Lithium-Ion Batteries Exposures

Marine insurance issues seminar

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Introduction

A rechargeable battery using Lithium ions movements across the cathode and anodes to create electric energy through an electrolyte

Uses of Li-Ion batteries

- Mobile phones, laptops and wearable devices eg watches
- Electric vehicles (including cars, forklifts, & e-scooters)
- Handheld power tools (cordless drills, saws, garden eq.)
- Photovoltaic battery systems
- Battery Energy Storage Systems (BESS)
- Uninterruptible Power Supplies (UPS)

Main Hazards

- **Fire** – electrolyte is ignitable liquid
- **Explosion** – release of ignitable vapor in confined space
- **Thermal runaway** – rapid self-heating that may cause fire or explosion
- **Poison (Toxic)** – gases given off during any of the above three other hazards produce irritating, corrosive and/or toxic gases.

Note: lithium-ion batteries **do not** contain lithium metal, which is highly combustible / reactive

Common Causes

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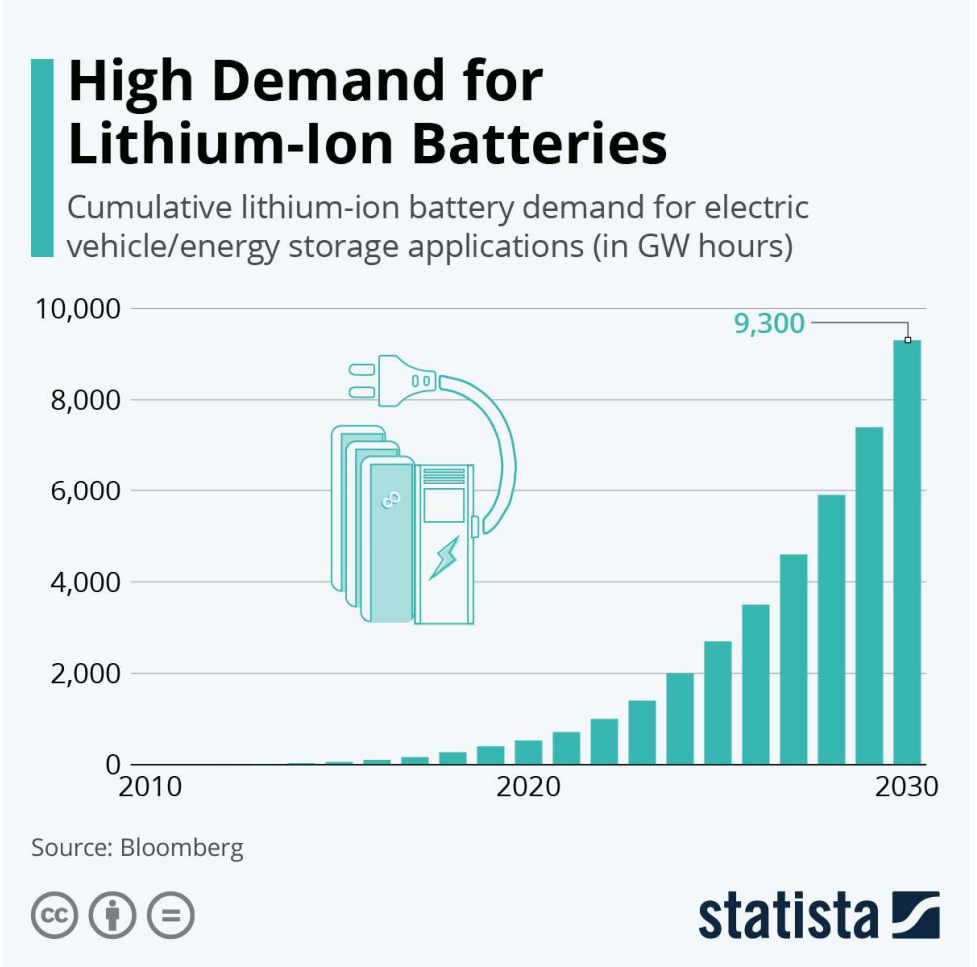
- Substandard Manufacturing
- Over-Charging
- Short Circuiting
- Damaged Batteries

Li-Ion batteries in use since 1970s and largely incident free
What changed?

Lithium-Ion battery

- Exponential increase in Li-ion battery demand, expected 5-10-fold increase in the next decade
- Fueled by sustainability targets
  - Popularity of EVs
  - Green energy storage
- New manufacturing hubs/countries
- Global intermodal transportation of Li-Ion batteries rising



Rising incidents of Fires on board Ro-Ro and Container ships

- 200 reported fire incidents in 2022 alone, highest in the last decade
- 64 vessels lost due to fire in last 5 years
- Catastrophic consequences of such fires
- Mis declared cargo key concern
- Used EVs and DDR battery carriage very high risk

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Battery Energy Storage System (BESS)

- Large battery banks for storage & managing electrical energy
- Containerized modular system popular
- Battery/Energy management systems in place
- Fires incidents on BESS on the rise, 30 in the last 4 years (as per EPRI)

Regulatory Framework

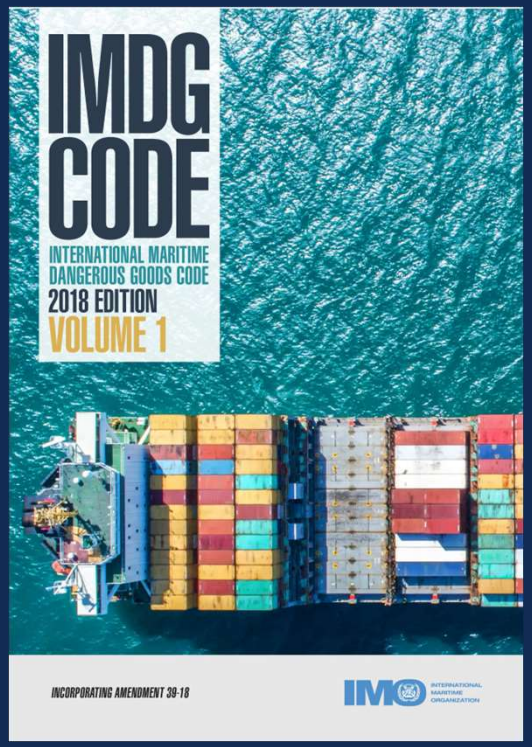
STANDARDS - IMO, PHMSA, EU

- Manufacturing
- Shippers
- Carriers

Eg

- Test Summary requirements by PHMSA
- New fire detection and prevention regs for containerships
- CTU Code

Hard to ensure compliance of regs



Questions ?

Thank you!

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