



Challenging the SOLAS fire regulations for container vessels – a conversation with Alf Martin Sandberg

Following the successful conference on containership fires in Arendal in October, in this Insight, Gard's Are Solum talks to Alf Martin Sandberg about the way forward on this important issue.

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Are - Alf Martin, you were one of the prime movers in putting together [the Gard conference on containership fires](#) in October. I think it is worth reiterating the point made by many at the conference - the approach to solving the problem with containership fires requires a holistic approach and contributions from all the various stakeholders. Container lines need to figure out how cargo can be safely booked and accepted. Contents of containers must be verified and booking information must be better communicated between the parties in the logistic chain. Problematic shippers, those that mistakenly or fraudulently mis-declare dangerous cargo, must be stopped. There is work in progress for many container lines and organizations such as the Cargo Incident Notification System (CINS), and we can expect developments going forward.

Your focus Alf Martin begins after the containers are on board. You spoke about the shortcomings to the SOLAS convention when it comes to fire prevention, detection and firefighting aboard today's fleet of containerships. I appreciate the opportunity to catch up with you again to discuss more about your presentation to the conference. Let's start with where we are today and then discuss what could be done to amend the SOLAS regulations.

Alf Martin – I agree that solving the problem requires a holistic approach, but my starting point is that no matter how carefully cargo is booked, there will still be fires originating in containers. We have to remember that when the largest containerships had a capacity of 5,000 TEU, it took only one container with a problem cargo to start a fire. That is still the same today, a fire onboard a larger vessel will still start in one container. Onboard today's largest vessels of 22,000 TEU there is more than 4 times the risk of having that one problem container onboard and the consequences of a fire is also more than 4 times as great.

Moving to the current SOLAS regime. For fire safety SOLAS divides the regulations in two groups: passenger ships and cargo ships. For cargo ships there are the basic regulations and some special ones for oil tankers, gas tankers, chemical ships and RoRo ships. For cargo ships including container vessels, firefighting requires that jets from two fire hoses have to reach any part of the ship, but there is no regulation demanding that they reach all the cargo. In modern large container vessels, the cargo on deck now rises almost 30 meters above deck level, and there is no efficient firefighting means at such heights.

Long awaited, IMO introduced some special additional requirements concerning firefighting equipment in large containerships. SOLAS now requires containerships built after 1 January 2016 to have:

- At least one water mist lance capable of penetrating a container wall.
- If 5 or more tiers of containers are carried on or above weather deck, ships with a breadth up to 30 meters are to have at least two mobile water monitors, and for vessels with a breadth exceeding 30 meters there are to be at least four.

Above I am showing the Conference audience the equipment, which in my view is not fit for purpose. The pointed hammer normally equipped with the lance, for penetrating the container, has a heavy head and a short handle. It is very unbalanced. It is possible to knock a hole in a container door with this equipment, but the hole is not large enough for the lance to penetrate. It may be necessary for one man to hold the pointed hammer, while another is using a sledgehammer to hit it. In this case two men are exposed to a possible explosion of a burning container. We have also seen battery powered drills being provided with the lance, poorly charged. We have seen saw bits being used, of poor quality and being damaged before a hole is drilled through the container skin.

The portable monitors (23 kg) will have to be carried by a crewmember in a firefighting suit, smoke mask and breathing apparatus. He may have to climb ladders three lashing bridges high. Hopefully he is fit! In sum, the additional portable equipment has proven to be insufficient and it has not reduced the fire risk onboard large containerships.

Are – Let's move below deck and begin with your comments about the current state of fire detection.

Alf Martin - Most containerships are using a smoke detection system where air is continuously sucked through pipes to a detector. If smoke reaches the detector, an alarm will sound. The pipes used are the same as for CO2 release. A problem of this system in a containership is that it may take some time before smoke reaches the suction points, being the CO2 nozzles. As the hatch covers are not tight, there may be a draught to open air. From the CO2 nozzles, the smoke will have to pass pipes 300-400 meters in length on a large containership with a fire in hold no 1. When the extracted smoke creates an alarm, considerable time has passed, and the hold may now be full of smoke and possibly an open fire. Should the captain now send crewmembers into the cargo hold for checking and firefighting? We need faster alarms, alarms that should be linked to a rise in temperature in a specific container.

Are - We know that fires often originate inside of a container with a spontaneous rise in temperature due to chemical or biological reaction in certain cargos. So, it would make sense to take advantage of modern cellular container stowage where bay, row and tier are part of a stowage plan and try to identify where a temperature is rising dangerously.

Alf Martin – That's right. A known location would identify the container and its contents including the neighboring containers at risk. Advanced technology could combine fire detection, localization and immediate risk assessment to enable an appropriate response.

Are – You mentioned in your Conference presentation that the SOLAS regulations are based on the traditional general dry cargo vessels where cargo is carried below deck and protected by weather tight hatch covers. Fires below deck in cargo spaces and the engine room of general cargo ships are controlled by release of CO2. What are the challenges for fighting fire with CO2 below deck in containerships?

Alf Martin - Hatch covers of large containerships are basically used to create a new platform for container stacks. They are not watertight or airtight. CO2 has proven its worth in engine room fires, where the fire is likely to be an oil fire in an open space to which all air inlets can be closed. CO2 is much less efficient for cargo holds of containerships and will in major cases not extinguish the fire. This has been experienced in several cases and is also confirmed by salvors.

We question the efficiency of CO2 when there are gaps between hatch covers and between hatch covers and hatch coaming and the gas is released from the top of the cargo hold. CO2 is heavier than air, but what happens if there is already a full fire down below and hot air and smoke is rising? Will the CO2 be blown out through the hatch cover openings instead of reaching the object on fire? Also, CO2 is not likely to penetrate a container on fire or any other container. Those containers will contain oxygen, supporting the fire within the container. We know of tests carried out when releasing CO2 to engine rooms, but not of tests carried out in container cargo holds

Are - You made a point in your talk about protecting the engine room. What are the current shortcomings?

Alf Martin - If you lose the engine room in a fire you lose generators, fire pumps and the control room, - and the battle is lost. The engine room should therefore be protected from a fire in the adjoining cargo holds by insulated bulkheads. Also, heat from the engine room should not be allowed to spread to the adjoining cargo holds, which could contain cargo sensitive to heat. Currently, only the decks of engine rooms of purpose-built containerships are required to be insulated, not the bulkheads, and dangerous goods can be placed right up to the bulkhead. (Except Class 1.1-1.6 explosives which have to be stowed three meters away from the bulkhead.). My view is that we need to insulate also the bulkheads of the engine room.

Are - Alf Martin, you and many others at the Conference had much to say about protecting the lives of seafarers and we should start by noting that while the size of containerships has grown,

the required crew complement has not.

Alf Martin - For professional firemen firefighting is their job. They are educated, trained and well equipped. Firemen need to be physically fit, have proper protective gear and have knowledge of how to handle fires in different materials. Professional firemen are tested regularly for mental and physical fitness. Crew members are not firefighters, although the SOLAS regulations have clear expectations.

For most crew members a serious fire is a once in a lifetime experience. Crewmembers have no specific training in handling a container fire. They are not necessarily physically and mentally fit for the task. It is extremely difficult to work in a fire with protective gear and breathing apparatus. Crew members have no support from a chemist and from rescue personnel. There is a limited amount of compressed air available for the breathing apparatuses of the crew, unless they have a well working compressor on board.

There may be an explosion any time during a fire in a container. Containers in the vicinity may also explode if containing cargo affected by the heat of a fire. Young people, eager to prove their worth, may try too hard. The crewmembers are in danger when in the vicinity of a burning container.

Procedures for how to handle a fire in a cargo hold normally start with an alarm and by alerting the Master. Written procedures are seen to require that crewmembers are to investigate, in other words, to enter the cargo hold. The hold is probably full of smoke. They cannot see much. If they must enter by a hatch on deck, it is difficult. It is easier if they can enter from an underdeck passageway, but the passageway will fill with smoke once the door to the cargo hold is opened. It is very heavy work to move around in a fireman suit with a breathing apparatus. The safety line is only 30 meters long. If crew members are to enter a cargo hold to investigate, they need to get an alarm before the hold is full of smoke. That is not the situation today.

In major fires the crew often have to evacuate to save their lives. The way large containerships are constructed today, the accommodation, lifeboats and rafts are in close vicinity to containers. Are crew quarters and lifesaving craft in a safe, protected position if there is a full fire in the closest bay of containers?

Are – the objectives of the SOLAS fire safety are to:

1. prevent fire and explosion;
2. reduce the risk to life caused by fire;
3. reduce the risk of damage by fire to ship, cargo and environment;
4. contain, control and suppress fire and explosion in the compartment of origin;
5. provide adequate and readily accessible means of escape.

Your view and the view of many others attending the Conference was that these objectives are not met. What are your suggestions for improvement?

Alf Martin - The Conference was meant to gather experts and stakeholders to share knowledge and to move together toward solutions. My suggestions included:

- There is a need for much faster alarms from a cargo hold on fire. An alarm system reacting to a rise in temperature in a given container is preferable.
- Have water monitors permanently installed on lashing bridges.
- Build higher lashing bridges on deck or install “masts” to improve the reach of fire monitors.

- Protect hatch covers by water to stop a fire going through.
- Install water sprinkler systems in all cargo holds, not just in holds for dangerous cargoes.
- Arrange for water curtains to protect superstructure and lifesaving craft.
- Insulate all boundaries of the engine room in purpose- built container vessels, not just the decks.

Are – Containership fires occur with alarming frequency. We agree that the SOLAS regulations have not kept pace with the realities of the risks faced, and there is an urgent need for review and revision. Severe containership fires threatening the lives of the crew and risking damage to the environment also cost the maritime industry substantial sums in losses or damage to the vessel and equipment, and cargo losses. Carriers face a wide range of additional losses and commercial challenges including business interruption and reputational damage.

Thank you, Alf Martin, for your work with us at Gard. The work is ongoing with Gard, IUMI and the International Group of P&I Clubs. We are very happy to see that the matter of reviewing, and possibly changing the SOLAS regulations is now on the agenda at maritime authorities and various industry organizations. The matter should be treated with priority it deserves.