

KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-143-2013
(Risks involved with the Fixed CO2 System Operating Controls)

► **Description of the incident:**

During the annual service of a fixed CO2 fire-extinguishing system onboard a passenger vessel, it was found that there was a risk that if the main control valve to discharge the gas from the storage containers was opened prior to operation of the section control valves, which convey the gas into the protected spaces, the high differential pressure across the section valves could result in them failing to open.

The section valves installed were of the ball type which were found to be inoperable under high differential pressure, and this is a significant concern given the control system was not set up to positively ensure that the relevant section valve was first opened prior to the release of the CO2 from the storage containers.

At the date of build of this ship, the CO2 operating controls conformed to the requirements of the International Maritime Organization Fire Safety Systems Code (FSS Code Resolution MSC.98 (73)), which required two separate controls be provided: one control to be used for opening the valve of the piping which conveys the gas into the protected space, and the second control to be used to discharge the gas from its storage containers.

Amendments to the FSS Code (IMO Resolution MSC.206 (81)) for CO2 systems, which entered into force on 1 July 2010 for ships built on or after this date, require that positive means be provided for the two separate controls so they can only be operated in the correct sequential order, i.e. the section valve to the relevant protected space is operated prior to the main valve to release the gas from the storage containers.

The "positive means", referred to in these amendments for the correct sequential operation of the controls, should be achieved by a mechanical and/or electrical interlock that does not depend on any operational procedure to achieve the correct sequence of operation.

IMO has been aware of certain difficulties with the operation of high-pressure CO2 systems and the use of ball valves in circuits leading to protected spaces, and this specific amendment was a result of ball valves failing to open when subjected to a high pressure differential across them.



► **Advice to operators of vessels built prior to 1 July 2010:**

1. If a fixed CO2 fire-extinguishing system is installed, ensure that the onboard Operation Procedures clearly specify that the section valve to the relevant protected space is opened BEFORE the main valve to release the gas from the storage containers.

2. If the section valves are of the ball type, check with the system manufacturer/supplier that they have been designed to be positively operated by hand in the event of high differential pressure acting upon them. If this is not the case, consideration should be given to

retrofitting an alternative type of valve that has been designed to be positively operated by hand in the event of high differential pressure acting upon it.

► **Advice to operators of vessels built on or after 1 July 2010:**

1. If a fixed CO₂ fire-extinguishing system is installed, ensure that the operation of the two release controls conform to the requirements of the FSS Code amendments, i.e. one control shall be used for opening the valve of the piping which conveys the gas into the protected space and a second control shall be used to discharge the gas from its storage

containers. Positive means shall be provided so they can only be operated in that order.

2. If the section valves are of the ball type, check with the system manufacturer/supplier that they have been designed to be positively operated by hand in the event of high differential pressure acting upon them. If this is not the case, consideration should be given to retrofitting an alternative type of valve that has been designed to be positively operated by hand in the event of high differential pressure acting upon it.

