

KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-66-2013 **(Problems associated with Shipboard Watertight Doors)**

► Introduction:

The watertight doors on board have been designed to make the various areas accessible through properly closed watertight openings. These doors may be one of the essential elements within a floating structure. On the other hand the casualty statistics show that the majority of Serious & Very Serious casualties are attributable to the hull & watertight door failures which allow sea water to flood in & consequently sink the vessel.

The operation of watertight doors have been improved from a simple hand operated geared door to hydraulic & power operated closures & barriers. The idea of making a place watertight necessitates enormous amounts of pressure exertion and various joints & gaskets. In any area where there are high pressure lines & systems involved along with power driven motors & pumps, there will be dangers existent & precautions required. This circular aims at explaining and promulgating points that may be used as loss prevention guidelines in this respect.



► What Happens:

Watertight doors are fitted in watertight bulkheads of ships like cruise vessels, Roll on –Roll off passenger vessels, ferries, large supply ships, special purpose ships, etc., and are electrically or hydraulically operated. On the lowermost decks doors are often hydraulically operated, closing with a force of about two tons. There are reports about the people who have been killed or severely maimed by such doors.

The main reasons we may recall upon are:

- An element of fault by the affected person in such accidents,
- Non-abiding by the strict procedure for passing,
- Lack of proper maintenance,
- Lack of familiarization with the SOLAS regulations and guidance.

► SOLAS Operational requirements for watertight doors:

The bulkheads in which such doors are fitted are required to be watertight in order to save the vessel should water enter the hull, following a collision or grounding. Regulations for the subdivision of ships are found in SOLAS, and so are the regulations concerning power-operated watertight doors.

SOLAS requires as few watertight doors as possible in subdivision bulkheads, regarding them as a certain risk, but it has become relatively easy, depending on the policy of the flag state, to obtain a relaxation, so it is not uncommon for ships to have 30, 40, 50 or more watertight doors. If a ship is at risk of being flooded, these doors must be closed. Doors can be closed from the bridge or they can be opened and closed on location. When the ship is at sea, in principle all such doors must be in a closed position. Under certain circumstances, however, some doors may be allowed to be opened at sea. Although the regulations are quite strict, the practice on board is often found to be more relaxed, and ships with a number of doors open during voyage are not difficult to find.

The bridge may need to close all watertight doors in an emergency, but must also be assured that no one is trapped within a compartment. Doors can therefore always be opened locally and, if the vessel suffers a blackout, there must be stored energy within the door for three movements.

In addition, it is possible to pump the door open with a manual pump.

The current SOLAS regulations apply to vessels built after 1 February 1992. The regulations demand that a number of safety measures be built into the operational system of the doors.

There must be a diagram on the bridge showing the location of each door, with indicator lamps for open and closed doors: red for open and green for closed. The logic is that an open door represents a danger to the ship, thus a red light. There must also be a master mode switch, which has two positions: "Local control" and "Doors closed". That switch must always be in "Local

control” mode, unless there is an emergency or the system is being tested.



SOLAS regulations for “Subdivision and stability” and for doors in watertight bulkheads are found in Chapter II, Part B-4, Regulation 22 requires all doors to be kept closed at sea, but makes some exceptions.

For passenger ships the IMO Circular MSC.1/Circ.1380 “Guidance for watertight doors on passenger ships which may be opened during navigation” contains a useful checklist for determining if a door may be open during navigation.

In summary, ship management and crew members should bear in mind the following concerning watertight doors:

- **Be aware of the risks posed by steel doors closing with a power of 2 tons.**
- **Know the regulations for such doors, read the instructions and follow them.**
- **For older vessels, bring the bridge control panel in line with current SOLAS regulations. A red indicator lamp should mean an open door, and doors should not be able to be opened from the bridge.**
- **Be aware of the dangers to local users if the master mode switch is set to “Doors closed”.**
- **Do not walk through a door in motion. If items are to be carried or pulled through a watertight door, ask for assistance.**
- **Do not tamper with alarm bells, operating levers and speed controls of doors.**
- **Maintain doors in good condition, they are there to save the ship in an emergency. Have regular servicing carried out by the door manufacturer.**
- **Keep doors closed at sea.**

► An accident & Lessons to be Learnt:

The crew on board a vessel were conducting a fire and emergency drill, of which part was to close and test the hydraulically closed watertight doors.

The master closed the watertight doors remotely from the bridge. Some minutes later the chief engineer opened the watertight door to the engine room, but for some reason he became trapped by the door as he passed through the doorway. The chief engineer was trapped in the door for more than 8 minutes before he was found and the crew were able to free him. He was resuscitated but never regained consciousness and later died in hospital.

The watertight doors were normally set in the local-control mode, which meant that they would not automatically close after someone had walked through. At the time of the accident the doors were in the remote-close mode, which meant they would automatically close when the user released the opening handle. The crew routinely passed through the watertight doors without fully opening them when the doors were in the local-control mode, a practice that was probably followed when the doors were in the remote-close mode as well.

The chief engineer possibly tried to pass through the door before it was fully open, and for some reason it began closing and trapped him.

The door had been set to close at twice the allowable closing speed, which would have likely contributed to the accident. It is possible that the audible alarm warning that the door was closing, was not working at the time. A failure of the audible alarm may have contributed to the accident.

The watertight door did not comply with the minimum requirements of the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS). The safety management system on board did not ensure that the watertight doors were maintained in a condition consistent with the regulations or good marine engineering standards. The procedures for operating the watertight doors were the same for both modes of operation, even though the remote-close mode carried a much greater risk.

A recommendation was also made to the manufacturer of the watertight doors to address possible design issues with the watertight doors. This recommendation was copied to the International Association of Classification Societies (IACS) so that its member surveyors could be alerted to the safety issues identified in this report and begins monitoring for these when conducting watertight door surveys and tests.

Lessons Learnt:

These are the generic lessons arising from the inquiry:

- ✓ Always fully open a watertight door before passing through the doorway when the door is in the remote-close mode;
- ✓ The faster the door closes, the greater the risk. Under no circumstances should watertight doors be set to close faster than the maximum allowable speed;

- ✓ Ship operators should adopt specific procedures for operating watertight doors in both local-control and remote-close modes. The procedures should be compatible with the purpose and design of such doors, and the frequency with which they are used;
- ✓ Legislation governing the design and use of watertight doors should be flexible enough to achieve appropriate procedures for the use of any watertight door in any mode;
- ✓ Poorly maintained watertight doors are dangerous. Shipboard planned maintenance systems should be designed and followed to ensure that watertight doors are maintained in accordance with manufacturers' instructions, and in accordance with good standard marine engineering practice.

In a flyer, MAIB said: "Power operated watertight doors are essential to the safety of many vessels but, unfortunately, they also pose a considerable danger to seafarers and shore workers; a number of whom have died or have been seriously injured in recent years".