

CI 6416 Occurrence Investigation Executive Summary

On March 31, 2014, at 1304 Taipei local time¹, a Boeing B747-400 airplane, registration number B-18721, operated by China Airlines performing a cargo flight CI 6416 took off from Abu Dhabi International Airport for Taoyuan International Airport. The aircraft had 3 pilots on board and there was no anomalies had been found during climb and cruise.

The flight crew had the approach briefing before descent, they discussed landing configuration, decided to set the flap 25 and vacate at the end of runway due to heavy landing weight, also decided to apply autoland unless the runway insight, landing clearance received or the runway was clear.

The aircraft was conducted runway 23R instrument approach, While the aircraft was at about 4.1 nautical miles from the airport, the control tower instructed another aircraft at the holding area took off immediately, then cleared CI 6416 to land while it was at about 0.7 nautical miles from the airport. The aircraft was stable on the glide path and centerline of the runway 23R before the height of 100 feet but started to deviate and banked to the right from the centerline after 100 feet, the maximum bank angle was 5.6 degrees. The aircraft touched down at the right side of runway centerline with bank angle of 2.5 degrees to the right, and the right main wing gear veered off the runway edge line two seconds after landing. The aircraft rolled off the runway for about 1,400 feet before returned to the runway, resulted in 6 runway edge lights and a taxiway edge lights damaged. The flight crew then disengaged the autopilot after returned to the runway.

¹ Taipei local time is UTC time + 8 hours.

Flight crew indicated that the aircraft had no anomalies found except they felt the aircraft had unusual attitude at touchdown. They also checked the aircraft condition after taxi back to the ramp and did not find any abnormalities, therefore not informing the aircraft veered off the runway. The flight occurrence has been confirmed when the airport operational personnel found the damaged runway edge lights and tires track outside the runway during runway patrols at next day.

In accordance with the Aviation Occurrence Investigation Act, Republic of China (R.O.C) 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, after confirmation of this occurrence, organized a team to conduct the investigation. The investigation team also included members from operator, China Airlines, Civil Aeronautics Administration R.O.C, Taoyuan International Airport Corporation and the state of manufacture, represented by NTSB (National Transport Safety Board, USA) including technical advisor from Boeing.

The Investigation Draft Report finished on October, 2014 and the final draft was send to parties after the approval at the 28th Council Meeting on 25th November, 2014. Investigation Report was published on March 23rd, 2015 after approval by the ASC council members at the 30th Council Meeting on 27th January, 2015,

There are 10 findings and 5 safety recommendations are concluded after this investigation.

The Safety Council presents the findings derived from the factual information gathered during the investigation and the analysis of the

occurrence. The findings are presented in three categories: findings related to the probable causes, findings related to risk, and other findings.

Findings related to the probable causes identify elements that have been shown to have operated in the occurrence, or almost certainly operated in the occurrence. These findings are associated with unsafe acts, unsafe conditions, or safety deficiencies that are associated with safety significant events that played a major role in the circumstances leading to the occurrence.

Findings related to risk identify elements of risk that have the potential to degrade aviation safety. Some of the findings in this category identify unsafe acts, unsafe conditions, and safety deficiencies, including organizational and systematic risk, that made this occurrence more likely; however, they cannot be clearly shown to have operated in the occurrence alone. They also identify risks that increase the possibility of property damage and personnel injury and death. Further, some of the findings in this category identify risks that are unrelated to the occurrence, but nonetheless were safety deficiencies that may warrant future safety actions.

Other findings identify elements that have the potential to enhance aviation safety, resolve an issue of controversy, or clarify an issue of unresolved ambiguity. Some of these findings are of general interest and are not necessarily analytical, but they are often included in ICAO format accident reports for informational, and safety awareness, education, and improvement purposes.

Finding(s) related to the probable causes

1. The flight crew selected autoland under good weather condition, and did not notify ATC to confirm if the ILS sensitive area was

protected. There was another airplane takeoff and passed over the ILS sensitive area while the CI 6416 was on final landing phase in the same runway, resulting in ILS signal interference.

2. When touch-down, the autopilot and navigation system were affected by the interfered ILS signals, making the aircraft deviate from runway centerline. Flight crew did not maintain situational awareness, and manually control the aircraft by disengaging the autopilot when it behaved unexpectedly. As a result, the aircraft veered off the runway.

Finding(s) related to risk

1. The standard callout procedure training and Evidence Based Training (EBT) of China Airlines that simulated line operation scenario did not review the effectiveness of the training results according to current training system, and develop a specific scenario that reflects actual line operation risks to enhance the training effectiveness.
2. The relevant manuals at China Airlines did not regulate specifically if it is allowed to manually override autopilot and a standard regarding deviation from runway centerline during landing, making prevention of runway veer-off events more difficult.

Other finding(s)

1. All related licenses of the flight crews are in accordance of the current civil aviation regulations. No evidence shows the flight crew was under influence of alcohol during the flight.
2. The investigation did not have any finding regarding aircraft maintenance, airworthiness and airport facilities.

3. Under single runway operation, the traffic controllers at Taoyuan International Airport will have increased workload during heavy traffic or highly closure rate between the airplane.
4. The management at Taoyuan International Airport did not truly follow airport safety management system provisions to re-identify possible risk factors, and execute all relevant safety risk assessment and control.
5. China Airlines staffs kept conducting daily after-flight check and pre-flight check with aircraft power on, without observing the aircraft had veered-off runway, causing critical CVR voice data overwritten after the occurrence.

Safety Recommendations

To China Airlines

China Airlines has been improving or already improved the deficiencies that the investigation finding has been found by ASC.

To Civil Aviation Authority (CAA)

1. Supervise national carriers on training regarding autoland, its standard callouts, and the effectiveness of Evidence Based Training.
2. Supervise national carriers on training and alertness over aircraft anomalies, and implement relevant staff on their duties of daily checks and pre-flight checks.

To Taoyuan International Airport Corporation

1. Enhance runway foreign object detection and prevention mechanism.

2. Implement the changing management procedures as regulated in airport safety management system. When activation condition is met, re-identify risk factors to confirm if they generate new hazards so that follow-on safety risk management actions can be taken.