CSSF e.V. input to the IUMI Expert Group on the evaluation of possible improvements of fire protection regulations for containerships.

Preface:

Generally, it should be noted that classification societies are working on notation that seek to address the raised topics, some are referred to here but should not be seen as an exhaustive investigation.

Reference is made to the Risk-Zone Based Dangerous Goods Stowage Concept which is published under the name: Safety Considerations for Ship Operators Related to Risk-Based Stowage of Dangerous Goods on Containerships.

We find it imperative to mention that we are of the firm belief that loss prevention starts with the cargo acceptance procedure and the control measures that are possible to detect mis- and un-declared Dangerous Goods. Stowage of containers based on risk evaluation is an effective supporting measure however it cannot address mentioned mis- and un-declaration issues. Countermeasures to assist in firefighting onboard are supportive and increases the chance of keeping a fire exposed vessel manoeuvrable and stability intact however the thousands of cargo combinations that are possible have clearly showed that there is a considerable risk of reaching self-enhancing fire development despite efforts to extinguish both on and under deck.

Secondly it is of utmost importance that quality control of accepted shipments is considered and controlled systematically, i.e., that packers are educated according to the CTU code, that correct packaging is used, and container stuffed correctly. A know-your-client approach which, when relevant includes a quality assessment or inspection of the production process, ISO certification control etc., would be very relevant as a harmonized industry initiative. It should also be mentioned that the IMO circular on container inspection is being reviewed and aims to make use of CTU guide principles mandatory.

Finally, we strongly advocate and would like to express that a goal-based approach which is in line with IMO practice should be followed, thereby ensuring that desired results are outcome driven and not technology driven.

It should be noted that whilst publicly available detailed cargo information is unavailable for the Express Pearl incident, stowage would have benefitted from the Risk-Zone Based Dangerous Goods Stowage Concept, since commodities that are not effectively extinguished with CO2 have been moved to deck stowage and secondly, since the concept also caters for non-block stowage specific to commodities. Whilst radiant heat of such temperatures as can be interpreted from the publicly available media, can travel downwards if the right receptor is available below deck, the Risk-Zone Based Dangerous Goods Stowage Concept segregation and positioning of Dangerous Goods, could possibly have enabled a more effective on deck firefighting and an effective CO2 underdeck extinguishing since oxidizing commodities are not allowed under deck and block stowage is regulated.

1. What can be done to improve the fire detection in a container cargo under deck?

- Fitting of thermal detectors / temperature (CO_2, humidity) sensors (possibly batteryless and wireless), sample smoke extraction with reduced response time, laser smoke detection with alarms in case of threshold temperature violation.
  (For example DNV Enhanced fire detection notation FCS(FD) requires enhanced smoke and heat detection systems installed in all cargo holds)
- CFD (Computational Fluid Dynamics) testing may support the set-up of sensors/detectors.
- Fitting CCTV systems (thermal/optical imaging) within the cargo area under deck to detect any abnormalities and continuous observation (possibly automated, AI).

2. What can be done to improve the fire detection in a container cargo on deck?

- Fitting of thermal detectors / temperature sensors (possibly batteryless and wireless) for continuous measuring of surface temperature, laser smoke detection
- Fitting CCTV systems (thermal/optical imaging) within the cargo area on deck to detect any abnormalities and continuous observation (possibly automated, AI).
  (For example FCS(FD) requires installation of camera-based on-deck heat (fire) detection system)

3. What can be done to enable a more precise and quick fire localisation?

- Fitting of thermal detectors / temperature sensors (batteryless), laser smoke detection. E.g. scanning entire deck with thermal sensors permanently installed in high-up positions such as funnel, bridgewing, wheelhouse top.
  (For example a notation or solution similar to Enhanced fire detection with container identification FSC (FD+))
- Fitting CCTV systems (thermal/optical imaging) within the cargo area (on and under deck) to detect any abnormalities and continuous observation (possibly automated, AI).
  However fixed installations are prone to damage during discharge and loading of cargo, therefore mobile equipment solutions would seem to be a good possibility
- Minimum number of handheld thermal scanners/cameras as a part of the standard firefighting equipment.
- Risk evaluation based: Equip containers with high risk cargo on the outside e.g. with dataloggers, install systems on board that gather this data and trigger alarms in case of fire.

4. What can be done to compensate the deficiencies of CO_2 with regard to smothering a fire in a container stow under deck?

- Automated operation (closing) of mechanical and natural ventilation
- A risk evaluation based approach such as the Risk-Zone Based Dangerous Goods Stowage Concept where only Dangerous Goods that can effectively be extinguished with existing Fixed Fire Fighting CO_2 solutions, is stowed under deck.
- There are many cargoes that will flare up again once CO_2 begins to dissipate where for only cargoes that can effectively be extinguished permanently should be placed under deck, similarly all oxidizing cargoes should be placed on deck only.
- But also: In addition to CO_2 as a fire-fighting medium, sprinkler system could be fitted inside cargo holds (as hatch covers on container vessels are not airtight, efficiency of CO_2 as an extinguishing agent remains questionable).
- General considerations to hatch coaming effectiveness could be relevant as well as inspection program.

5. What can be done to improve the confinement of a fire in containers under deck to the particular cargo hold?

- Enhanced detection
- Mandatory fire protection and fireproof insulation of electric wires.
- Sprinkler/flooding systems
- A notation or solution similar to DNV Fire-fighting notation FCS(FF) could be considered. The notation requires a permanently installed cooling system to be installed in all cargo holds. The cooling system shall consist of water spray nozzles, fixed supply piping system and remotely operated stop valves. Further defined requirement that the cooling system shall be able to distribute water uniformly on the upper surfaces of all top (under deck) containers and underside surfaces and open supporting structure of the hatch covers.

6. What can be done to improve the confinement of a fire in containers on deck to the particular bay or section thereof?

- Enhanced detection
- Mandatory fitting of remote controlled fixed/semi portable type water monitors / hypermist systems in crossbays / on lashing bridges on new ships (portable water monitors, have their own limitations related to carrying heavy fire-fighting equipment to the site of fire).
- Firefighting equipment to reach and fight fires inside containers in the top tiers (e.g. Hydro Pen)
- The Risk-Zone Based Dangerous Goods Stowage Concept does not allow Dangerous Goods to be stowed next to accommodation or engine room, minimum 40' separation is required. The 40' gives crew an improved distancing when on-deck firefighting and improves successful fire extinguishing before breaching accommodation and engine room access.

7. What can be done to improve active firefighting on deck bearing in mind reduced crew and local conditions?

- Early detection
- Mandatory fitting of remote controlled fixed/semi portable type water monitors / hypermist systems in crossbays / on lashing bridges on new ships (portable water monitors, have their own limitations related to carrying heavy fire-fighting equipment to the site of fire).
- Higher/additional pump capacity/pressure for effective cooling
- The Risk-Zone Based Dangerous Goods Stowage Concept provides distancing to the fire and increases possibility of firefighting with adequate distance and without exposure to direct heat radiation.
- Firefighting equipment to reach and fight fires inside containers in the top tiers (e.g. Hydro Pen)
- Additional SCBAs and compressors
- Additional (enhanced) Fireman's outfits
- Additional hoses
- (Mandatory) more realistic training scenarios

8. What can be done to protect vital ship structures under deck and on deck from excessive heat?

- Water curtains / sprinkler systems (additional firefighting equipment on such as fixed or portable water monitors on deck can provide extra water curtains between bay areas and once installed does not need permanent manning).
- The Risk-Zone Based Dangerous Goods Stowage Concept is designed to protect hull integrity, vessel stability and vessel manoeuvrability. It should be considered to imbed the Risk-Zone Based Dangerous Goods Stowage Concept in SOLAS and the IMDG Code as mandatory DG Stowage.
- As the engine room is vital for the safe running and continuity of firefighting on board, it must be protected from a fire in the adjoining cargo holds by fireproof insulated bulkheads (heat from the engine room should also not be allowed to spread to the adjoining cargo holds, which could contain cargo sensitive to heat).
- Cofferdams around LNG fuel tanks

9. What can be done to improve the protection of deck house and life-saving appliances?

- No DG cargo near living quarters / engine room / LSA: The Risk-Zone Based Dangerous Goods Stowage Concept does not allow stowage of Dangerous goods adjacent to accommodation and engine room under deck structure i.e. stowage of Dangerous Goods is only possible where removed by a fire proof bulkhead, thus restricting development of under deck fire to cargo space between fire proof bulkheads away from critical areas essential to crew safety and vessel maneuverability.
- Detailed evaluation of life saving appliances positioning could be relevant based on the latest major fire incidents
- Fitting of mist/spray systems around the accommodation and LSA equipment