CIVIL AVIATION SAFETY AUTHORITY OF PAPUA NEW GUINEA

SAFETY ALERT BULLETIN

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A SAB contains important safety information and may include recommended action. SAB content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest degree of safety in the public interest. Besides the specific action recommended in a SAB, an alternative action may be as effective in addressing the safety issue named in the SAB.

TITLE: Lithium Battery Fires in Passenger Cabin.

OBJECTIVE: This SAB serves to alert Civil Aviation Rule Part 119-121, 125, 135, 136 and 129 Air Operators of the risks associated with lithium battery fires in aircraft cabins and provides recommendations for air operators, aerodrome operators, and civil aviation authorities to enhance safety measures and prevent the potential risk of hull loss.

This SAB also contains information and recommended actions that the Civil Aviation Safety Authority of Papua New Guinea (CASA PNG) strongly recommends, for air operators to consider when developing risk mitigation measures before transporting lithium ion or lithium metal batteries as cargo on both passenger and cargo aircraft.

NOTE: *This SAB only addresses lithium batteries carried by passengers and crew on-board an aircraft.*

BACKGROUND: On 17 July 2024, a PNG passenger's mobile phone experienced thermal runway while passengers were boarding the flight resulting in an in-cabin fire and smoke event. It burnt up a portion of the cabin floor carpet before it was extinguished. The cabin crew safely evacuated all passengers from the aircraft. In Quarter 1, 2025, two other operators in the Asia Pacific region experienced similar cabin-fire events, one resulted in hull loss on the ground while the other occurred in cruising altitude with the fire extinguished during the flight. Both events were suspected to be caused by lithium battery power banks stowed in the overhead compartment. Fortunately, none of the events resulted in loss of life but these events have drawn the attention of governments, industry stakeholders, and the general public about the dangers of lithium batteries carried by passengers on board aircraft.

1. **Lithium Ion batteries (UN3480)** – These are rechargeable lithium batteries similar to those found in cameras, cell phones, laptop computers and radio controlled toys. Lithium polymer batteries are types of lithium ion batteries.

2. **Lithium Metal batteries (UN3090)** – These cannot be recharged and are designed to be discarded once their initial charge is used up.

This SAB recognizes that ICAO Technical Instructions (Doc 9284) on dangerous goods prohibit the carriage of lithium metal batteries (UN3090) as cargo on passenger aircraft. However, this prohibition does not mitigate the risks of carriage of lithium ion batteries (UN3480) as cargo on passenger aircraft, nor mitigate the risks with carrying either lithium ion batteries or lithium metal batteries onboard a cargo aircraft.

ICAO Technical Instructions permits passengers to carry devices containing lithium batteries (e.g. mobile phones, tablets and laptops) in carry-on baggage or checked baggage while spare lithium batteries (e.g. power banks) may only be permitted in carry-on baggage subject to certain conditions and safety precautions. IATA has promulgated additional guidance on quantity limits with regard to spare lithium batteries and PEDs.

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DISCUSSION: FAA testing has shown that a single lithium battery (cell), whether metal or ion, in thermal runaway will spread to neighboring batteries in the package and to adjacent packages. Thermal runaway is initiated by an internal short within the battery that may be caused by a manufacturing contaminant, battery damage during handling or from heat produced in the environment, such as by an adjacent fire. A lithium battery fire can be started by heating, overcharging or internal short circuit triggered by poor manufacturing quality, aged batteries or damage due to mishandling. Unlike other fires, lithium battery fires may be self-sustaining and require special extinguishing methods to contain. Fire propagation may be fueled by the heat released from burning batteries, which may potentially escalate into a catastrophic event if not properly managed in a timely manner.

In 2015, FAA Tech Center testing showed that the ignition of the unburned flammable gases associated with a lithium battery fire could lead to catastrophic explosion. The current design of the Halon 1301fire suppression system (concentration 5%) in a Class C cargo compartment in passenger airplanes is incapable of preventing such an explosion. In addition, tests also revealed that the ignition of a mixture of flammable gases could produce an over pressure, dislodging pressure relief panels, and thereby allowing leakage from the associated cargo compartment. This could lead to the spread of smoke and gases from the fire into occupied areas of the airplane. The number of cells necessary to produce this condition is small and can occur with just a few packages.

Nowadays, the majority of energy storage devices, including batteries, power-banks and other similar portable electronic devices (PEDs) having higher energy density and efficiency which are suitable for compact applications. However, these benefits come with risks, especially when not handled properly.

Currently, passengers are generally advised about the restrictions of items carried as baggage at various touch points such as check-in and during pre-flight passenger briefings etc. Lithium batteries with not more than a specified energy capacity may be permitted for carriage by passengers without prior approval from air / aerodrome operators.

After the recent cabin fire events, civil aviation authorities (CAAs) and air operators have become more conscious about the associated risks. Some have implemented measures, such as forbidding stowage of

power banks in the cabin overhead compartment and enhancing preflight passenger briefings, in addition to the ICAO TI requirements.

RECOMMENDATIONS: CASA PNG strongly recommends the following action(s):

To Air Operators:

1. Conduct a review of safety risk assessments on the carriage of lithium batteries by passengers; *get familiarized* with hazards of lithium batteries and potential consequences of incidents involving such batterie; and *keep abreast* of the latest technology / devices containing lithium batteries;
2. Adopt mitigating measures that reduce the likelihood of inducing lithium battery fire in the cabin, and also measures that help to reinforce early detection and effective firefighting;
3. Review the adequacy of aircraft emergency equipment, particularly on the provision for firefighting aboard aircraft;
4. Review crew operating procedures and align procedures with relevant guidance and requirements from ICAO, IATA, OEMs and/or CAAs;
5. Review and if necessary, reinforce crew competencies through Safety and Emergency Procedures training by drawing from experiences in mitigating lithium battery related incidents during flight;
6. Review the effectiveness of current promulgation methods for dangerous goods information to passengers and cooperate with all stakeholders in communicating with passengers about relevant requirements such as through signage, messaging; and
7. Report safety issues to CASA promptly and actively participate in safety investigations;

To Aerodrome Operators:

1. Promulgate dangerous goods information to passengers at airport terminals; and
2. Collaborate with all stakeholders to enhance effectiveness of campaigns to raise passenger awareness on inherent risks of lithium batteries and advise them on the actions needed for securing the safe carriage of lithium batteries and associated consumer products

OTHER REFERENCE INFORMATION: Other related information on the above can be found in:

1. RASG-APAC Safety Advisory No.25-002, June 2025 Lithium battery fires in passenger cabin.
2. CASA PNG Safety Alert Bulletin No. SAB-01-2016 Risks of Fire or Explosion when transporting Lithium ion or Lithium metal batteries as cargo on passenger or cargo aircraft.
3. FAA SAFO 10017, Risks in Transporting Lithium Batteries in Cargo by Aircraft. 10/8/10. http://www.faa.gov/news/press_releases/media/safo10017.pdf. Boeing operators can reference Boeing Multi Operator message, MOM-MOM-15-0469-01B, dated July 17, 2015
4. EASA Safety Information Bulletin – Operations – SIB No.: 2015-19; 05 October 2015; Transport of Lithium Batteries as Cargo by Air
5. FAA SAFO 15010, Carriage of Spare Lithium Batteries in Carry-on and Checked Baggage. 10/8/15. https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2015/SAFO15010.pdf.
6. FAA SAFO 16001