

New Installation Guidelines for Sprinkler Systems on Ro-ro Decks on Ships

Fire protection in transportation

According to the requirements of SOLAS chapter II-2, vehicle spaces and ro-ro cargo decks that cannot be closed, and ro-ro decks where passengers have access, shall be fitted with a manually activated water spray system. Detailed requirements for the design and installation these systems are given in IMO Resolution A.123 (V), published in 1967.

New fire hazards requires modern sprinkler systems

Modernisation of the requirements outlined in this Resolution is long overdue. New types of cargoes on freight trucks, new construction material in vehicles and the increased use of plastics in the interior and exterior of vehicles have all contributed to substantial increases in the fire load on ro-ro decks since the 1960s. New alternative fuels, electric and hybrid cars and hydrogen powered vehicles have – or will – change the fire risk and the nature of a vehicle fire. Furthermore, present ship design is moving towards larger vessels and larger ro-ro spaces.

Tests in both small and large scale

The aim of the project was to evaluate modern water based suppression technology in order to replace the design criteria in Resolution A.123(V). A series of small-scale and a large-scale fire tests were conducted where the potential benefits of modern water based suppression technology were explored. Test results indicate that a water discharge density of at least 10 mm/min is necessary to provide fire suppression of a fire in a heavy goods freight truck, whilst the presently stipulated 5 mm/min would only provide limited fire control. Further, the test results indicate that a high pressure water mist system would require higher flow rates than a traditional water spray system in order to provide fire control.

A formal safety assessment in accordance with the guidelines in MSC/Circ.1023-MEPC/Circ.392 was undertaken. The results indicate a cost benefit of adopting the new proposed installation guidelines.

The sponsors of the project

The project was funded by VINNOVA, the Swedish Governmental Agency for Innovation Systems, the Swedish Mercantile Marine Foundation, Brandforsk – The Swedish Fire Research Board, and the Maritime Department at the Swedish Transport Agency.

Published reports

The following reports have been published in the project:

Arvidson, Magnus, "A survey of sprinkler design recommendations relevant for ro-ro decks on ships", SP Report 2010:33, ISBN 978-91-86319-71-7

Arvidson, Magnus, "Large-scale ro-ro deck fire suppression tests", SP Report 2009:29, ISBN 978-91-86319-17-5

Arvidson, Magnus, "Water distribution tests using different water spray nozzles", SP Arbetsrapport 2009:04

Arvidson, Magnus, "Down-scaled fire tests using a trailer mock-up", SP Report 2008:42, ISBN 978-91-85829-58-3

Palm, David and Frid, Rasmus, "An analysis of fixed water sprinkler systems on ro-ro decks", Report 5326, 2010, Department of Fire Safety Engineering and Systems Safety, Lund University, Sweden.

The reports can be downloaded from www.brandforsk.nu. Project number 401-081.

Contact information

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