

LITHIUM BATTERY FIRES DO HAPPEN HERE

AvSec officer at Wellington Airport prevents catastrophic event.

When Wellington-based Aviation Security Officer Hayden Bradley started a 10am shift in February 2022, the last thing he expected was a lithium battery fire.

Senior staff had told Hayden in the past about the possibility of unstable lithium batteries, and to be mindful of screening for chargers that still had batteries in them. It had also been talked about in dangerous goods training, but he hadn't personally heard of such an incident before.

But, while scanning passengers' carry-on bags during the busiest part of the evening, the x-ray picked up four loose batteries, and two more in a charging device. Following protocol, Hayden re-checked the bag.

To his astonishment, there was smoke curling out of the bag, and underneath some clothes, he found a very hot and molten vape charger.

"I removed the batteries immediately to prevent further damage and to stop any ignition of the items. They were obviously extremely hot and melted through the PPE gear I was wearing."



// The startling find that ASO Hayden Bradley made, at the bottom of an embarking passenger's luggage.

"The passenger was as startled as me, and very apologetic.

"They told me the charger had been only recently plugged into the wall, and then put into the bag. They'd expected everything to be fine."

Geoffrey McConnochie, AvSec Team Leader at Wellington, says they find so many items of concern that they usually treat them like an everyday occurrence.

This incident, however, was different.

"The batteries and charger had already deteriorated, and the two components were the ingredients of a catastrophic event."

Geoffrey says the batteries were in a "volatile state".

"They contain acid which is corrosive, and the battery charger was still holding energy which would produce heat until all the power was released.

"All this corrosiveness and heat was wrapped in clothing, so the combination was highly flammable."

Is New Zealand complacent?

Catastrophic lithium fire events do occur on aircraft in New Zealand. In Kaikohe, in 2017, a fatal glider crash was caused by structural failure after one of the fitted lithium polymer batteries ignited.

While there've been no recorded lithium battery fires on New Zealand commercial aircraft, there have been four occurrences of thermal runaway¹ – the precursor to a fire – with accompanying smoke. One was during baggage loading, one at engine start-up, one just prior to pushback, and one during the climb.

CAA dangerous goods specialist Jim Finlayson says three of the four thermal runaway events were saved from becoming a full-blown blaze because the batteries were carried in the cabin, and detected by the passenger.

"This is why lithium batteries have to be in carry-on luggage. Thermal incidents should be seen and reacted to straight away. A battery in thermal runaway doesn't have the ability to eventually cool down."

Meanwhile, Fire and Emergency New Zealand has responded to 41 battery-caused fires this year. One, in July, was caused by an unplugged lithium battery, and it destroyed an entire house.

Lithium battery fires have become such an issue globally that air cargo logistics company, World Flight Services, are trialling dog detection of lithium batteries.

But there's resistance to the reality.

In 2017, the CAA's then dangerous goods specialist, Kate Madden, observed², "It's sometimes hard for people to comprehend that the lithium batteries in their cameras, power tools, and cellphones are considered dangerous goods when carried on aircraft".

That lack of comprehension extends to some New Zealand operators.

Jim says many go on the basis of, "it won't happen to me".

"Because people have carried lithium batteries for a long time without an issue, complacency is common.

"But lithium battery fires are like many things we train for in aviation – the possibility of it occurring is statistically low, but the potential outcome, if it does occur, is very serious – possibly lethal."

Without screening

Jim says international flights out of New Zealand, and between major domestic airports, are subject to AvSec screening. But other operators have to be vigilant about communicating and educating passengers on the dangers of lithium batteries, and the civil aviation rules about taking them on aircraft.

"Rules³, policies, and procedures are there for safety.

"But it goes beyond basic compliance to be always striving for the best safety outcomes that we can. If that means taking a real good look at how we carry certain items safely, to the point of being pedantic about applying the rules, then we should do it."

Back at Wellington Airport, Geoffrey McConnochie says, "I was very proud of Hayden for acting the way he did.

"If this bag had made its way onto the aircraft, it could have, at the very least, caused a standard fire or even an electrical fire.

"We can only speculate what the outcome would have been – logic and experience tell me it wouldn't have been at all good." 

¹ When handled improperly, or if manufactured defectively, some rechargeable batteries can experience thermal runaway resulting in overheating. Sealed cells will sometimes explode violently if safety vents are overwhelmed or nonfunctional. Finegan D.P. et al; 2015.

² "Lithium Batteries – The Good, the Bad and the Ugly", Vector, September/October 2017

³ For specific guidance on carrying lithium batteries, refer to Section 7 of Advisory Circular AC92-2 *Carriage of dangerous goods*, pages 21, 24 and 25.