



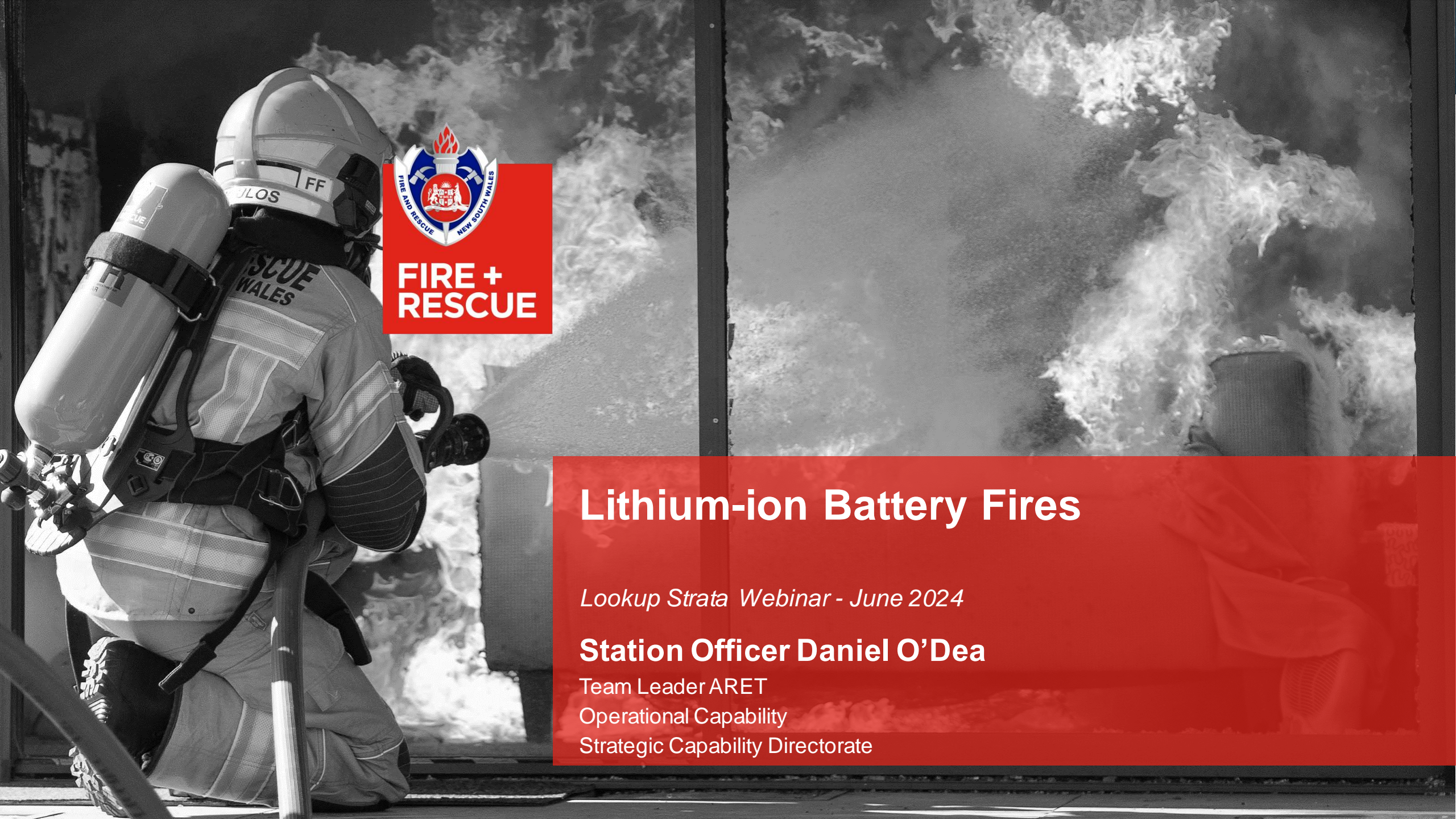
## The risk of e-bikes & e-scooter to strata owners

13<sup>th</sup> June 2024

## Presentation Topics



1. Associated fire risks e-bikes & e-scooters pose to those living in strata.
2. Steps owners corporations/body corporates can take to mitigate these risks
3. Complexities of claims relating to e-bike/e-scooter fires.
4. Introduction of by-laws to assist owners navigate how to address electronic mobile transport devices



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RESCUE**

# Lithium-ion Battery Fires

*Lookup Strata Webinar - June 2024*

**Station Officer Daniel O'Dea**

Team Leader ARET

Operational Capability

Strategic Capability Directorate



# LITHIUM-ION BATTERIES (LiBs)

## APPLICATIONS



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# LIB INCIDENT DATA

## INCIDENTS ATTENDED AND CASUALTIES

	2022	2023	2024*
LiB incidents	171	285	112
Injured persons	14	38	7
Fatalities	0	0	2
Evacuations	829	1320	153
Rescues	3	3	U

\*2024 data to 24<sup>th</sup> April 2024.

## RESPONSE TIMES AND DURATION

Average Time (minutes)	2022	2023	Overall
Response	9.3	9.0	9.1
Duration	72.9	122.3	103.8

## INCIDENTS BY LGA

TOP LGAs	2022	2023	Total
Sydney	16	25	41
Cumberland	7	16	23
Bayside	6	15	21
Central Coast	9	11	20
Blacktown	10	9	19
Sutherland Shire	7	11	18
Canterbury-Bankstown	3	15	18
Northern Beaches	6	9	15
Fairfield	8	7	15
Lake Macquarie	6	8	14
Inner West	3	11	14
Parramatta	7	6	13
Newcastle	5	7	12
Liverpool	1	11	12
Campbelltown	3	8	11
Wollongong	3	7	10

## INCIDENTS BY DEVICE INVOLVED

Top 10 LiB devices	2022	2023	Total
E-bike, e-scooter, mobility scooter	23	67	90
Battery charger	19	27	46
Energy storage battery, power supply, UPS	16	21	37
Hand tool, power tool	15	10	25
Mobile phone	10	13	23
Powerpack / portable charger	8	10	18
E-cigarettes, vape pens	4	12	16
Laptop / Tablet	7	6	13
Lamps, lights, torches	5	7	12
Remote control toy	4	7	11



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### 3. MICROMOBILITY INCIDENTS

#### DEVICE TYPE AND CHARGING STATUS

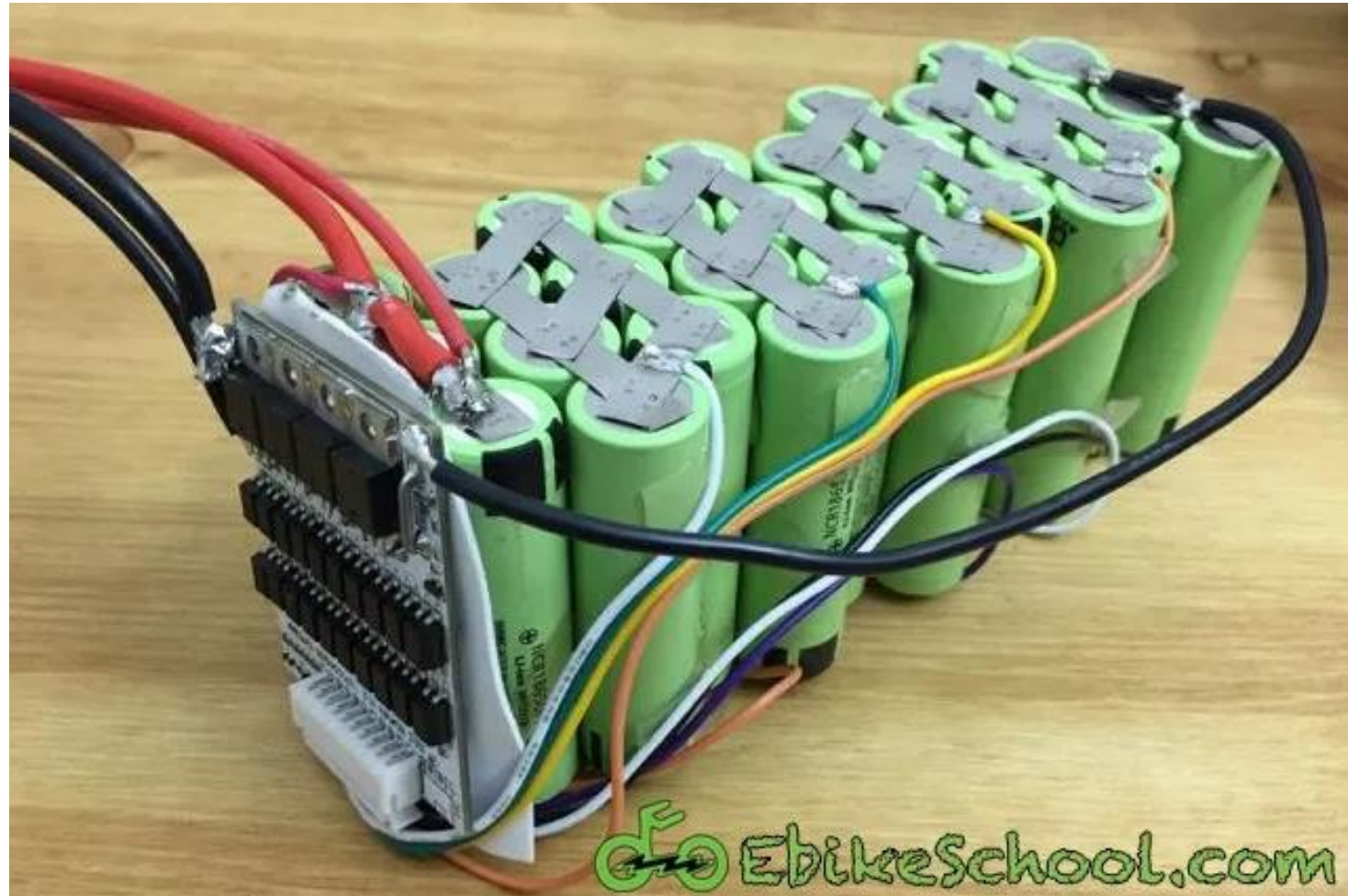
Type	2022	2023	Total
E-bike	11	41	52
E-scooter	7	17	24
Hoverboard	1	2	3
Toy car	1	1	2
Mobility scooter		1	1
E-motorscooter		1	1
E-skateboard	1		1
E-wheelchair	1		1
E-surfboard		1	1
Unspecified	1	3	4
<b>Total</b>	<b>23</b>	<b>67</b>	<b>90</b>

	2022	2023	Total
Actively charging	8	30	38
Recently off-charger	1	1	2
Not charging	2	13	15
Unconfirmed	12	23	35
<b>Total</b>	<b>23</b>	<b>67</b>	<b>90</b>



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# LiB FIRE RISKS AND HAZARDS



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# LiB FIRE RISKS AND HAZARDS

## CAUSES OF THERMAL RUNAWAY



### Manufacturing defects

Defects from manufacturing, e.g. inclusions, burrs, tears, crimping errors, uneven coatings, etc. can lay dormant and cause hot spots, dendrite growth, and separator failures while battery cells are in use or as they age.



### Mechanical abuse

Physical damage resulting in significant deformation (crush, impact, bending) or penetration (piercing, cutting) can lead to separator failure and short circuiting, causing thermal runaway.



### Electrical abuse

Overcharging, overdischarging, overcurrent, and incorrect electrical treatment, can lead to the growth of lithium or copper dendrites at the cathode or anode, leading to separator failure, short circuiting and thermal runaway. Water ingress is also a common cause of short circuiting.



### Thermal abuse

Overheating can cause the liquid electrolytes to boil, and the separator to melt (~130°C and above), resulting in short circuiting and thermal runaway.

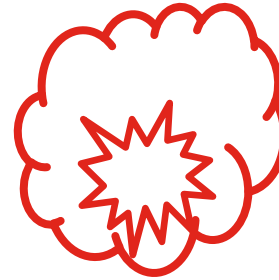


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# LiB FIRE RISKS AND HAZARDS



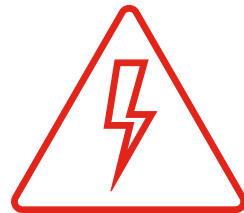
Thermal runaway



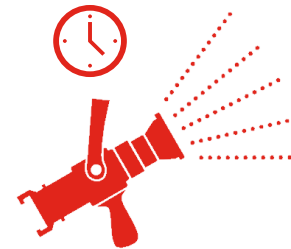
Vapour cloud explosion



Toxic emissions and effluents



Stranded electrical energy



Protracted extinguishment



Recycling and disposal



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# LiB FIRE RISKS AND HAZARDS

## VAPOUR CLOUD PRODUCTION AND EXPLOSION



Sustained venting of large volumes of flammable vapours from LiB cells in thermal runaway can occur, especially in LiB cells with a higher ignition point, or LiB cells at a lower state of charge (<50%).

The build up of vapours in (especially) covered or enclosed areas can result in vapour cloud explosions (VCEs).

Note: Vapours produced during LiB thermal runaway include those that are both heavier and lighter than air. VCEs are known to have occurred in open areas.



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# LiB FIRE RISKS AND HAZARDS

## THERMAL RUNAWAY

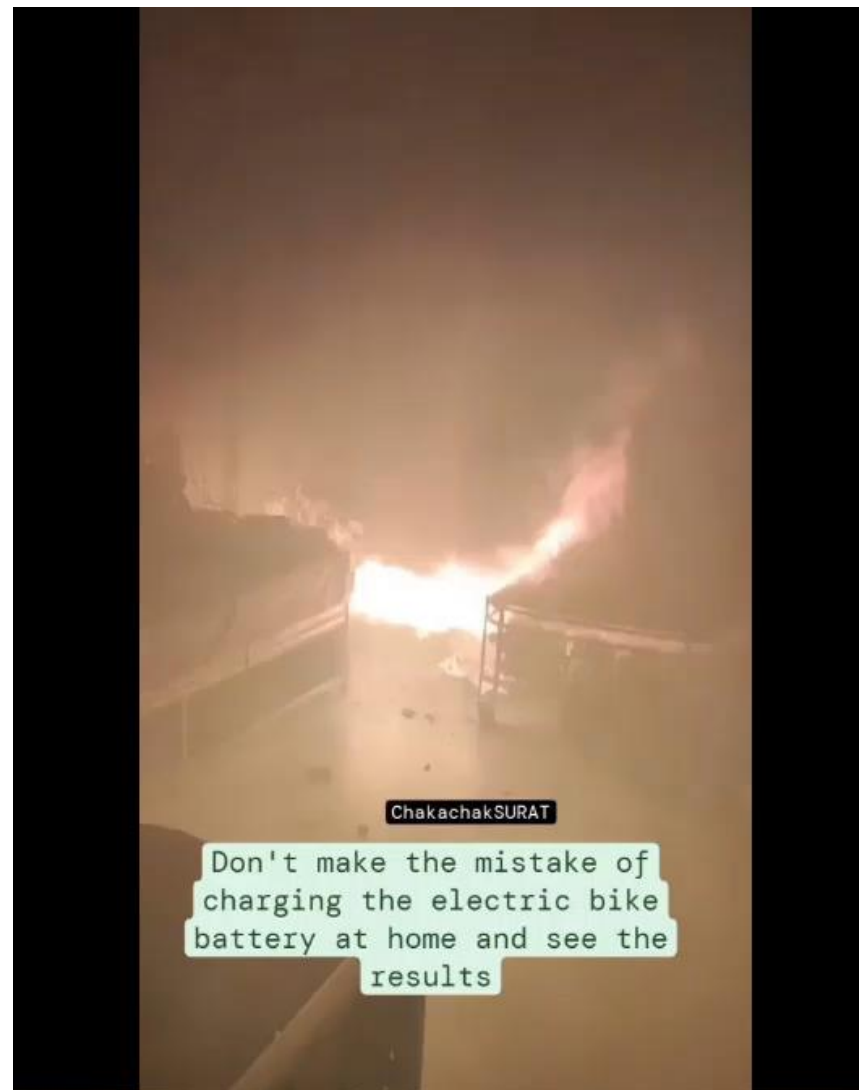


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# LiB FIRE RISKS AND HAZARDS

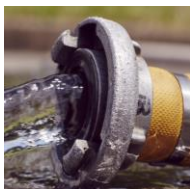
## THERMAL RUNAWAY



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## SARET COLLABORATIVE RESEARCH PROGRAM

Emergency responders need solid research evidence to inform the development of safe and effective response procedures to manage risks, and keep communities safe. While there is a lot of research being conducted around the world, it is disparate, limited and sometimes conflicting. There is a clear need for an objective, systematic and coordinated approach and FRNSW is leading this work on behalf of our AFAC partners with the support of a number of government, industry and research partners. The four projects include:



### 1 - FIRE SERVICE RESPONSE TO LiB FIRES

Efficacy of various extinguishing agents and methods, specialty tools and equipment, and first responder personal protective clothing and equipment in LiB-related incidents.



### 2 - END-OF-LIFE LiB HAZARD MANAGEMENT

Lithium-ion battery-related fire and explosion risk in battery recycling collection programs, and the safe handling, storage and transportation of damaged LiBs and battery systems.



### 3 - ELECTRIC VEHICLE FIRES IN STRUCTURES

Electric vehicle fire behaviour and fire brigade response in parking garages.



### 4 - FIRE PROPAGATION IN ENERGY STORAGE SYSTEMS

Fire propagation within and between stationary battery energy storage systems and fire safety requirements.



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## COMPLEXITIES OF CLAIMS RELATING TO E-BIKE/E-SCOOTER FIRES





## Case Study

- Overview of fire loss/claim
- Assessing the claim
- Claim complexities including liability
- Recovery potential
- Claim outcome/policy coverage

<https://vimeo.com/904279080/3b4e916638>



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## What is OCN doing?






- OCN Advocates for a better future that electrification
- Let the facts speak, rather than opinion.
  - ACC report
  - Submissions and evidence to NSW Stay Safe inquiry
  - EV Fire Safe
- Recommended focus areas
  - Education
  - Risk Mitigation
  - Better regulation





## Lithium-ion battery categorisation for emergency response - common uses



Category	Smaller Devices	Personal Mobility Devices (PMD)	Light delivery EV (LDEV)	Road registered EV (EVs)	Battery energy storage systems (BESS)
					
OEM guidance	No ERG	No ERG	No ERG	Most ERGs available	Most ERGs available
Risk	Low risk	High risk	Moderate risk	Very low risk	Very low risk



## e-bike/ e-scooter Lithium-ion Battery Fire risk

- Regulation
- Modification
- Incompatible chargers
- Battery management systems
- Defects or poor quality batteries
- Charge indoors
- Disposal

## Ban or not to Ban?

- Legitimate and clean mode of transport
- NSW Pets NCAT Case
- Fire events are still very rare
- Address the problem:
  - Minimise the risk
  - Safe charging practices

## OCN Resources – [ocn.org.au](http://ocn.org.au)

- Lithium-ion fact sheet
- Template by-law for e-bike/ e-scooters
  - Safe charging practices
  - Minimising risk
  - Compliance
  - Storage
  - Notification and disclosure
- Code of conduct for general LIB awareness
- Strata Guide dealing with LIB enclosures

**Not legal advice!**



# Questions



## Sedgwick strata landing page

<https://aumarketing.sedgwick.com/acton/media/44302/helping-the-strata-community>

## *Take a closer look*

Learn how Sedgwick can help the strata community navigate their building concerns

