



LASH FIRE

LEGISLATIVE ASSESSMENT FOR SAFETY HAZARDS OF
FIRE AND INNOVATIONS IN RO-RO SHIP ENVIRONMENT

LASH FIRE
Information
sheet

Mechanical ventilation in case of fire in closed ro-ro spaces

To use mechanical ventilation during a fire in a closed ro-ro space, it is important to be aware of both the opportunities and risks.

Ventilation is of great importance for the fire growth rate, intensity and fire duration in ro-ro spaces. This guideline aims at giving the person responsible for manual firefighting tactics an understanding for how mechanical ventilation can be used during the early phase of a fire event.

The guideline is based on different types of studies. Computation fluid dynamic (CFD) study, model scale testing, in-situ visits, survey and interviews with personnel working with fire safety on board ships. The guideline is relevant for closed ro-ro spaces on board ro-ro passenger ships and ro-ro cargo ships.

Mechanical ventilation can be used to change the conditions in a space so that heat or fire gases flow in a desired direction. Fans are already used by professional firefighters in land-based operations. The usage of mechanical fire ventilation is an active tool, which needs to be adjusted to and during the specific fire scenario.

IMPORTANT FACTORS TO CONSIDER



Before considering using mechanical ventilation during a fire scenario, consider these factors:

Size of fire: This guideline is valid for fires up to 5 MW (equals a single car burning). If the fire exceeds 5 MW, the current practice of shutting off the ventilation and closing the dampers is not challenged.

Location of fire: The placement of the fire in relation to supply/ exhaust fans will affect how fans can be used.

Surrounding cargo: Take into account the risk of fire spread to adjacent cargo with the usage of ventilation.

Available equipment: Reversible fans and temperature sensors can be helpful for a successful fire ventilation strategy.

Ventilation set-up: Consider if the fan configuration onboard can create the desired airflow in the space.



Opportunities

Keeping the fans on at increased capacity in the early stages of a fire can reduce the amount of smoke inside a closed ro-ro space. This requires that the fire is less or equal to a single car burning. Computer simulations confirm that the visibility improves when smoke from a burning car close to an exhaust fan is vented away, which would facilitate manual firefighting.



No ventilation (0 ACPH).



Close to exhaust, increased ventilation (16 ACPH)

Visibility will not improve significantly if fan capacity is not increased or if the fire is located close to supply.



Close to exhaust, fan capacity not increased (8 ACPH)



Close to supply, ordinary capacity (10 ACPH)

Risks

Supply of fresh air through fans can accelerate the fire growth and fire and smoke may spread rapidly throughout the ro-ro space. This may also spread heat and smoke outside the ro-ro space and consequently increase the risk for evacuees in other parts of the ship.

Adaptation of guideline and limitations

Since ventilation design is unique for each ro-ro space it is important to make sure that the implementation of this guideline is adapted for the ventilation design and air flow in each ro-ro space. Having knowledge and ship specific practise is a prerequisite for using ventilation in case of fire. Drencher activation has not been studied.

VENTILATION STRATEGY



- If the fire exceeds 5 MW (1 single car burning), shut off the ventilation and close dampers.
- If fire is located close to an exhaust, keeping fans active at increased capacity will reduce smoke density.
- If fire is located away from ventilation fans, keeping fans active will thin out smoke downstream, but not enough to facilitate manual fire fighting.
- If fire is located close to a supply fan, keeping fans active will spread the smoke throughout the space.

This ventilation strategy should only be considered if the fire is small (< 5 MW) and manual firefighting is needed. Switching fans off is the best alternative to reduce the fire intensity but generates worse visibility conditions.



When to consider keeping fans on at increased capacity in an early phase of a fire (< 5 MW) in a closed ro-ro space?

Type of intervention	Location of fire	
	Fire location close to supply fan	Fire location close to exhaust fan
Manual firefighting	NO	YES
Activation of extinguishing system	NO	NO



This work was produced as part of LASH FIRE work package 11. It is a knowledge asset aimed at improving the understanding of both opportunities and risks with mechanical ventilation during a fire. It is published in the deliverable D11.5 Elucidation and guidelines for ro-ro space ventilation in case of fire.



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