

Executive Summary

On 11 April, 2014, China Airlines, flight CI 7916, a B737-800 aircraft, registration number B-18601, departed from Yangon to Taipei. At 12:55 Taipei time, at cruise altitude of 35,854 ft, cabin crew 1R heard a “Ban” sound and smelled something burning. Meanwhile she received a passenger report that have smoke came out from the ceiling. After check of, cabin crew 1R found that near the 1L door a dark spot on the ceiling and drops of dark dripping material were observed. Cabin crew 1R notified the chief and had had the fire extinguisher ready. Cabin crew 1R spoke to chief that she has a kind of feel which like having an electric shock when touching the ceiling panel. The cabin manager switched off the electric power of the equipments in the forward galley 2.

Cabin manager suspected that there was a hidden fire. Since the aperture on the ceiling panel was too small, for the sake of identified the fire source that need to chop the aperture to make it larger by an ax. There was only ax which in the cockpit. The captain agreed to provide the ax after cabin manager notified the flight crew. Cabin crew 1R obtained ax and trying to chop the aperture and make it larger. During the chopping process there has a approximately 30 cm in length electric arc shot from the aperture. The electric arc has ceased after the Cabin crew 1R shot the fire extinguisher into the aperture. The captain also seeing the electric arc shot from the aperture, then he turn back to the cockpit carried out the cockpit smoke procedure the flight divert to Bangkok. There were 155 passengers and 8 flight crew on board and the flight landed safely at Bangkok airport at 14:43 Taipei time.

According to Article 6 of the ROC Aviation Occurrence Investigation Act, and the content of Annex 13 to the Convention on International Civil Aviation (Chicago Convention), which is administered by the International Civil Aviation Organization (ICAO), the Aviation Safety Council (ASC), an independent agency of the ROC government responsible for civil aviation occurrences investigation. The occurrence was occurred in the territory of Thailand. After the power of the investigation was delegated by the director department of the Thailand Government the ASC commenced the investigation. The investigation team included members from operator, China Airlines, Civil Aeronautics Administration Taiwan and the state of manufacture, represented by NTSB (National Transport Safety Board, USA) including technical advisor from Boeing.

The Investigation Draft Report was finished on December, 2014 and the final draft was sent to parties for comments after the approval at the 29th Council Meeting on 23rd December, 2014. Investigation Report was published after approval by the ASC council members on 27th January, 2015, at the 30th Council Meeting.

There are 5 findings and 4 safety recommendations as the result of this investigation.

Finding(s) related to the probable causes

1. The forward galley 2 electric wire and the ceiling panel existing compression situation. The vibration of normal operation caused the wire to rubbing against the ceiling panel. The conducting wire inside the electric wire and graphite fibers inside the ceiling panel was exposed due to the rubbing against each other. The situation of direct compression was existed between the conducting wire and the graphite fibers. And then the short circuit happened between the left hand side of the panel and the metal beam. The metal beam was melted and discolored. It shows the electric circuit from conducting wire to the right hand side of panel, then from the left hand side of panel to the metal beam. It formed a short to ground circuit. That caused the electric arcing happened in the cabin.
2. There are 2 probable causes regarding to the situation of the compression between the Forward galley 2 electric wire and the ceiling panel.
 - 16 years ago, the occurrence aircraft shop out, the forward galley 2 wire compressed to the ceiling panel, since the wire wrap was close type the occurrence did not occur; 8 years ago, the mechanic reinstalled the clamp and wire in accordance with EO instruction, but the wire wrap was changed to open type, the wire compressed to the ceiling panel directly. The vibration of normal operation caused the electric wire to rubbing against the ceiling panel. The conducting wire inside the electric wire and graphite fibers inside the ceiling panel was exposed and compressed each other. The occurrence of electric arcing in the cabin was occurred.
 - 16 years ago, the occurrence aircraft shop out, the forward galley 2 wire did not compress to the ceiling panel, the occurrence did

not occur; CAL did not train the mechanic regarding the positioning marking before remove and reinstall the components, 8 years ago, the mechanic did not perform positioning marking when the EO was performed, EO content did not include the positioning marking step, all above cause the clamp was installed onto the fore side of the fastener mistakenly, the wire compressed to the ceiling panel. The vibration of normal operation caused the electric wire to rubbing against the ceiling panel. The conducting wire inside the electric wire and graphite fibers inside the ceiling panel was exposed and compressed each other. The occurrence of electric arcing in the cabin was occurred.

Finding(s) related to the risk

No related findings.

Other Finding(s)

1. The paper form work recommendation sheet did not keep in file, so that the inspection record did not agree with inspection photo, shows that the procedure of paper form work recommendation sheet needs to be reviewed.
2. There are different concepts between the cabin crews for the way of performed CQR, that might cause the important procedure were missed, and effect upon the cooperation of the cabin crew.
3. The FG2 manufacturer issued a SB after the occurrence. The purpose of the SB was offered an improvement measures for the problem of the installation direction of the wire clamp. Inspect the wire condition, relocated the clamp position if necessary. CAL have had relocated the clamp position of the fleet in accordance with the SB. The compress situation of the wire bundle and ceiling panel were eliminated.

Safety Recommendations

CAL presents the actions taken which arise from the Safety Recommendations were all accomplished. Therefore it's no more recommendation to be submitted.

On Nov. 28th 2014, the ASC invited the investigation team (including China Airlines) to attend the technical review meeting. According to the

findings of investigation, the ASC was intent to submit the Safety Recommendations as follow:

1. Educate the members of each specialty maintenance departments, for example: avionics, cabins, general, etc. must perform the positioning marking procedure to identify the original composed positions whenever dismantle the components.
2. The Maintenance Department shall consider the risk that might caused by the human factor, add a warning slogan for the execution of the position marking before dismantling the components on the job cards in a proper manner.
3. The Maintenance Department shall review the paper form work recommendation sheet procedure in order to preserve the correct maintenance records after the tasks.
4. Review the CQR using timing and manner, to prevent the crew missing the important procedure and strengthen the crew cooperation in order when the situation occurring.

Accordance with the supporting evidence submitted by the CAL, the actions taken were accomplished during the investigation process. The Safety Recommendations were intent to submit is not necessary.

Action Taken

CAL Submitted the Action Taken as follow:

1. The problem that may cause by the improper clamp installation is compiled in training material and conducted in EWIS Initial Training Course. B-18601 CI7916 case study is included in EWIS training material and will be discussed in the EWIS annually recurrent training course. The risks of human error are addressed as follows in training material: 『Mark or label wiring route or clamp position per EWIS standard to prevent incorrect installation which can cause an electric arc and lead to a sever hazard.』 The training is compiled in training material and conducted in EWIS Recurrent Training Course.
2. CAL has issued a missive to relevant department for this policy, the abstract of the missive as follows: 『The risk of human error should

be taken into account when issuing a job card. An additional NOTE can be added in job card to remind technician. For example, incorrect installation of clamp orientation could lead to parts damage. Therefore, marks and labels should be made prior to removal to prevent improper installation. 』 Missive has been dispatched to related department on Nov. 27, 2014.

3. CAL EMO should review and revise the procedure of Instruction Sheet and make sure finished work has been recorded correctly. In considering the correctness and integrity of maintenance record, Instruction Sheet was suspended and replaced by AD-Hoc job card. All maintenance data/record can be checked in ERP system. Instruction Sheet had been replaced by AD-Hoc job card since May, 2014. Related procedure (OPM in this case) will be revised on Dec. 31, 2014.
4. CAL Flight Operations Division has revised the Cabin Quick Reference (CQR), Chapter 1-Introduction- “ crew shall check the CQR related handling techniques to ensure contribute towards satisfactory performance after procedures are carried out, if situation permit.” in revision 8, which has been accepted by CAA and will be effective on 01-Jan-2015.