Lithium-ion Battery Maritime Concerns

Port of Baltimore

- SMFF Sub-Committee 1st meeting July 2022 & most recent May 2025
- 2023 Marine Firefighting Workshop & TTX
- 2022 – 2025 Several Vessel Familiarization for Firefighters and Command Staff
- 23 JUN – 07 JUL 2025: BCFD Hosted a Marine Firefighting for Land Based Firefighters
- 2026 TTX RO/RO EV Fire at the Pier
- Containers with Lithium-ion (batteries, rechargeable tools & toys)
  - 2023: 326 2024: 485 49% increase
- New Full Electric Vehicles
  - 2023: 2635 2024: 6690 154% increase
- Wallenius Wilhelmsen
  - Maximum State of Charge (SOC) 50% or lower, preferably below 30%
  - No used EV
- Atlantic Container Line
  - SOC 20% to 50% percent on new
  - No used EV

EV State of Charge

- EV's are most dangerous when they are fully charged, if the temperature rises above a certain point, it can experience thermal runaway, emit toxic smoke vapors, and explode.
- Complicating the fire-fighting effort, many fire departments lack adequate training, knowledge and general fire-fighting capabilities particular to vessels.
- Most shipping companies recommend maintaining a State of Charge (SOC) between 20% and 50% for high voltage batteries in EVs during marine transport.
  - Lower end (20%): Ensures enough power for basic vehicle functions; driving, dwell time operation during at port, loading/unloading.
  - Higher end (50%): Aims to prevent overcharging and potential damage or risks associated with higher SOC's. It also helps maintain optimal battery health over time.
- The European Maritime Safety Agency (EMSA) Guidance, which is widely followed by shipping lines, also recommends an SOC between 20% and 50%.
- No mandatory IMO regulations specifically addressing the SOC for EVs transported on ships. IMO is working on mandatory regulations, with a target completion date of 2027. Interim guidelines for Fire Prevention, Detection, Suppression, Crew Training and Emergency Preparedness

Recent Industry Actions

Matson: Announced in July 2025 suspension of all EV and PHEV shipments. Continental United States to/from Hawaii, Guam, and Alaska

TOTE Maritime Alaska: Announced in June 2025 a phased suspension of all EV, PHEV, and lithium-ion powered machinery shipments. Continental United States to Alaska and Canada.

TOTE Maritime Puerto Rico: Announced in June 2025 a phased suspension of all EV, PHEV, and lithium-ion powered machinery shipments. Continental United States to Puerto Rico and the Caribbean

The International Air Transport Association (IATA) is the trade association for the world's airlines, representing some 350 airlines over 80% of global air traffic recommends shippers of lithium-ion batteries packed in or with equipment (UN 3481), or in vehicles (UN 3556 state of charge not exceeding 30% of their rated design capacity. Mandatory Limits Start January 1, 2026

Notable Fires

RO/RO HOEGH XIAMEN June 2020 Jacksonville enroute **Baltimore** (Grimaldi Group/ACL)

- Vessel burned for 10 consecutive days, nine firefighters were subsequently injured, five of them seriously.
- Improperly disconnected battery in a used vehicle

RO/RO FELICITY ACE March 2022 enroute RI then **Baltimore** (vessel sank)

- 4,000 vehicles, including electric vehicles
- Probable fire **lithium-ion** battery from one of the electric vehicles (EVs)

CONRO GRANDE COSTA D'AVORIO July2023 Newark departed **Baltimore** (Grimaldi Group/ACL)

- Two land-based firefighters died while attempting to put out the fire.

RO/RO FREMANTLE HIGHWAY July 2023 departed Germany enroute Egypt

- 3,783 vehicles, including electric vehicles
- Probable fire **lithium-ion** battery from electric vehicle

M/V GENIUS STAR XI December Enroute San Diego, safe refuge Dutch Harbor, AK

- Cause large industrial **lithium-ion** batteries
- 25 December 1st fire in cargo hold 1 depleted all 153 CO2 bottles
- 28 December 2nd fire in cargo hold 2
- 30 December fire out

Notable Fires

M/V YM MOBILITY August 2024 China

- Container explodes causing a large fire **Lithium-Ion** batteries and tert-Butyl peroxybenzoate

Port of Miami November 2024

- Shipping container caught fire and exploded **Tesla** Model S with hurricane flood damage

CONRO GRANDE CONGO February 2025 enroute Baltimore (Grimaldi Group/ACL)

- Possible cause, shift in vehicles stowed on deck due to heavy weather

CONRO GRANDE BRASILE February 2025 English Channel (Grimaldi Group/ACL)

- Possible cause, unknown

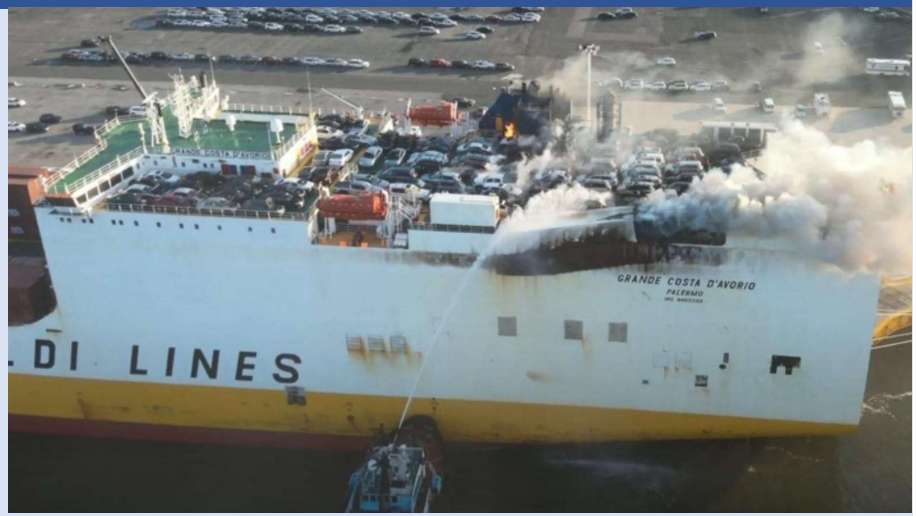
RO/RO DELPHINE April 2025 Zeebrugge, Belgium

- At 1500 fire on 3rd deck, 60 electric vehicles (**lithium-ion**)
- Fire Dept onboard, but did not directly engage.
- Deck sealed, CO2 actiavted.
- Four tugs used to cool hull.
- 2200 Nitrogen pumped into space.
- Next morning fire extinguished

RO/RO MORNING MIDAS June 2025 300 miles south of Adak, Alaska

- 3,159 vehicles—including 65 fully electric and 681 partial hybrid
- Probable fire **lithium-ion** battery from electric vehicle

MV GRANDE CONGO



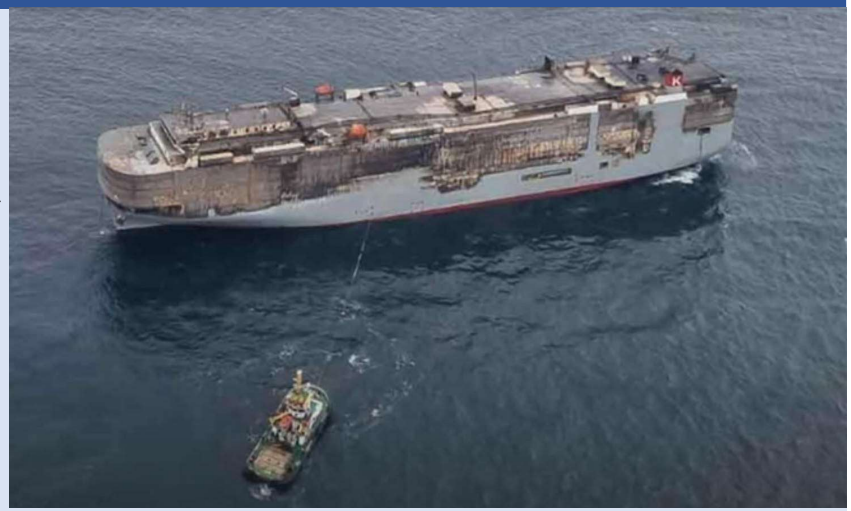
CONRO GRANDE COSTA D'AVORIO



RO/RO FELICITY ACE

Notable Fires

RO/RO FREMANTLE HIGHWAY





RO/RO DELPHINE

Notable Fires

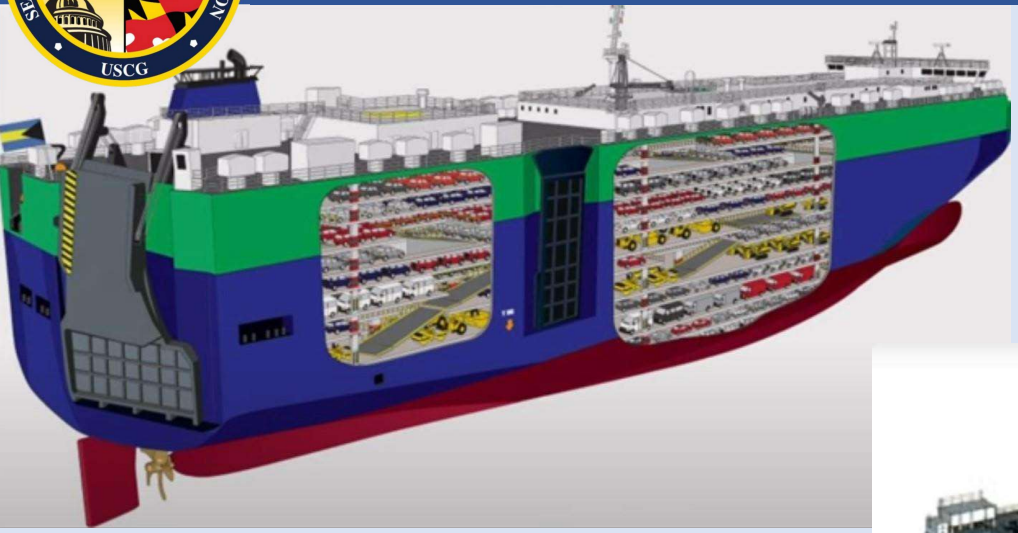
RO/RO MORNING MIDAS





Port of Miami

RO/RO's





USCG

Safety Alert 06-20 November 30, 2020

RECOGNIZING FIRE HAZARDS & PROPER CARGO STOWAGE ON RO-RO VESSELS

- Highlights: Ro/RO vessels carry unique cargo that have a higher potential to introduce fire hazards if required safety protocols are not properly implemented.
- Protect vehicle batteries against short circuiting, for example by disconnecting the battery if appropriate.

Safety Alert 09-23 November 20, 2023

BY LAND AND SEA – FIREFIGHTING PREPARATION IS KEY!

- Purpose - To raise awareness within the MTS to the unique dangers of shipboard fires, particularly onboard multi-level freight vessels like vehicle carrying Ro-Ro's.
- Engage with each other and their local Captain of the Port to establish regular shipboard firefighting education and training.
- Fire departments develop training, qualification, and response doctrine utilizing guidance from the NFPA 1005: Standards for Professional Qualifications for Marine Fire Fighting for Land-Based Fire Fighters, and 1405: Guide for Land-Based Fire Departments that Respond to Marine Vessel Fires.

April 2025 Lithium Battery Fire Hazards in the Maritime Environment

- The use of commercial maritime battery propulsion and energy storage systems, as well the number of EVs and electric micromobility devices on commercial vessels (e.g., ferries) is rapidly increasing. In response, CG-ENG-4 requested the USCG Research and Development Center (RDC) to investigate LIB technology, battery fire behavior, battery fire suppression, and personnel risks.

National SMFF Task Force

- **Team 1 SMFF Subcommittee Establishment:**
  Promulgate standardized guidance and tools for the establishment of SMFF Subcommittees in each COTP Zone. This will come with a prepared charter template and a recommended organization chart.
- **Team 2 Marine Firefighting Planning:**
  Promulgate a standardized Marine Firefighting Plan (MFFP) template Guidebook & framework to assist all U.S. Ports in building operationally executable MFFPs for Incident Commanders.
- **Team 3 VRP Activation Guidance & Tools:**
  Develop updated VRP activation guidance and tools for Coast Guard FOSCs that supports implementation of the MFFP & SRP to include a template ADMIN Order for VRP activation and SMFF QRC for Sector Command Centers to facilitate incident management and decision making, while fostering immediate incident communication between Vessel Master, SMFF Industry, local Sector, and responding Incident Commander.
- **Team 4 Training:**
  Identify SMFF training gaps and training resources for Coast Guard units, SMFF Subcommittees, and the U.S. Fire Service.
- **Team 5 Port SMFF Studies:**
  Identification of SMFF Port Vulnerability Assessment (Threat Assessment) Case Studies and best practices guidance to demonstrate port capability gaps that inform SMFF Subcommittee planning and preparedness efforts across our port communities.

Thank you for your time!

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