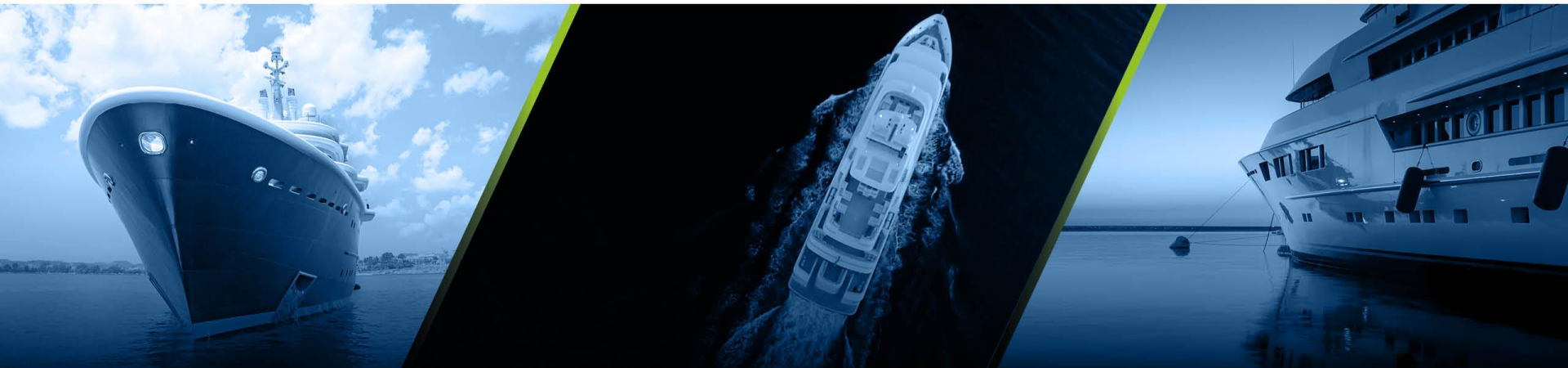




## Lithium-ion batteries on yachts

IUMI Webinar  
22 October 2024





## Lithium Batteries – Tenders and Toys

Adam Jackson – Head of Yachts

[www.abl.yachts](http://www.abl.yachts)



## **ABL Yachts – who are we and why are we here?**

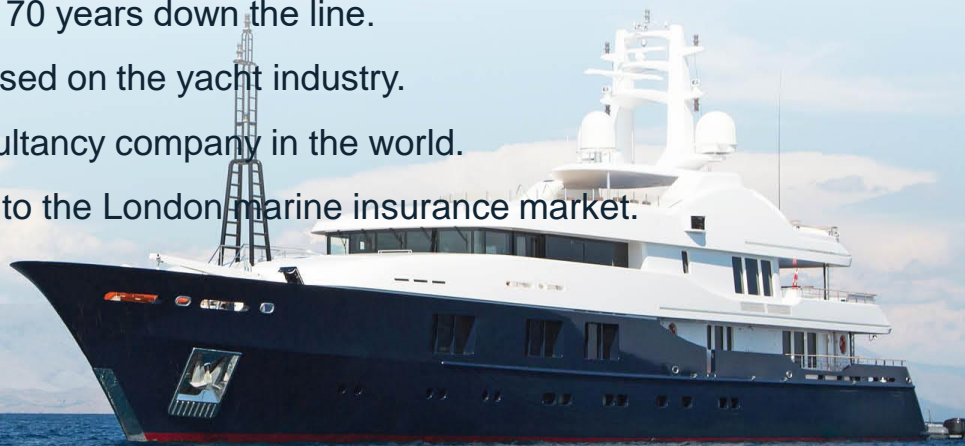
The Salvage Association

ABL Group are 'The Salvage Association' 170 years down the line.

ABL Yachts are the part of ABL Group focused on the yacht industry.

ABL Group is now the largest marine consultancy company in the world.

We act as third party technical consultants to the London marine insurance market.



# Joint Hull

- Lloyds Market Association



- Joint Hull Sub Committee of Yacht Underwriters.

# The current rules and regulations concerning Lithium ion batteries

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- MGN 681 – guidance
- REG Yacht Code Common Annex A
  - A6 - The Requirements of MGN 681 concerning Fire Safety and Storage of Small Electric Powered Craft, as amended shall be applied to the satisfaction of the Administration.
- Lithium Battery Clause.
  - The clause is intended to encourage and trigger responsible and safe management of lithium batteries due to the undeniable additional risk they bring.
- Joined up thinking



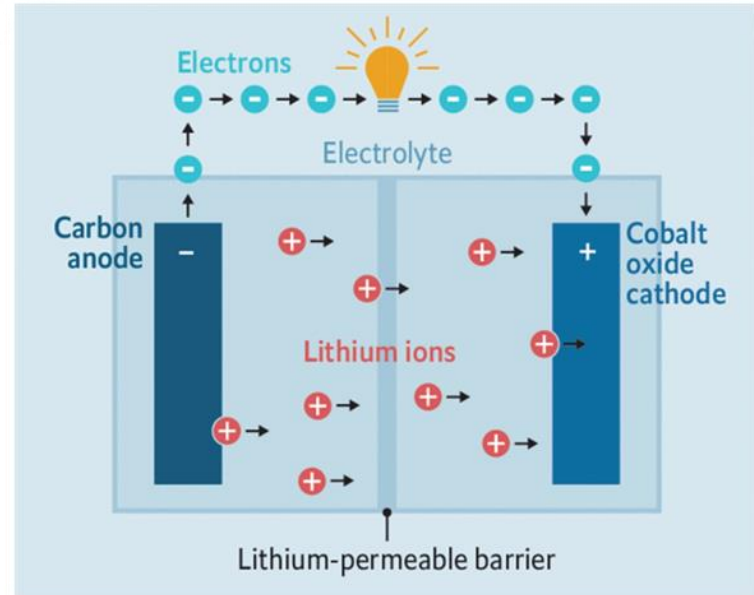
# What's the problem?

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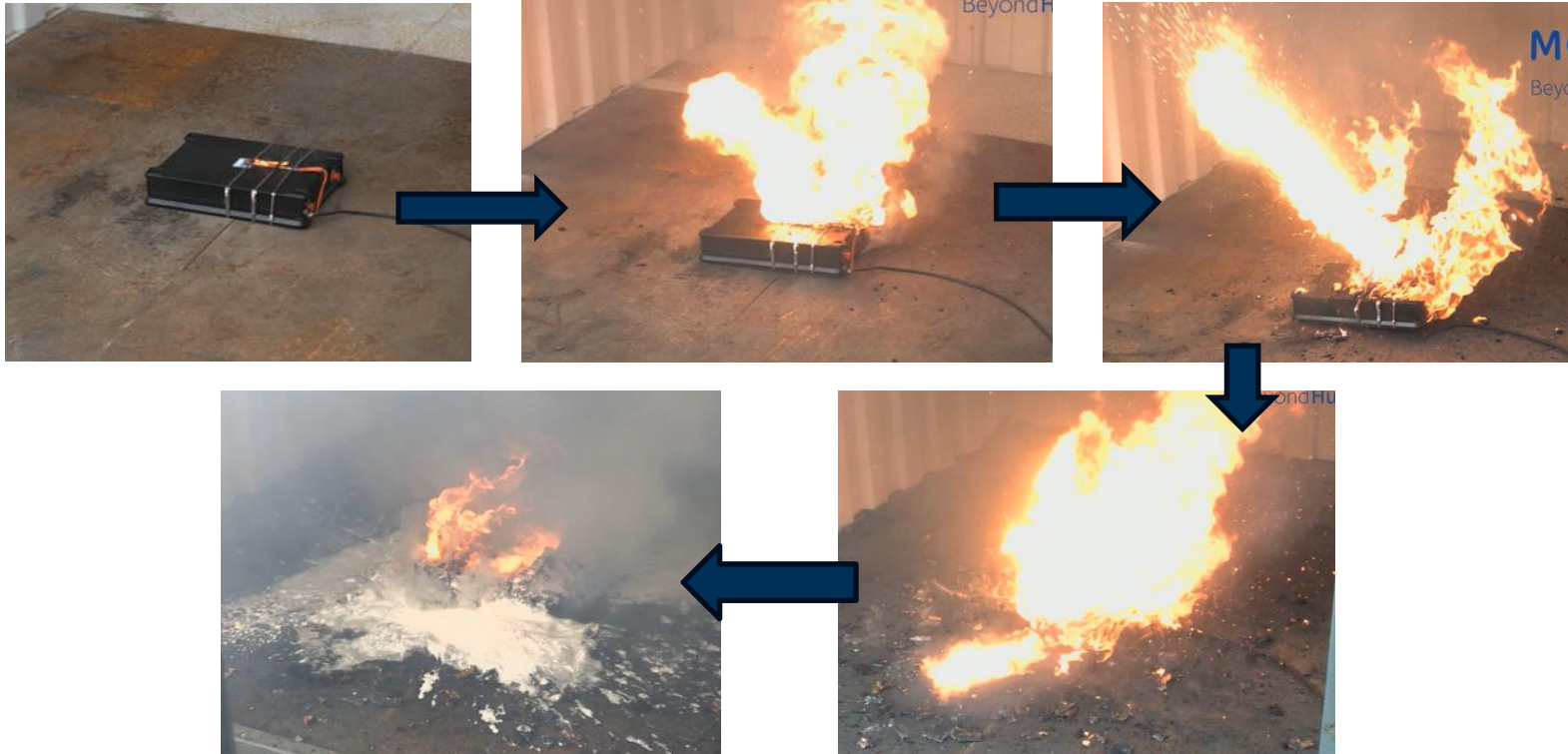


# What are Lithium-Ion Batteries and why are they so popular?

- Low Weight
- High Energy Density
- Low cost
- Maintenance free
- High rate of charge and discharge
- More usable capacity
- Minimal voltage drop across discharge
- Reliability



# How Do They Fail?





# How Do They Fail?

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# Lithium-Ion Battery – Explosion risk

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## The Wrong Conditions

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Mechanical abuse of the battery from drops, impacts, abrasion, vibration

Short Circuit – external through direct connection of the positive and negative terminals, or internal through contact between the electrodes.

Operational over-heating through improper discharge of the battery

Heating of the battery by an external source

Rapid charging stresses a battery



# What is the risk?

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Even on large yachts, space is limited. And, Owners and guests want toys. So, where do you put them?  
On the bulkhead next to the petrol jetski?

Or, how about neatly stored and charged above some containers of oil? With some rags and towels nearby...



## What is the risk?

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Two comparable underwater scooters.  
One of an unknown Chinese manufacturer.  
One from Yamaha.  
Both 500Wh.  
One £90  
One £1800



## So, what does the clause say?

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- Definitions used in this clause:
- "Container"
- "Electronically Driven Equipment"
- "Lithium Battery"
- "OEM"
- "Tenders"
- "Toys"

## • The Clause

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- **It is a condition precedent to Underwriters' liability in respect of any claim for loss, damage, liability, or expense caused by fire and/or explosion that each of the following shall have been complied with:**
  1. any Lithium Battery (whether attached to or detached from Electronically Driven Equipment) shall only be charged in a Container, or within a space meeting the requirements of Section 14.1 of the REG Yacht Code or on open deck where the risk of fire and accumulation of toxic gas is minimised;
  2. the charging of any Lithium Battery shall only be performed using charging equipment supplied or approved by the OEM;
  3. the location where any Lithium Battery is charged shall be free of any sources of ignition or flammable materials;

## • The Clause - continued

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4. all OEM guidelines and recommendations in relation to the use, storage and maintenance of any Lithium Battery shall be complied with;
5. any repairs, modifications, alterations to any Lithium Battery or its charging equipment shall only be performed by the OEM;
6. an inventory of all Electronically Driven Equipment shall be kept on board;



## • The Clause - continued

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7. a full risk assessment shall have been carried out in line with MGN 681 (M) or international equivalent. Any resultant mitigation measures shall be implemented on board and documented in the vessel's safety management system or safe operating procedures; and
8. the vessel shall have an operational lithium fire suppression / containment system and/or lithium firefighting equipment on board and all crew shall be trained in its operation.

# Final Note

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- In the event of any failure to comply with these conditions precedent, Underwriters shall not be liable for any claim for loss, damage, liability, or expense caused by fire and/or explosion, unless the Assured can demonstrate that non-compliance neither caused the fire and/or explosion nor increased the loss, damage, liability, or expense resulting therefrom.
  
- JH2024-011A
- 4th April 2024
- Feedback
  - *Container definition*
  - *Condition Precedent*
  - *Away from Flammable Materials*
  - *Risk Assessment and the requirement to train.*
  - *Lithium fire suppression system*
  - *Crew Training*

# Example of some of the more common toys and tenders

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Fliteboard AIR – Inflatable eFoil - **850 to 2100 Wh**.

EWave V2 6000 – powered surfboard – **2700 Wh**

Scubajet – waterjet **100 to 400 Wh** with removable stackable **100Wh** batteries

Underwater Scooter Trident – **130 Wh** with removable battery

F5 Seabobs – charged with battery fitted, **2500 Wh**

Mavic Pro platinum air drone – **77 Wh** (the guidance doesn't apply)

Electric scooter – **500 - 1260 Wh**

Radinn extended range jetboard – **3478 Wh**

Waterwolf jetboard – **1900 Wh**

Electric Tender – total **5000 Wh**, each battery is less.



## MGN 681 – Brief Summary

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- Storage and Charging
- Battery Management
- Fire Detection and Alarm
- Fire Suppression
- Crew Training

# An appropriate standard for Container approval?

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- Explosion
- Toxic Gas
- Fire
- Containment
- Test 1 – Fire and Toxicity
- Test 2 - Explosion
- Both tests must pass using the same container.
- Independent test facility
- ISO standard ideally
- Type Approval from Class.



# What does the future hold?

- More stuff!
- More fires
- Improved battery technologies
- Cheaper alternatives
- Better understanding of risks
- Better onboard management
- Trickle slowly down to the recreational sector.





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Part of ABL

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# Thank you!

✓ Feedback survey

✓ Next webinar 07 November: 150 years IUMI

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