Fail-closed Systems for Emergency Shutdown (ESD) Valves of Ships Carrying Liquefied Gases in Bulk

Amended Guidance

Guidance for the Survey and Construction of Steel Ships Part N

Reasons for Amendment

The IMO's International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) prescribes various requirements related to minimisation of risks to the environment and ship personnel. In addition, IACS unified requirement (UR) G series prescribes technical requirements related to cargo containment systems and process piping systems for ships carrying liquefied gases in bulk. All of the aforementioned requirements have already been incorporated into Part N of the Society's Rules for the Survey and Construction of Steel Ships.

In accordance with the IGC Code, ESD valves for cargo piping systems are required to be of a fail-closed type so that they automatically close in the case of power failures. However, neither the IGC Code nor the IACS UR G series prescribe a method for fail-close. IACS, therefore, deliberated on the matter and agreed that springs, weights or accumulators in addition to the ones for normal operation (in cases where hydraulic or pneumatic systems are used) are to be provided for the purpose of fail-close. IACS further agreed that audible and visible alarms are to be given in the event of loss of pressure for the normal operation and that such alarms are to be located at normally manned control stations. These new requirements were adopted as IACS UR G5 in December 2022.

Accordingly, relevant requirements are amended based on the IACS UR G5.

Outline of Amendment

The main details of the amendment are as follows:

(1) Amends relevant requirements to specify that audible and visible alarms are to be provided for even ESD valves using springs or weights for fail-closed operations in the case of the loss of hydraulic or pneumatic pressure for normal operations.

(2) Stipulates that the alarms are to be located at normally manned control stations.

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

N18 OPERATING REQUIREMENTS

N18.3 Cargo Emergency Shutdown (*ESD*) System

N18.3.1 Cargo Emergency Shutdown (*ESD*) System

Sub-paragraph -3 has been amended as follows.

3 "Fail-closed type" referred to in **18.3.1-2(1)(b), Part N of the Rules**, is to be in accordance with the following requirements **(1)** ~~and~~or **(2)** and **(3)**.

(1) Oil hydraulics and air pressure are used only for the opening of the valves and the closing of the valves, including the fail-closed operation, is carried out by springs or weights.

(2) In cases where both the opening and closing of the valves are carried out by oil hydraulics or air pressure due to the impracticability of the **(1)** above derived from the large diameter of the valves, oil hydraulics or air pressure for the fail-closed operation is to be supplied from a specially provided pressure accumulation tank. The composition of the system is to be in accordance with the following requirements **(a)** ~~through (c)~~and **(b)**.

(a) Cylinders for valve operation may be used both for the normal operation and the fail-closed operation. However, oil hydraulics and air pressure piping from the specially provided pressure accumulation tank for fail-closed operation to the cylinders for valve operation is not usable as that for the normal operation. Further, stop valves are in principle not to be provided for the oil hydraulics or air pressure piping for the fail-closed operation.

(b) The pressure accumulation tank for the fail-closed operation is to have the capacity sufficient to activate all the connected *ESD* valves at least twice. In cases where one accumulation pressure tank is connected to the identical *ESD* valves fitted to the both sides, the tank may have the capacity sufficient to activate the *ESD* valve on only one side at least twice.

(~~c~~3) Visible and audible ~~A~~alarms are to be activated in a normally manned control station (e.g. cargo control room and/or the navigation bridge, etc.) at the loss of oil hydraulics or air pressure for the normal operation ~~and at the fail-closed operation~~, in cases which may cause fail-close.