국토교통부
Ministry of Land, Infrastructure and Transport

Prevention of Aircraft Fire Risk from Portable Electronic Devices (PED)

November 19, 2013

Hye-seong Jun

KOREA OFFICE OF CIVIL AVIATION

Contents

Event Summary

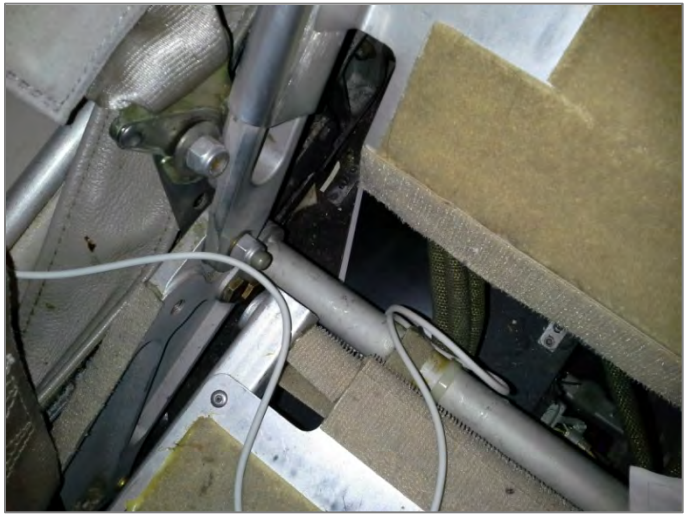
◇ PED was being charged via USB port in Passenger's seat

◇ Passenger's seatback reclined

◇ Smoke and fumes emitted from PED under the seat bottom

◇ Cabin Crew utilized a Halon fire extinguisher and cooled PED

◇ No damage to the aircraft, no injuries to passengers or crew



Event Summary

◇ Cause of Ignition and Subsequent Explosion

- a Lithium-battery-powered Device ? “Yes”
- Spontaneous Combustion ? “Not Sure”
- Defective or Counterfeit Device ? “Not Known”
- Possibilities of Prevention? “Yes”

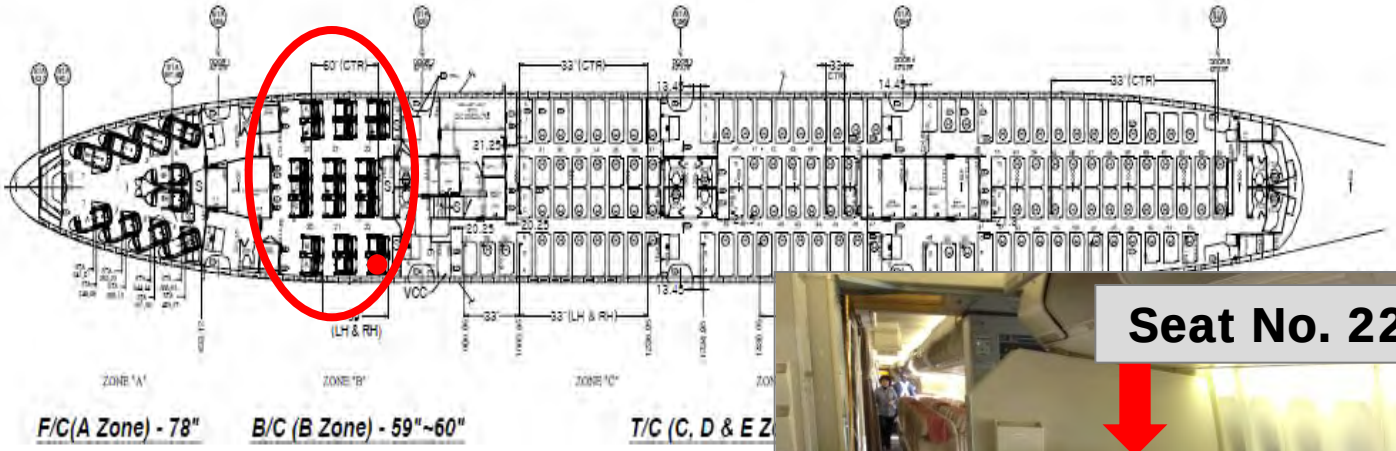
Contents

Factual Information

◇ Flight Information

- Date : Feb. 27, 2013 (45 min. before landing)
- Carrier & Flight No. : ooo Airlines, Flight 101(NRT/ICN)
- Type of Aircraft : B747-400
- Number of Crewmembers : 17 (2/15)
- Number of Passengers : 256 (5 in B/C, 251 in T/C)

Factual Information

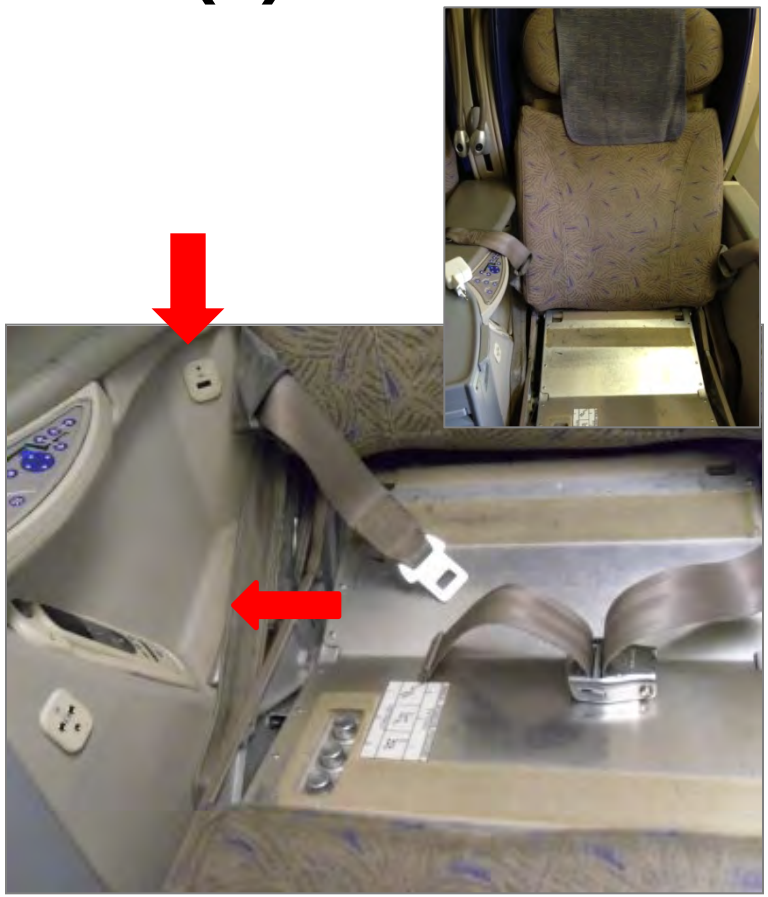


◇ B747-400, B Zone

Factual Information

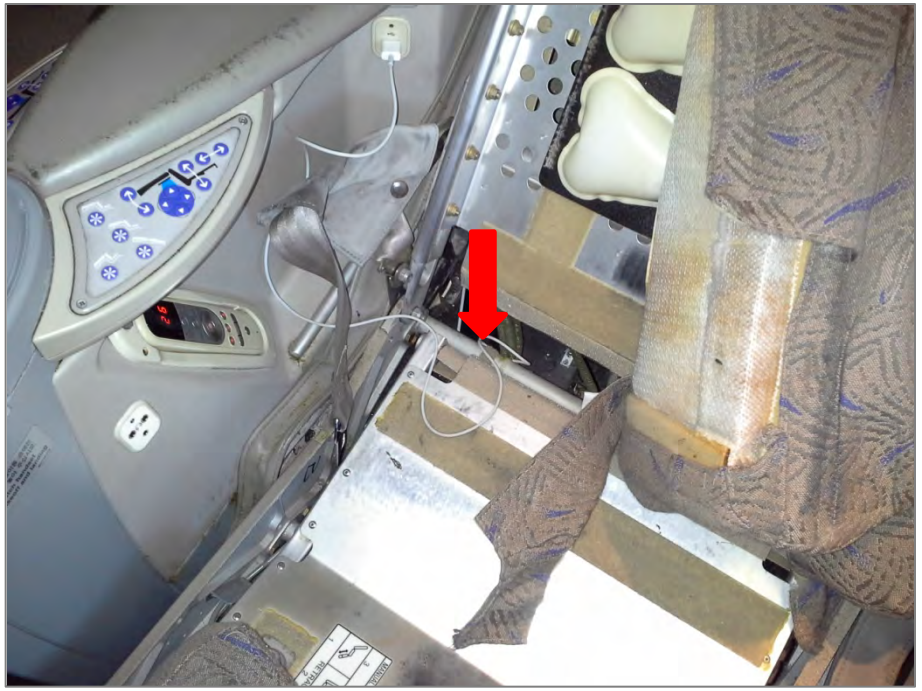
◇ Close-look at the Passenger's Seat(1)

- Weber Aircraft 7800 Series



Factual Information

◇ Close-look at the Passenger's Seat(2)

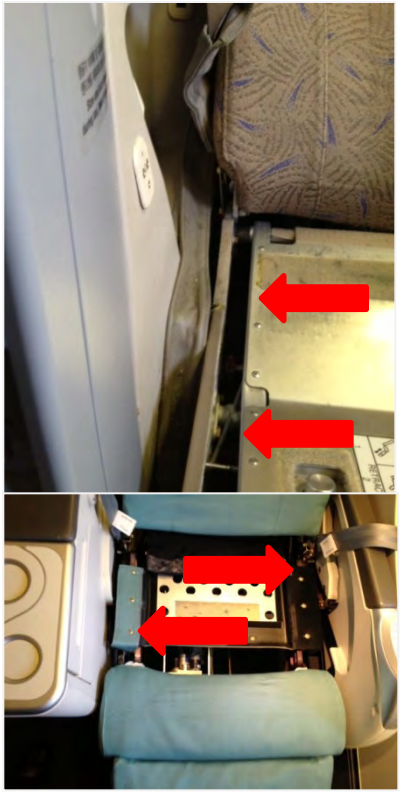


Factual Information

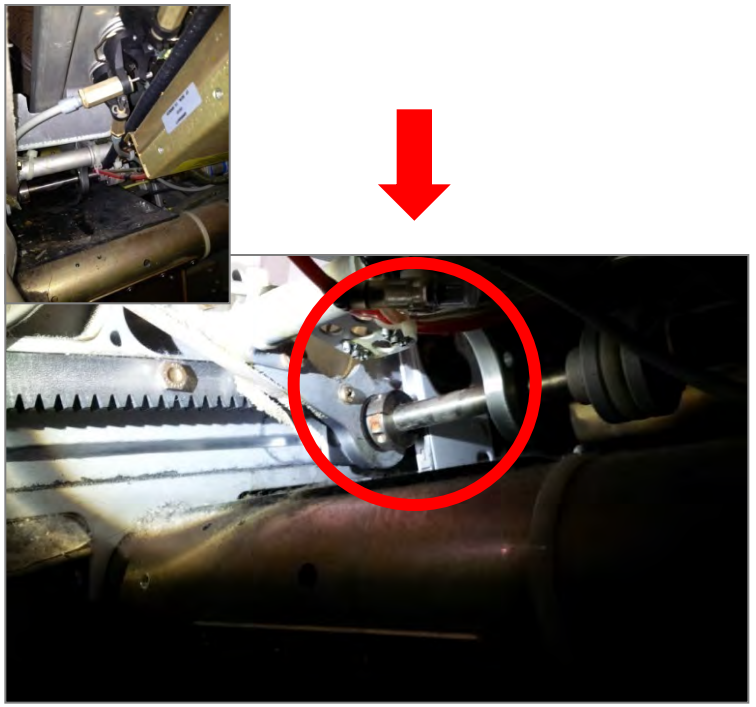
◇ If there were …, it would not happen…

• storage for PED

• edges covered-up



• PED fallen and trapped



(bottom view, Seat Control Mechanism)

Contents

Recommended Action 1

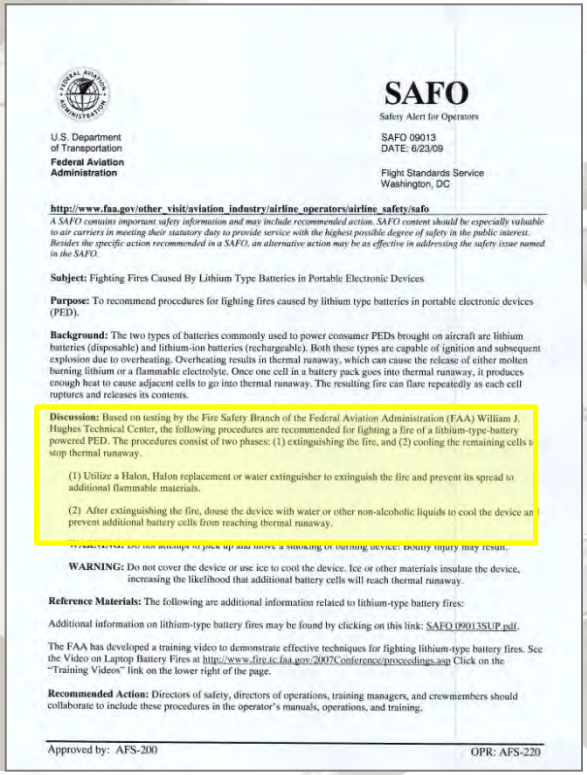
◇ Safety Procedures and Training

- To raise awareness passengers who use and/or charge PED
- To fight fires caused by lithium-battery powered PED (SAFO 09013)

Recommended Action 1

◇ SAFO 09013 (June 23, 2009)

- Recommended Fire Fighting Procedures of a Lithium-battery Powered PED



SAFO

Safety Alert for Operators

U.S. Department of Transportation
Federal Aviation Administration

SAFO 09013
DATE: 6/23/09

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

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

Subject: Fighting Fires Caused By Lithium Type Batteries in Portable Electronic Devices

Purpose: To recommend procedures for fighting fires caused by lithium type batteries in portable electronic devices (PED).

Background: The two types of batteries commonly used to power consumer PEDs brought on aircraft are lithium batteries (disposable) and lithium-ion batteries (rechargeable). Both these types are capable of ignition and subsequent explosion due to overheating. Overheating results in thermal runaway, which can cause the release of either molten burning lithium or a flammable electrolyte. Once one cell in a battery pack goes into thermal runaway, it produces enough heat to cause adjacent cells to go into thermal runaway. The resulting fire can flare repeatedly as each cell ruptures and releases its contents.

Discussion: Based on testing by the Fire Safety Branch of the Federal Aviation Administration (FAA) William J. Hughes Technical Center, the following procedures are recommended for fighting a fire of a lithium-type-battery powered PED. The procedures consist of two phases: (1) extinguishing the fire, and (2) cooling the remaining cells to stop thermal runaway.

(1) Utilize a Halon, Halon replacement or water extinguisher to extinguish the fire and prevent its spread to additional flammable materials.

(2) After extinguishing the fire, douse the device with water or other non-alcoholic liquids to cool the device and prevent additional battery cells from reaching thermal runaway.

WARNING: Do not cover the device or use ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.

Reference Materials: The following are additional information related to lithium-type battery fires:

Additional information on lithium-type battery fires may be found by clicking on this link: SAFO 09013SUP.pdf.

The FAA has developed a training video to demonstrate effective techniques for fighting lithium-type battery fires. See the Video on Laptop Battery Fires at http://www.fire.tc.faa.gov/2007Conference/proceedings.asp Click on the "Training Videos" link on the lower right of the page.

Recommended Action: Directors of safety, directors of operations, training managers, and crewmembers should collaborate to include these procedures in the operator's manuals, operations, and training.

Approved by: AFS-200 OPR: AFS-220

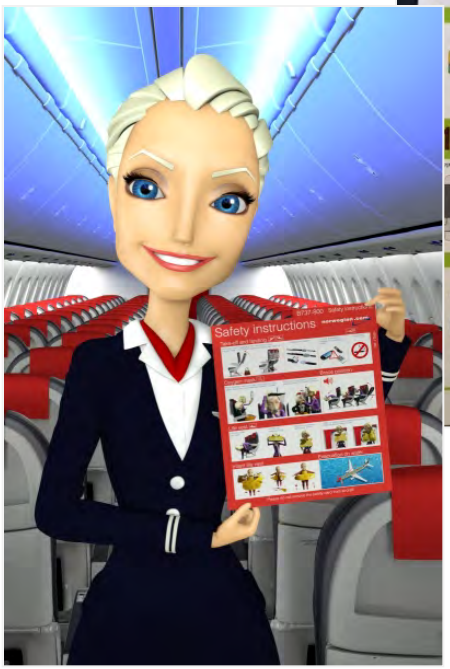
(1) extinguishing the fire to utilize a Halon, Halon replacement or water extinguisher to prevent its spread to additional flammable materials

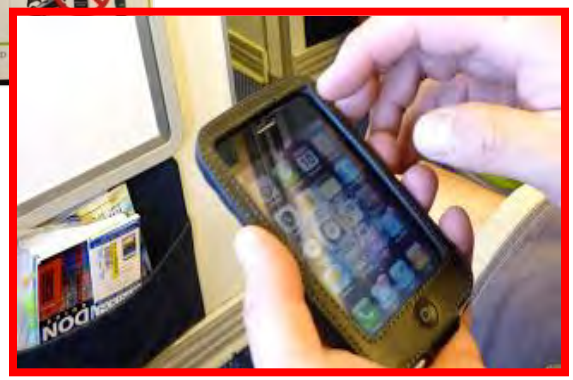
(2) cooling the device to douse with water or other non-alcoholic liquids to stop battery cells reaching thermal runaway

Recommended Action 2

◇ Fire Safety Precautions

- Passenger Safety Briefing Cards
- Pre-flight Safety Demonstration





Recommended Action 3

◇ Risk Mitigation with New Seat Design(1)

- storage around power outlet

Recommended Action 3

◇ Risk Mitigation with New Seat Design(2)

- Safer location of USB port

Recommended Action 3

◇ Risk Mitigation with New Seat Design(3)

- Built-in grooves

- Small pockets


THANK YOU