CIVIL AVIATION AUTHORITY OF THE PHILIPPINES
Aircraft Accident Investigation and Inquiry Board
Aircraft Accident Report

BASIC INFORMATION

Aircraft Registration No.	:	B-5498
Make and Model	:	Boeing 737-800
Owner/Operator	:	Xiamen Airlines
Address of Operator	:	Xiamen, China
Date/Time of Accident	:	August 16, 2018 / 2355H (1555UTC)
Type of Operation	:	Scheduled Commercial Passenger
Phase of Operation	:	Landing
Type of Occurrence	:	Runway Lateral Excursion
Place of Accident	:	Ninoy Aquino International Airport (RPLL) Manila, Philippines

EXECUTIVE SUMMARY

On August 16, 2018, about 1555UTC/2355H local time, a Boeing 737-800 type of aircraft with Registry No. B-5498 operating as flight CXA 8667 sustained substantial damage following a runway excursion after second approach while landing on Runway 24 of Ninoy Aquino International Airport (NAIA), Manila, Philippines. The flight was a scheduled commercial passenger from Xiamen, China and operated by Xiamen Airlines. The one hundred fifty-seven (157) passengers and two (2) pilots together with the five (5) cabin crew and one air security officer did not sustain any injuries while the aircraft was substantially damaged. An instrument flight rules flight plan was filed. Instrument Meteorological Conditions (IMC) prevailed at the time of the accident.

During the first approach, the Captain who was the pilot flying aborted the landing at 30 feet Radio Altitude (RA) due to insufficient visual reference. A second approach was considered and carried out after briefing the First Officer (FO) of the possibility of another aborted landing should the flight encounter similar conditions. The briefing included a diversion to their planned alternate airfield.

The flight was “stabilized” on the second approach with flaps set at 30 degrees landing position, all landing gears extended and speed brake lever appropriately set in the ARM position. On passing 1,002 feet Radio Altitude (RA), the autopilot was disengaged; followed by the disengagement of the auto-throttle, three (3) seconds later.

The ILS localizer lateral path and Glide slope vertical path were accurately tracked and no deviations were recorded. The “reference” landing speed for flaps 30 for the expected aircraft gross weight at the time of landing was 145 knots and a target speed of 150 knots was set on the Mode Control Panel (MCP). The vertical descent rate recorded during the approach was commensurate with the recommended descent rate for the profile angle and ground speed; and was maintained throughout the approach passing through the Decision Altitude (DA) of 375 feet down to 50 feet radio altitude (RA).

As the aircraft passed over the threshold, the localizer deviation was established around zero dot but indicated the airplane began to drift to the left of the centerline followed by the First Officer (FO) making a call out of “Go-Around” but was answered by the Captain “No”. The

throttle levers for both engines were started to be reduced to idle position at 30 feet RA and became fully idle while passing five (5) feet RA. At this point, the aircraft was in de-crab position prior to flare. At 13 feet RA, the aircraft was rolling left and continuously drifting left of the runway center line.

At 10 feet RA another call for go-around was made by the FO but was again answered by the Captain with "No" and "It's Okay". At this point, computed airspeed was approximately 6 knots above MCP selected speed and RA was approaching zero feet. Just prior to touchdown, computed airspeed decreased by 4 knots and the airplane touched down at 151 knots (VREF+6). The wind was recorded at 274.7 degrees at 8.5 knots.

Note:

1. *VREF is the reference landing approach speed based on aircraft landing weight and flaps configuration for landing.*
2. *De-crab is a maneuver to straighten the aircraft in the air just before touchdown by means of the aircraft rudder.*
3. *Flare is a maneuver to reduce the rate of descent just before touchdown by means of the aircraft elevator.*

Data from the aircraft's flight data recorder showed that the aircraft touched down almost on both main gears, to the left of the runway centerline, about 741 meters from the threshold of runway 24. Deployment of the speed brakes was recorded and auto brakes engagement was also recorded. The auto brakes subsequently disengaged but the cause was undetermined.

Upon touchdown, the aircraft continued on its left-wards trajectory while the aircraft heading was held almost constant at 241 degrees. After the aircraft departed the left edge of the runway, all landing gears collided with several concrete electric junction boxes that were erected parallel outside the confines of the runway pavement.

The aircraft was travelling at about 147 knots as it exited the paved surface of the runway and came to rest at approximately 1,500 meters from the threshold of Runway 24, with a geographical position of 14°30'23.7" N; 121°0'59.1" E and a heading of 120 degrees (Figure 1).

Throughout the above sequence of events from touchdown until the aircraft came to a full stop, the CVR recorded 2 more calls of "GO-AROUND" made by the FO.

Throughout the landing sequence, the thrust reversers for both engines were not deployed. Throttle Lever Position (TLP) were recorded and there was no evidence of reverse thrust being selected or deployment of reversers.

After the aircraft came to a complete stop, the pilots carried out all memory items and the refence items in the evacuation non-normal checklist, which includes extending the flaps to a 40 degrees position. The aircraft suffered total loss of communication and a failure in passenger address system possibly due to the damage caused by the nose gear collapsing rearwards and damaging the equipment in the E/E compartment or the E-buss wires connecting the Very High Frequency (VHF) 1 radio directly to the battery was broken. The Captain then directed the FO to go out of the cockpit to announce the emergency evacuation. The cabin crew started the evacuation of the passengers utilizing the emergency slides of the left and right forward doors. There were no reported injuries sustained by the passengers, cabin crew, flight crew or the security officer.

- **Safety Corrective Actions by Xiamen Airlines**

  Following the occurrence, Xiamen Airlines initiated the following safety corrective actions:

  a. Relevant manuals were reviewed and revised.
  b. The GO-AROUND POLICY was reviewed and strengthen.

c. Training in rain and on wet contaminated runway during night operation were added to the initial and recurrent simulator training of Boeing 737 pilots. This is to cultivate the decisive ability in the critical phase of flight and improve operating capability in adverse weather conditions and special circumstances.

d. Deeply analyzed the effect of unstable approach and adverse weather conditions to operational safety.

e. It was specified in Standard Operations Procedures that take-off and landings are prohibited in heavy rains, and landing in moderate rain is prohibited during night flight where there is no runway center line light or center line light is unavailable.

f. Strengthen the policy and training regulations on safety culture for Non-Chinese pilots.

g. Ensure that all safety regulations and standards, and cultural concept of both CAAC and Xiamen Airline are effectively published, accepted and implemented by Non-Chinese pilots.

h. Analyzed the CRM habits and characteristics of Non-Chinese pilots; increased the daily communication and proficiency cooperation between Chinese and Non-Chinese pilot.

i. Optimized the safety meetings to improve the cooperation ability among multi-national pilots.

j. Defined the function of operational risk control, identified the operational risk points of operation system, and provide timely updates involving weather information to flight crew on arrival airports.

- **Safety Corrective Actions taken by MIAA**

  As a result of the accident, MIAA performed rehabilitation of runway 06/24 strip and concrete electric junction box. The rehabilitation is in compliant with the required transition slope as well as with the standards stated in CAAP Manual of Standards for Aerodromes and ICAO that may compromise the safety of aircraft.

FINDINGS

- **Aircraft**

a. The aircraft was certified, equipped and maintained in accordance with Civil Aviation Authority of China (CAAC) regulations and approved procedures.

b. The aircraft has a valid Certificate of Airworthiness, Registration and had been maintained in compliance with CAAC regulations.

c. The Maintenance records indicated that the aircraft was equipped and maintained in accordance with Boeing existing regulations and approved procedures was provided by the Aircraft Maintenance and Engineering Department of Xiamen Airlines.

- **Flight Operations**

a. The flight was conducted in accordance with the procedures in the Company Operations Manual.

b. The flight crew carried out normal radio communications with Manila Approach and Tower Controller.

c. The Captain was the pilot flying during the two approaches to ILS runway 24 of Ninoy Aquino International Airport.

d. At 46 feet and 10 feet respectively, the FO made a call out of go-around but the captain disregarded the call.

e. The aircraft touched down on runway 24 almost on both wheels at the left portion of the runway about 741 meters from the threshold and exited the runway.

f. As the aircraft continued to roll parallel the runway both main landing gears and the nose gear collided with several cemented electric junction boxes resulting in the LH Main Gear and Left Engine to be sheared off. The cemented electric junction boxes at the grassy soft ground were inconsistent with the CAAP Aerodrome MOS.

g. RH Main landing gear were folded inwards into the RH Wheel Well, the Nose Landing Gear was folded backwards damaging the E/E Bay.

h. The pilots were unable to respond to calls from the ATC and neither make any calls to ATC. The pilots were also unable to communicate with the cabin crew through the service interphone system and to make announcements using the passenger address system.

i. The failure of the aircraft communications systems were probably due to the damage to the E/E bay compartment and broken wires directly connecting the E-Buss of the VHF-1 to the battery.

j. The aircraft finally settled at a distance about 1500 meters from the threshold of Runway 24 with last heading of 120 degrees.

- **Weather**

a. At the time of accident there were thunderstorms and intermittent heavy rains observed.

- **Aircraft Recovery**

a. Telescopic wheeled type crane lifting capacity specified in Disabled Aircraft Removal Plan (DARP) manual for NAIA is only limited to 50 tons.

CAUSE FACTORS

Primary Cause Factors

a. The decision of the Captain to continue the landing on un-stabilized approach and insufficient visual reference.

- The Captain failed to maintain a stabilized landing approach moments before touchdown, the aircraft was rolling left and continuously drifting left of the runway centerline.

- The Captain failed to identify correctly the aircraft position and status due to insufficient visual reference caused by precipitation.

b. The Captain failed to apply sound CRM practices.

- The Captain did not heed to the First Officer call for a Go-Around.

Contributory Factors

a. Failure to apply appropriate TEM strategies

Failure of the Flight Crew to discuss and apply appropriate Threat and Error Management (TEM) strategies for the following:

- Inclement weather.
- Cross wind conditions during approach to land.
- Possibility of low-level wind shear.
- NOTAM information on unserviceable runway lights.

b. Inadequate Company Policy on Go-Around

- Company's Standard Operation Procedures were less than adequate in terms of providing guidance to the flight crew for call out of "Go-Around" during landing phase of the flight.

c. Runway strip inconsistent with CAAP MOS for Aerodrome and ICAO Annex 14

- The uneven surface and concrete obstacles contributed to the damage sustained by the aircraft

SAFETY RECOMMENDATIONS

As a result of this investigation, the Aircraft Accident Investigation and Inquiry Board made the following safety recommendations:

- For Xiamen Airlines to review and strengthen their policies of actions to be taken by the pilot flying once a call out of "Go-Around" is made by the pilot monitoring during landing.

- For Xiamen Airlines to establish policies on no fault "Go-Around" and to ensure that it is being implemented, understood by flight crew thru inclusion in their initial and recurrent training.

- For Xiamen Airlines to review recurrent ground training syllabus to improve/adapt CRM and TEM with consideration to company in-service scenarios like this accident and other findings as a result of flight crew interview in the conduct of their flight data monitoring (FDM) program.

- For MIAA to review Disabled Aircraft Removal Plan (DARP) and ensure the suitability of equipment to the current operation of NAIA.

- For CAAP to disseminate the above Safety Recommendations to Philippine Operators.