DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/25)

Delhi, India, 21 to 25 April 2025

Agenda Item 4: Managing safety risks posed by the carriage of energy storage devices by air *(Ref: Job Card DGP.003.05)*

LITHIUM BATTERY RELATED CABIN FIRE RISKS – AN EMERGING SAFETY ISSUE IN THE REPUBLIC OF KOREA

(Presented by S. Kang)

SUMMARY

This paper highlights the identification of lithium battery and e-cigarette related cabin fire risks as an emerging safety issue in the Republic of Korea (ROK). It summarizes a major incident in January 2025, relevant investigation findings, and the comprehensive mitigation measures introduced by the ROK government. The paper references relevant ICAO documents and encourages further panel discussion and information sharing.

1. INTRODUCTION

1.1 In recent years, the Republic of Korea (ROK) has identified lithium battery-related cabin fire incidents as a critical emerging risk. Following a serious accident in January 2025, immediate regulatory actions were taken to strengthen the management of lithium-ion batteries and electronic cigarettes (e-cigarettes) brought on-board by passengers.

1.2 The measures implemented by the ROK include national alignment with ICAO's Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284) and additional operational controls focused on risk mitigation in passenger cabin environments.

2. DISCUSSION

2.1 Recent Accident Overview

2.1.1 On 28 January 2025 at approximately 22:13 local time, an Air Busan Airbus A321-200 (registration HL7763) operating flight BX391 from Busan (PUS) to Hong Kong (HKG) caught fire while stationed at Gimhae International Airport in Busan. The accident occurred shortly after boarding was completed and the aircraft's doors had been closed in preparation for pushback. Cabin crew discovered flames emanating from a rear overhead stowage compartment in the cabin (around seat 30L), prompting the captain to initiate an immediate emergency evacuation. All 176 persons on board (170 passengers and

6 crew) evacuated the aircraft using the emergency slides; three occupants sustained serious injuries and 24 suffered minor injuries during the evacuation. Despite prompt firefighting efforts, the aircraft was completely destroyed by the ensuing fire.

2.1.2 According to the forensic analysis by the National Forensic Service (NFS), the fire is believed to have been ignited by a short circuit within a lithium-ion battery. The NFS reported that no other significant factors contributed to the fire, as no unusual conditions were found in the area of the aircraft other than the overhead compartment where the battery was stowed. They also concluded that the fire was not caused by any issues related to the aircraft's internal facilities, and the possibility of ignition from such sources was deemed unlikely. The Aviation and Railway Accident Investigation Board (ARAIB) will perform a comprehensive accident analysis ranging from fire identification, FDR/CVR data, air traffic control data, aircraft components to the passenger interview and witness testimonials of the ground crew to accurately determine the cause of the accident. While the investigation is still in progress and no final conclusions have been reached, this accident underscores the severe fire risk posed by lithium batteries in the aircraft cabin – a safety concern directly relevant to the topic under discussion.

Location of overhead bin where fire occurred

Collecting evidence

Power bank found on the floor of seat 31

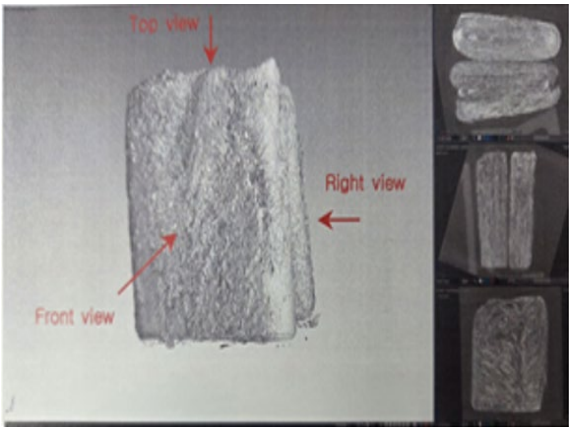

Photo of non-destructive CT scan

2.2 **ROK's Response and Safety Enhancements**

2.2.1 In response to the cabin fire accident in January 2025 and recognizing the broader risk of lithium battery fires, the Republic of Korea developed and implemented enhanced standards for managing lithium-ion portable batteries and e-cigarettes getting on-board aircraft. Given that most airlines had already begun strengthening their battery management procedures, the ROK aimed to minimize confusion among travellers and improve management efficiency across airlines. To achieve this, a standardized management protocol was developed through consultation with airline operators and related experts. Following an extensive public awareness campaign, these enhanced safety measures came into effect on 1 March 2025. These measures strictly adhere to ICAO's guidelines for the safe transport of dangerous goods by air, as detailed in ICAO Doc 9284 (Technical Instructions for the Safe Transport of Dangerous Goods by Air).

2.2.2 In line with these international provisions, spare lithium batteries and e-cigarettes are prohibited in checked baggage, battery terminals must be protected to prevent short circuit (e.g. by insulating tape on exposed terminals or placing each battery in a separate protective pouch), and ICAO-prescribed watt-hour limits are enforced for batteries. For example, batteries up to 100 Wh are allowed in carry-on baggage without special approval, batteries between 100 Wh and 160 Wh are limited to two units with airline approval, and any battery over 160 Wh is not permitted in passenger baggage.

2.2.3 In addition to implement the above ICAO-aligned requirements, the ROK has introduced further safety enhancements to mitigate cabin fire risks. Notably, passengers are prohibited from stowing spare batteries or e-cigarettes in overhead compartments; instead, such items must be kept on the person or in seat pockets to allow immediate access and rapid response in the event of overheating or smoke incidents. Furthermore, each passenger is limited to carrying five (5) spare batteries onboard, with additional batteries requiring airline approval under special circumstances (e.g., medical devices). When airline approval is granted for batteries exceeding established limits, airlines affix an approval sticker to the battery, facilitating quicker and smoother verification during security checks.

2.2.4 Furthermore, if unauthorized portable batteries are suspected, additional inspections will be conducted by opening baggage to check for batteries that require airline approval. Any unauthorized batteries detected during this process will be immediately handed over to the respective airline for verification and appropriate handling. Monthly summaries of detected cases will be provided to airlines to enable internal corrective actions and enhance compliance with established battery carriage regulations.

a) **Compliance with ICAO Doc 9284:**

1) **Prohibition** of spare batteries and e-cigarettes in checked baggage.

2) **Protection** of terminals using insulation methods or original packaging.

3) **Limitations** on watt-hour (Wh):

— ≤100 Wh: allowed in carry-on without approval

— 100–160 Wh: limited to two units with airline approval

— 160 Wh: not permitted in passenger baggage

b) Additional National Controls:

1) **No stowage** of batteries/e-cigarettes in overhead bins. They must be carried on the person or stored in seat pockets.

2) **Limit of 5** spare batteries per passenger; additional units require prior approval and are tagged with airline-issued stickers.

3) **No charging power banks using** aircraft seat power outlet or another power banks

2.3 **Challenges**

2.3.1 Despite these efforts, concerns continue to be raised regarding the effectiveness of current short-circuit prevention methods for batteries. Placing spare batteries in plastic bags or applying tape to terminals may reduce the risk of external short circuits; however, these methods do not address internal short circuits, which are a more common cause of battery fires. Additional measures specifically targeting internal short circuit prevention may be necessary. The limit on the number of batteries allowed onboard is also a subject of ongoing debate. ICAO Doc 9284 does not specify a quantity limit, whereas the IATA Dangerous Goods Regulations (DGR) set a limit of 20 batteries. This raises the question of whether it is appropriate for passengers to carry such a large quantity of batteries. Further review and consideration of this issue appear to be necessary.

2.3.2 In light of the recent increase in incidents and accidents involving lithium batteries in the Republic of Korea, this issue is recognized as an emerging risk at the national level. It is acknowledged that similar trends may be observed globally, and therefore this matter may be considered an emerging risk within the scope of the Dangerous Goods Panel. This recognition is further supported by international safety data related to air transport. Accordingly, the Republic of Korea emphasizes the importance of panel discussions focused on safety assessments and appropriate mitigation measures regarding the carriage of lithium batteries and electronic cigarettes. In this context, the Republic of Korea expresses its willingness to actively engage in collaborative efforts within the DGP to strengthen preventive strategies and promote the exchange of best practices aimed at addressing this increasing safety concern.

3. CONCLUSION

3.1 The meeting is invited to:

a) note the information provided in this paper;

b) discuss the technical implications of Attachment A 2 Method of Insulation and;

c) consider including the topic of “battery-related cabin fire risks” as a Focused Discussion item for the next DGP/30 meeting.

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APPENDIX

ROK CARRY-ON SAFETY CONTROL PROCEDURES

For our safety, it's common sense to know!

Spare Battery & E-cigarette CARRY-ON PROCEDURES

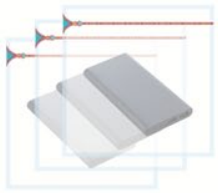
1 (RULES FOR) BATTERIES CARRIED ON BOARD — Prohibited in Checked Baggage

CHARGING CAPACITY	QUANTITY	REQUIREMENTS			
		APPROVAL (AIRLINE)	STICKER	INSULATION	STORAGE AREA
100Wh(27,000mAh) or less	1 ~ 5	N/A	N/A	Required	Keep it on your body or in the seat pocket (Not in overhead-bin)
	6 ~	Required	Required	Required	
100Wh(27,000mAh) over ~ 160Wh(43,000mAh) or less	1 ~ 2	Required	Required	Required	
	3 ~	Not allowed			
160Wh(43,000mAh) over		Not allowed			

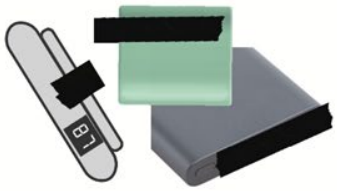
[Note] Most spare batteries are 100Wh or less(approximately 74Wh capacity based on 20,000mAh, 3.7V)
Voltages other than 3.7V are calculated as Charge (Ah) x Voltage (V) = Energy (Wh)
Caution. If the voltage of the spare battery is 12V, the charging capacity will be 120Wh even if the current is 10,000mAh, so be sure to check the battery specifications.

*** E-cigarettes can be carried on your body, but should not be kept in checked baggage**

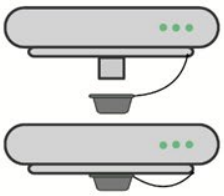
2 METHOD OF INSULATION — By any of the following three methods



① Store in plastic bags or pouches (one by one)



② Attach with tape to the terminal



③ Protect it with a cap

3 CARRY-ON PROCEDURES

Stickers and approval are not required for batteries 100Wh(27,000mAh) (≤5 cells) or less

APPROVAL BY THE AIRLINE

~ 100Wh (6 units ~)

100Wh ~ 160Wh (~ 2 units)

Attach stickers after approval & insulation at the check-in counter

SECURITY SCREENNING

Not allowed without approval sticker

ON BOARD

Keep it on your body or in the seat pocket (Do not keep it in overhead-bin)

4 IN-FLIGHT MANAGEMENT & HANDLING GUIDELINES

① STORAGE	Keep it on your body or in the seat pocket (Do not use the overhead-bin)
② USE	Keep it insulated except for in-flight use
③ CAUTION	Be cautious of shock or pressurization (Do not charge batteries & E-cigarettes)
④ ACTION	Inform the crew immediately if it overheats or swells

Ministry of Land, Infrastructure and Transport

Korea Transportation Safety Authority

— END —