Insurers organizations worldwide) have a tendency to last over three decades before a new edition is needed. Therefore, the simulator manufacturers could now be interested in development of also casualty simulation in their simulators when the YAR Rules 2016 are going to form the standard in the industry for the next decades.

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In the accidents the vessels face at sea, crew members often have precious little time in which to determine precisely whose cargo they are jettisoning. While general average traces its origins in ancient maritime law still it remains part of the Admiralty law and Law of Marine Insurance and Average in shipping community.

### **Casualty management teaching before, now and tomorrow**

The before the STWC code and its implementation, YAR was taught to students worldwide. When the STCW convention does not mention it specifically, teaching GA rules has been neglected by many Universities in last decades.

Bringing it back to curriculums as a practical skill of a master and crew is possible through developing the simulator environment, which makes the skills practicable instead of just theory.

The research plan initiated at the Satakunta University of Applied Sciences is to built up a system how the Rules could be trained by the Masters, who need to implement the Rules in practice. This combines the law and practice and makes it in e-learning environment, which makes delivery of the skills possible by experts worldwide. When the Masters make the decisions worth tens or even hundreds of millions often in minutes without a possibility to ask questions from anyone in the shipping company management or insurance company, it would be fair if they would be able to practice before they make them.

The Master Mariner education still does not make use of all technology, which is available today. The simulator environment can be easily adjusted to casualty management practices if the simulator developers are financially encouraged to this work. It is up to the Maritime Universities to encourage them and lead the way by being creative and co-operative in their research and development work.

There is no scientific research available how the general average is taught at maritime Universities globally. Therefore, we need to base our information on co-operation and discussions with our member Universities in IAMU. Discussions in Haiphong 2016 revealed that the older teachers still remembered the time when this topic was lectured actively. As a general outcome from these discussions, it was found out that the topic has been more or less abandoned in the 1980's after the STCW convention came into force. Earlier generation of teachers often had practical experiences of general average situations themselves and they could use them as examples. Nowadays the situations are less common, but their financial value has been increasing. At the same time need for speed in Masters Actions has increased.

### **Simulating the casualty management**

Casualty management according to STCW includes action's in a collision or grounding. Evaluation of damages, safety of crew and passengers in these situations are basic features that need to be covered in the studies. Stability calculations are also relevant part of the casualty management. Now the physical simulation environments are not realistic enough for simulating effects of groundings or collisions as the simulators have not been planned for the purpose. Listing of the vessel, changes in ballast water tanks or cargo holds and their effects on stability of the vessel and vessels behavior in these situations are not considered even in latest simulator models. It is evident that this kind of changes would be useful even in normal navigation simulations. Especially in Northern winter conditions, it would be useful on more realistic if for example the effects of icing could be taken into account when simulating the stability of the vessel.

When evaluating different simulator environments, it was found out that oil- and chemical spills can already be simulated at certain level in some environments. It differs from manufacturer to manufacturer how realistic the spills and their effects are. Simulations for liquid cargoes are better than bulk cargoes or containers as they already can take into account stability of the vessel. Engine simulators are already more developed in taking into account casualty management and engine failures.

### **Examples of General average situations, which could be taught through simulation**

Most common general average situations, like vetting the cargo, casting containers, stranding or scuttling the vessel etc. are topics, which could be combined with a modern simulator environment, made part of the studies and combined with teaching the legal and other topics.

Rule III – Extinguishing Fire on Shipboard in YAR 2016 states the following:

*“Damage done to a ship and cargo, or either of them, by water or otherwise, including damage by beaching or scuttling a burning ship, in extinguishing a fire on board the ship, shall be allowed as general average; except that no allowance shall be made for damage by smoke however caused or by heat of the fire.”* (International)

Today one of the most common GA situations is related to container vessels and fire on board (Harvey, 2010). We have a large amount of cases where fire breaks out in one container and very often that is not the container on top of the others but one below. Sometimes the reason is that the containers with flammable materials (like packed HNS) has been placed too near the sources of heating boilers etc. Vetting all the cargo above is a costly and dangerous

procedure, which could be simulated. Simulations could also be connected to the outcome of the legal and financial outcome as well as how the simulated process affects the stability of the vessel in order to control that the vessel does not become actual or constructive total loss. Simulations like this could be connected not just in GA situation itself but if they are built on a knowledge from actual investigation and outcome of legal case law, this kind of practice could be connected to teaching the liability issues which need to be lectured also according to STCW.

In many Maritime Universities this part of STCW is taught purely based on lecturing which does not interest students very much and the outcome is sometimes poor as the topic is not made interesting enough for the students. Some Universities use case based studies or/and group work where the students learn by doing as they have to apply the rules themselves in a given casualty with practical facts. Needless to say that this works much better than just lecturing the rules.

But we could do things better. Winston Churchill said 1940 in his speech in House of Commons: “Give us the tools – And we will finish the job”. Every maritime University has a simulator, but the simulators are not yet planned for the casualty management practices, which could be combined to teaching the handling of a casualty and its consequences. Therefore, we need to address our message to the manufacturers who develop the simulators: “Give us the tools – And we will make such exercises that the casualty management and legal/liability issues can be envisaged and visualized to the future master mariners. This generation needs action and is used to learning by doing already at high school level. They are used to play in virtual environments and learning this way, is far more interesting and concrete for them than any other way of learning.

We need to think what the students are familiar with when they acquire the skills we need to teach them. The example above is quite simple and would not need much from a data development team. But let us take a further step and think about the next issue in the Rule 3 of YAR 2016: Beaching the vessel which would otherwise become a total loss together with its Cargo if not stranded.

This exercise is the most common GA situation in narrow fairways through archipelago with rocky waters, like in Finland. Typical example is that a RORO vessel is some ten meters from its course and runs on a rock, which opens a long hole in the hull. The Master makes a general average act and runs the vessel aground and beaches the vessel on a nearby island where it stays standing only partly filled with water. Simulation needed for the following GA actions would be like a game where different player could participate. First of all we would need a

salvor who arrives with his tug and barges which are needed for lightening the vessel. Generally, there must be some temporary repairs in order to refloat the vessel after the cargo, or part of it has been transshipped with the barges. After the temporary repairs, the refloating can be simulated. The tug and vessel could be combined in the same simulation – even from distance. The other vessel could be operated fully from another simulator “bridge” and they could play the same simulation. After this the towage to repair yard could be simulated. All these actions are necessities and rewarded as general average sacrifices according to following Rules and can be combined in one simulation practice. First YAR 2016 Rule V – Voluntary Stranding:

*“When a ship is intentionally run on shore for the common safety, whether or not she might have been driven on shore, the consequent loss or damage to the property involved in the common maritime adventure shall be allowed in general average.”* (International)

And YAR 2016 Rule VI – Salvage Remuneration:

*(a) Expenditure incurred by the parties to the common maritime adventure in the nature of salvage, whether under contract or otherwise, shall be allowed in general average provided that the salvage operations were carried out for the purpose of preserving from peril the property involved in the common maritime adventure and subject to the provisions of paragraphs (b), (c) and (d)*

And YAR 2016 Rule VIII – Expenses Lightening a Ship when Ashore, and Consequent Damage:

*“When a ship is ashore and cargo and ship’s fuel and stores or any of them are discharged as a general average act, the extra cost of lightening, lighter hire and reshipping (if incurred), and any loss or damage to the property involved in the common maritime adventure in consequence thereof, shall be allowed as general average.”* (International)

And YAR 2016 Rule XIV – Temporary Repairs

*“(a) Where temporary repairs are effected to a ship at a port of loading, call or refuge, for the common safety, or of damage caused by general average sacrifice, the cost of such repairs shall be allowed as general average.*

*(b) Where temporary repairs of accidental damage are effected in order to enable the common maritime adventure to be completed, the cost of such repairs shall be allowed as general average without regard to the saving, if any, to other interests, but only up to the*

*saving in expense which would have been incurred and allowed in general average if such repairs had not been effected there.” (International)*

And YAR 2016 Rule XII – Damage to Cargo in Discharging, etc.

*“Damage to or loss of cargo, fuel or stores sustained in consequence of their handling, discharging, storing, reloading and stowing shall be allowed as general average, when and only when the cost of those measures respectively is allowed as general average.”*

Examples above only visualize some of the most common casualty situations, which could be connected to simulations and teaching casualty management as well as General average and ship-owners liability issues mentioned in STCW. There’s many more some of them, which are fairly simple and some more complex to realize. One very common rule, which still needs to be mentioned, is the YAR 2016 Rule VII – Damage to Machinery and Boilers:

*“Damage caused to any machinery and boilers of a ship which is ashore and in a position of peril, in endeavouring to refloat, shall be allowed in general average when shown to have arisen from an actual intention to float the ship for the common safety at the risk of such damage; but where a ship is afloat no loss or damage caused by working the propelling machinery and boilers shall in any circumstances be allowed as general average.”*

This is a rule, which could be connected to both machinery simulations as well as bridge simulations at the same time.

The other common and quite simple one is YAR 2016 Rule I – Jettison of Cargo:

*“No jettison of cargo shall be allowed as general average, unless such cargo is carried in accordance with the recognized custom of the trade.”*

This is a rule, which is a traditional rule first expressed in the Rhodian law about 900 BC but is nowadays the most commonly used GA rule in relation to containers release to sea, when the vessels stability is endangered and made to avoid listing and total loss of vessel and cargo. (Reeder, 2013)

### **How to make it economically feasible for training institutions?**

The simulation environment is heavy investment for Maritime Universities and other training institutions. Investments to the environment should therefore be used effectively. Casualty response teaching would also be beneficial for maritime authorities, classification societies, casualty investigation authorities, insurance companies, Maritime courts etc. that could be served by training institutions and their facilities. Financing the investment through income

from these sources could help Maritime Universities in this development work. Simulations have already been used by some of these institutions in order to evaluate the actions, which have led to the casualty. The next generation simulation environments for casualty management should also be generated to make it possible to train masters and crew to act according to planned scenarios.

## **Conclusions**

When the STCW convention does not mention it specifically, teaching GA rules has been neglected by many Maritime Universities in last decades. Bringing it back to curriculums as a practical skill of a master and crew is possible through developing the simulator environment, which makes the skills practicable instead of just theory. The Maritime Universities should together take steps to make the studies more interesting and lucrative for the students. Young people need to be familiarized with the environment where they will work. They need to be taught the skills they will need in a realistic environment when the possibilities for realistic practice at sea is not any more certain for everybody. In addition, we need to look at the world where the present and future students are living – Using game like practices should be a way to teach the topics, which might otherwise feel boring or frustrating for the students. In every way possible, we should think how to combine the different topics with each other more effectively and how to make also teaching and learning more fun for our students. As Maritime Universities, we should work on this together.

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