



# EMSA Guidance on the carriage of AFVs in ro-ro spaces

11 October 2022

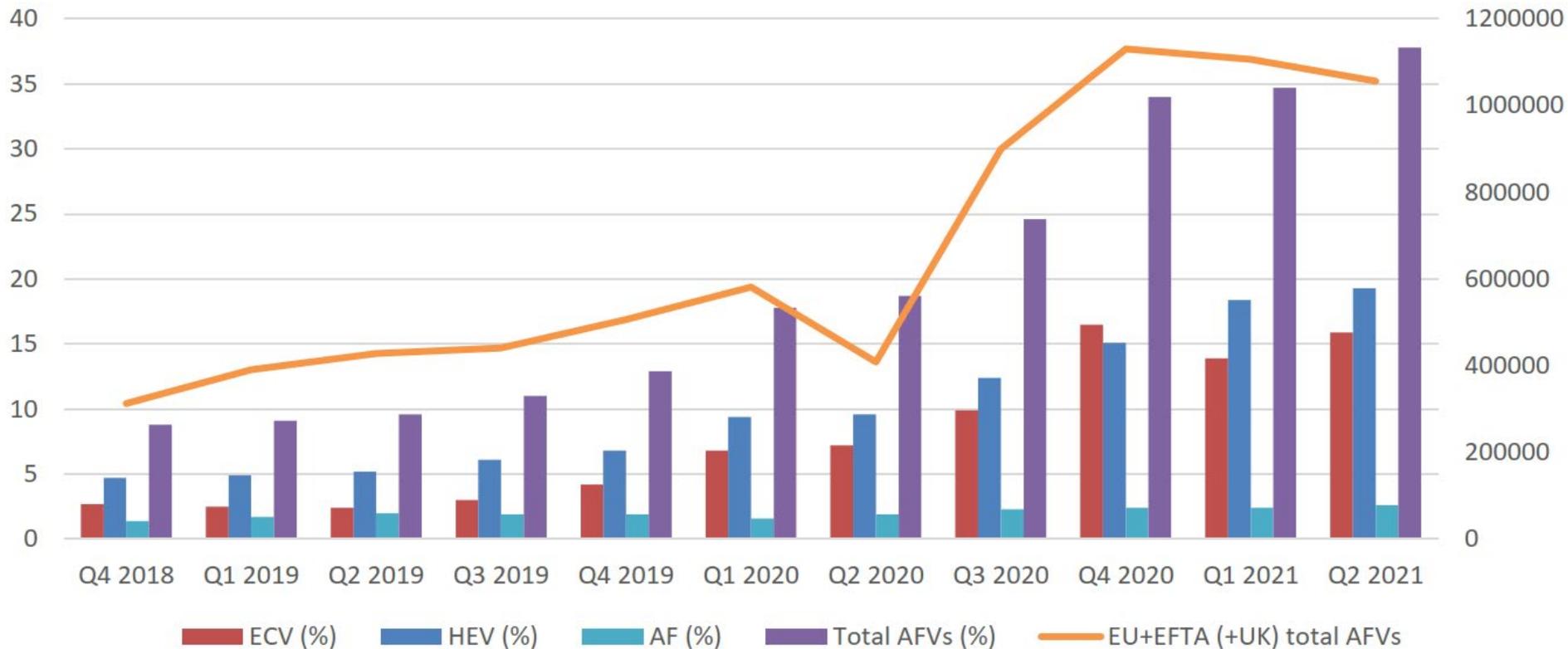
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## New passenger car registration by fuel type (EU)





Our fear:

*“Norwegian airport parking garage fire torches hundreds of cars, grounds flights” (January 2020)*

Fire not started on an APV

Norway the largest concentration of electric cars per capita

# Felicity Ace incident (16/02/22)



**PT authorities:**

***“[...] traditional water extinguishers do not stop lithium-ion batteries from burning.”***

**Watson Farley & Williams:**

***“Whilst the carriage of EVs is likely to be no more inherently dangerous than the carriage of ICE vehicles, the dangers they pose are different and the consequences potentially more severe.”***

- **Adopted Interim Guidelines (MSC.1/Circ.1615) stipulate:**
  - Appropriate cable protection and maintenance;
  - Connection/disconnection by *“trained personnel or other persons under the supervision of ship's crew”*
  - *“During voyages when vehicles powered by compressed natural gases or hydrogen are carried, the hazards associated with accumulation of flammable gases and gases lighter than air under ceilings need to be addressed.”*
  - *“The company should establish a fire-fighting plan that, in particular, identifies any risks specific to alternatively powered vehicles, [...]. The company should ensure adequate training and good access to any specialized fire-fighting equipment for alternatively powered vehicles.”*

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Several EU MS and stakeholders brought this item to the attention of DG MOVE in 2020

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DG MOVE decided to request EMSA to draft guidance on the issue in December 2020

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EMSA formed a consultation group in March 2021

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EMSA developed the Guidance together with the consultation group

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Published on 23 May 2022

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# Work in a consultation group

- Composition (approximately 30 participants)





Ro-ro passenger ships & ro-ro cargo/PCTCs



Risk assessment elements



Operational elements



All AFVs



Based on available research

LASH FIRE  
ALBERO  
BREND 1 & 2  
FIRESAFE I & II





- **Separated in three parts:**
  - General;
  - Ropax;
  - Ro-ro cargo and vehicle carriers;
  - + Annexes

- Risk based approach
- General description of new risks
- IMDG Code requirements

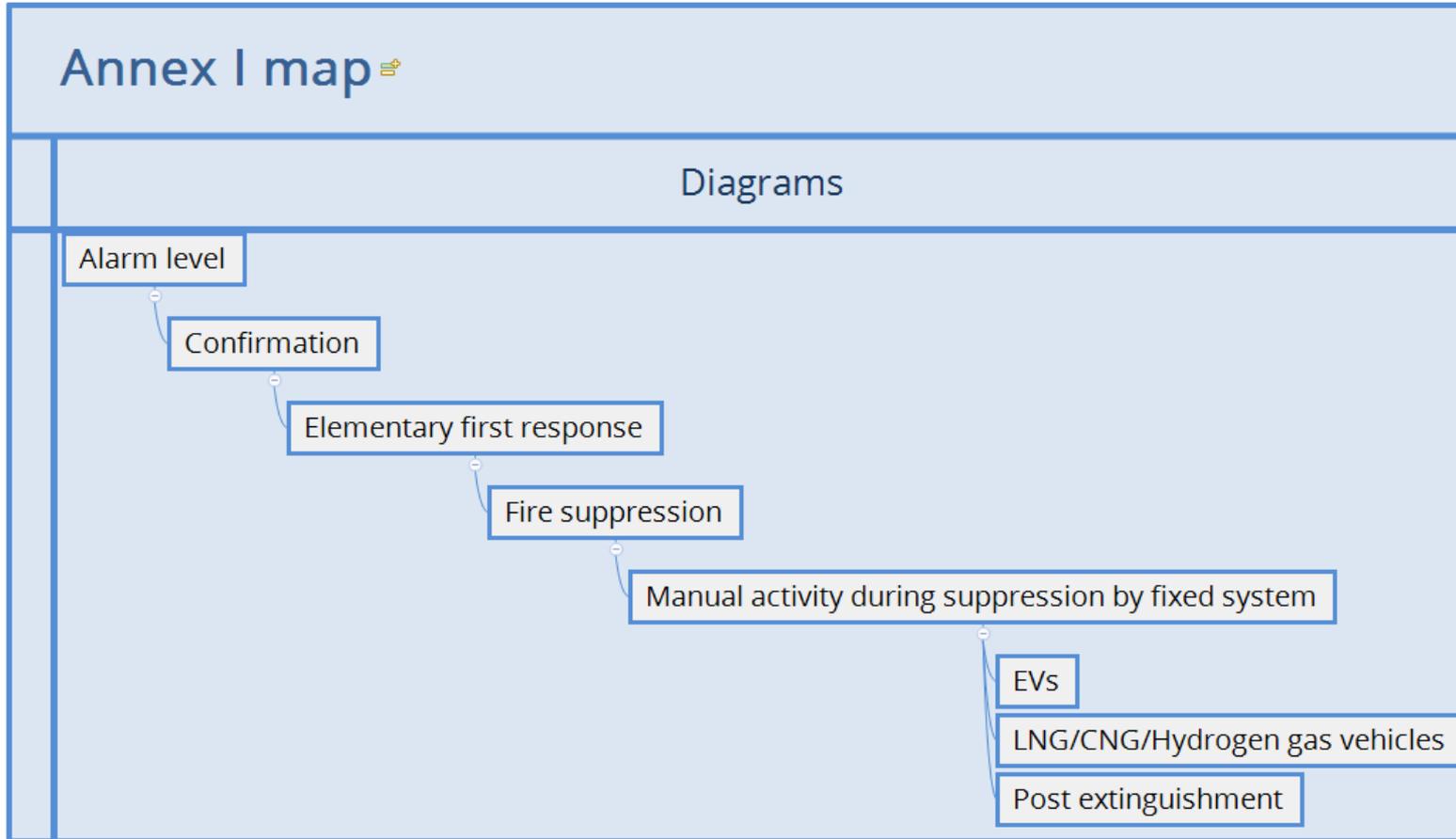


# Part 2 – Ro-ro passenger ships (highlights)

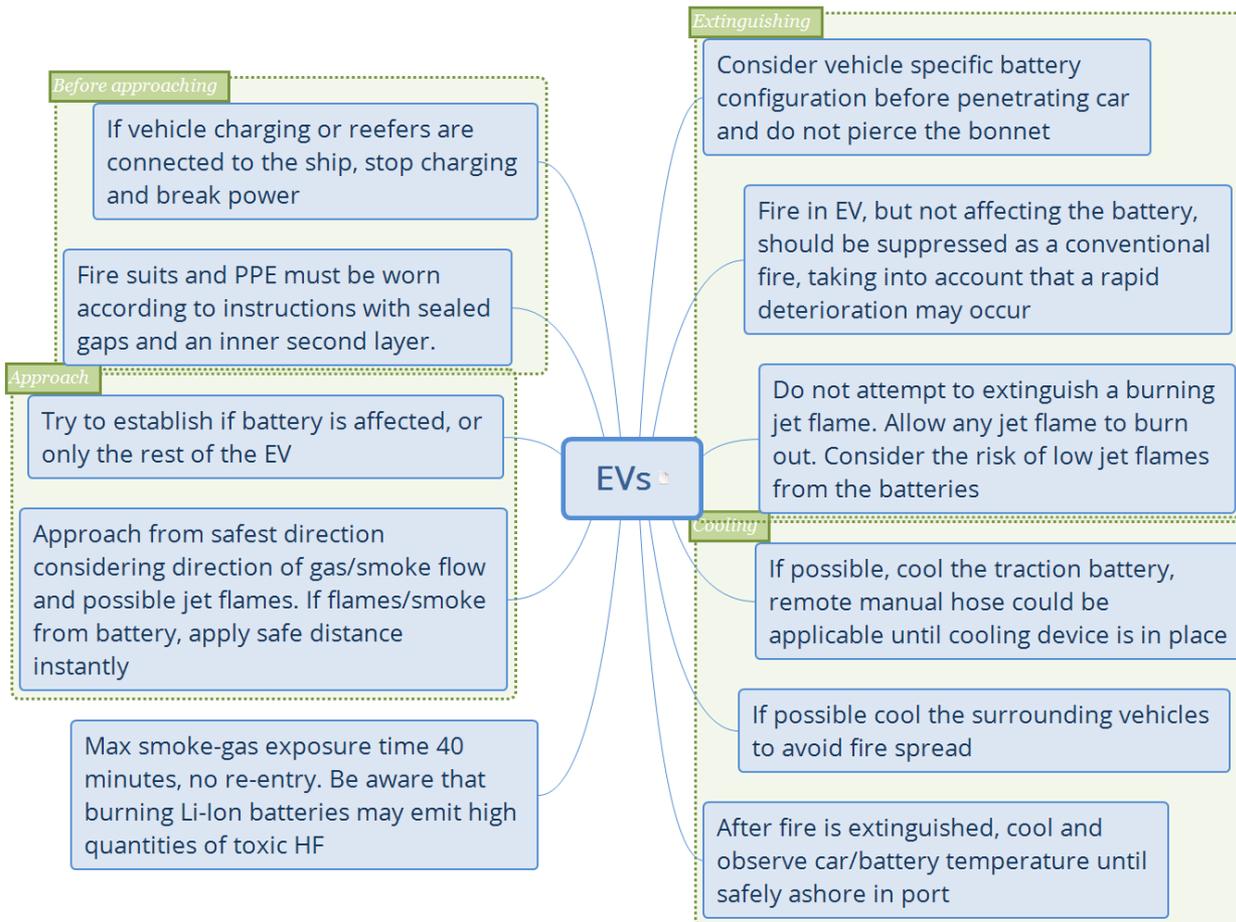
- **Precaution against ignition**
  - Identification of vehicles
  - Conditions of carriage
  - Small electric vehicles
  - **Charging**
- **Detection**
  - Video monitoring
  - Fire patrol routines
  - Exchange of information provided to the driver by the vehicle
- **Fire suppression and extinguishment**
  - AFVs emergency response procedure
  - Fire suits and specifications

- **Precaution against ignition**
  - Identification of vehicles
  - Conditions of carriage
  - Max SoC requirement
  - Low ground clearance
  - Charging
- **Detection**
  - Fixed fire detection
- **Fire suppression and extinguishment**
  - AFVs emergency response procedure
  - Fire suits and specifications

# Annex I – Operational guidance



## Additional considerations related to manual activity during fire suppression



The intention of elementary first response is that of a possible fast reaction to a minor/initiating event by an unprotected crew member

## Elementary First response

If a charging EV is at risk (also if adjacent or close to fire source), stop charging.

If limited fire not involving the battery of an EV, return to vehicle and apply appropriate suppression method, e.g. fire extinguisher

If situation affecting an EV deteriorates, stop charging of all vehicles in the affected deck and break power

If the early stage of thermal runaway is detected, consider the situation unsafe

If situation not safe, retreat to nearest safe location, act as instructed by bridge team

Prepare fire team

### Fixed System prioritisation

If considering to activate fixed system or wait, always choose to activate (except for CO2 systems when there is suspicion that a person may be in the space).

# Annex II – General fire properties of vehicles

Parameter	<u>General car (cab fire)</u>	<u>ICE</u>	<u>HEV</u>	<u>EV</u>	<u>LNG/LPG/CNG</u>	<u>Hydrogen</u>	<u>Small electric units</u>
Energy carrier	Plastic material, rubber, textile etc	Petrol, Diesel	NiCd/Li-Ion battery & Petrol	Li-Ion battery	Liquified CH <sub>4</sub> /Liquified Butane & Propane/Compressed CH <sub>4</sub>	Compressed H <sub>2</sub>	Li-Ion battery
Gas form density relative air	N/A	N/A	N/A	Heavier apart from H <sub>2</sub>	Lighter/ Heavier/ Lighter	Lighter	Heavier apart from H <sub>2</sub>
Toxicity (pre-fire)	N/A	N/A	N/A	Yes	Asphyxiant	Asphyxiant	Yes
Stowage advice	No preference	No preference	No preference	No preference	Preferably weather and alternatively open decks	Preferably weather and alternatively open decks	Designated area on vehicle deck, if possible, with natural ventilation
Pre-ignition signs of increased fire risk	Smoke, heat	Fuel leak	Fuel leak	Heavy smoke & heat from battery. Popping sounds from battery cells	Noise from Pressure Relief Device.	Noise from Thermally activated Pressure Relief Device.	Heavy smoke & heat from battery. Popping sounds from battery cells
Ignition	Heat/ spark and external fire	Heat/ spark and external fire	Heat/ spark and external fire	Battery heat, external heat/spark	Heat/ spark and external fire	Heat/ spark and external fire	Battery heat, external heat/spark
Modes of fire spread	Heat	Fuel pool	Fuel pool	Short lived jet flames, flame length up to several metres	Jet flame, flame length up to several metres resulting to quick fire spread	Jet flame, extensive flame length up to several metres resulting to very quick fire spread	Short lived jet flames Scatter of hot objects, mainly for cylindrical cells

## Approval by MSC 105 (April 2022) of the relevant agenda item

- Duration: 4 sessions
- Starting at SSE 9 (2023)
- Finalisation in 2026 (?)
- Entry into force in 2028 (?)



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