

11-A Division of ro-ro spaces

Radiation containment using water mist curtains in a model ro-ro ship deck.

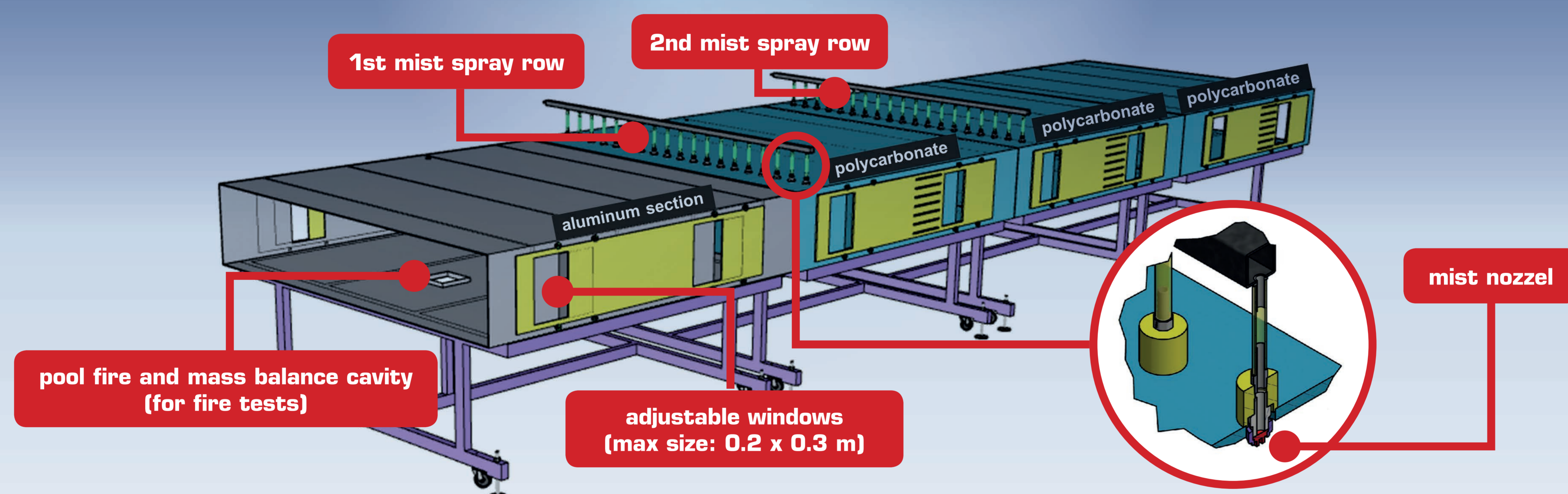
Overview

Experiments have been conducted at LEMTA to evaluate the capability of water mist curtains for the containment of radiation from a potential fire on the cargo deck of a ro-ro ship (i.e., large ferries designed to transport wheeled cargo). The setup consists of a model deck with a scale of 1 to 12.5, measuring 8 m x 2 m x 0.4 m. The water curtains are created using one or two rows of water mist nozzles, while the radiation source is an electric black body at 550 °C, measuring 0.3 m x 0.35 m.



Results

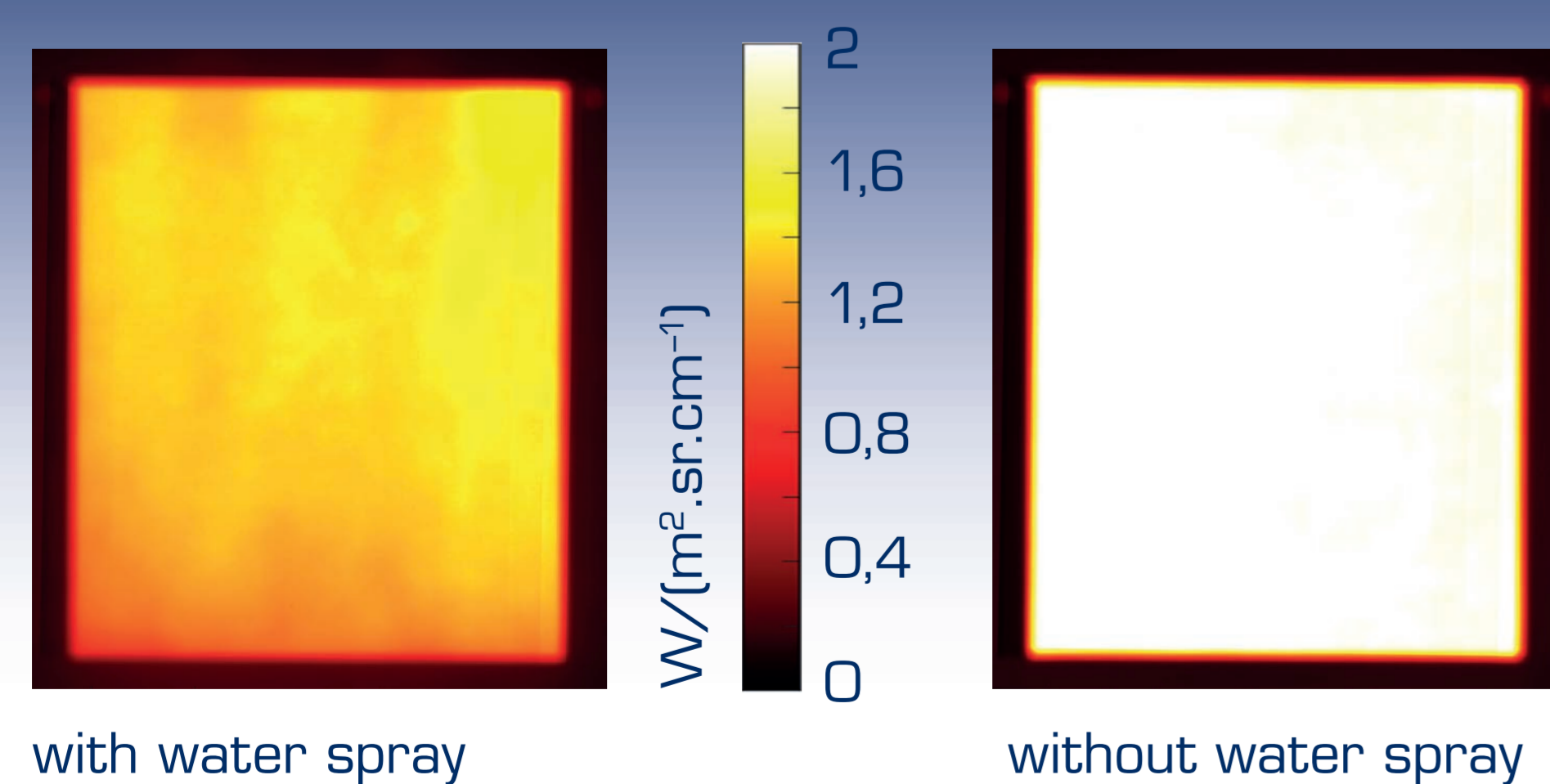
The conducted tests with water pressures ranging from 3 to 8 bar (corresponding to flow rates ranging from 0.2 to 0.4 L/min/nozzle) confirm that the level of radiation attenuation does not strongly depend on the wavelength and that it increases with increasing the water pressure. The highest level of attenuation observed is 80%, obtained with two rows of water curtains at 8 bar.



Methodology

The incident radiation is detected using an infrared camera at 7 different wavelengths ranging from 1.5 to 5 μm . The amounts of radiation measured with and without water curtains are compared to obtain the attenuation levels.

Black body images at 4.4 μm wavelength



Conclusions

Concerning the shielding of radiation alone, water mist curtains were found effective, particularly at higher water pressures. This was due to the reduced size of the water droplets and the increased volume fraction of water. Concerning the shielding of smoke, fire tests are being conducted, proving to be a bigger challenge for water mist curtains.

