

AE 369 Occurrence Investigation

Executive Summary

On August 17, 2012, a Mandarin Airlines ERJ-190 aircraft with registration number B-16825 was on a scheduled passenger flight AE 369 from Songshan Airport for Makong Airport, Penghu with 2 flight crew members, 1 mechanic, 3 cabin crew members and 104 passengers in total 110 people on board. When landing on Runway 20 at Makong Airport, the aircraft veered off to the left side of the runway grass field at the end of runway, the aircraft nose landing gear was ruptured and fuselage skin was damaged due to collided with 4 handholds during landing roll. All people on board were safe.

The ASC launched the investigation according to the Aviation Occurrence Act after the occurrence. Parties invited to the investigation include: Civil Aeronautics Administration, Ministry of Transportation and Communications (CAA), Air Force Command Headquarters, Ministry of National Defense, R.O.C., Mandarin Airlines, Centro de Investigação e Prevenção de Accidents Aeronáuticos (CENIPA) and Embraer (ERJ aerospace company). The investigation report was published after the approval by the ASC council members on July 30, 2013, at the 13th Council Meeting.

Findings as the result of this investigation

During landing phase, the flight crew early flare the aircraft, did not timely retract the thrust lever to idle position. The flight crew continued holding to the control column and did not initiate a go around or reject landing after the aircraft landed beyond the touchdown zone. After landing, the flight crew did not apply the best deceleration procedures, incorrectly considered the aircraft encountered hydroplaning and intentionally controlled the aircraft out of the runway to the grass field when approaching the end of runway. The aircraft hit the handholds of the taxiway edge lights during landing roll and damaged the nose landing gear.

Findings related to risks:

Flight operation related findings: The ERJ-190 manual recommended the flight crew applied the FLAPS FULL landing configuration during landing when

the aircraft was heavy and landing at wet or short runway. However, in this occurrence the flight crew applied the FLAPS 5 configuration during landing. Mandarin Airlines ERJ Flight Operation Manual did not include runway pavement characteristics, runway landing distance calculation, landing skill and touchdown zone judgment specification, nor have landing performance and operation guidance for the wet/slippery runway. Mandarin Airlines relevant manuals did not include the standard call-out when aircraft was deviating from normal operation range therefore the flight crew was unable to enhance situation awareness effectively. Mandarin Airlines ERJ different thrust reducing procedure during landing might caused flight crew's confusion, and finally, the landing performance information in QRH (Quick Reference Handbook) neither includes landing distance information on wet runways nor the extra 15% safety margin for landing.

Airport related findings: Some of the concrete structure within runway strip at Makong Airport was not installed in accordance with 'Civil Aerodrome Design and Operation Standards' recommended : Within the general area of the strip adjacent to the runway, measures should be taken to prevent an aeroplane's wheel when sinking into the ground, from striking a hard vertical face. The uncovered ditch, 85 meters to the runway centerline, parallel to Makong Airport runway 02 was not on graded in accordance to the 'Civil Aerodrome Design and Operation Standards' recommended that the portion of a runway strip should be graded for a precision approach runway.

The Aviation Safety Council issued a total of 7 safety recommendations.

Recommendations to Mandarin Airlines include: Enhance flight crew training on operation, judgment and response to follow the procedures recommended in the manual during landing phase in different condition. Consider to revise standard call out in relevant manual whenever aircraft deviating from normal operation range. Recommend flight crew to choose full flap configuration during wet, heavy weight/short runway landing as the manual recommended. Recommended operator to acquired sufficient landing performance data, such as landing distance at wet runways or other performance data that may affect landing distance condition, consider the actual landing distance to reflect the operator's specific operational practices, procedures, training and experience and provide the extra 15% safety margin landing distance data for flight crew's reference during

approach. **Recommendations to CAA** include: Supervise Mandarin Airlines to add extra 15% safety margin landing distance data for flight crew's reference during approach. Supervise Mandarin Airlines to revise standard call out in relevant manual whenever aircraft deviating from normal operation range. Supervise Mandarin Airlines to enhance flight crew flare operation during landing phase, enhance flight crew's judgment and response training. Supervised Mandarin Airlines' flight crew adhere to procedure as the manual recommended to choose full flap configuration during wet, heavy weight /short runway landing in different condition. Examine all national airports followed 'ICAO ANNEX 14' and 'Civil Aerodrome Design and Operation Standards' to adopt measures to prevent aircraft from hitting the hard vertical surface of any objects within runway area when aircraft wheels sink in the grass field. Examine ditches within a precision approach runway leveling area shall be leveled or covered to prevent aircraft damage after veering off the runway. **Recommendations to Air Force Command Headquarters, Ministry of National Defense, R.O.C:** Examine all national military and civilian jointly airport to follow 'ICAO ANNEX 14' and 'Civil Aerodrome Design and Operation Standards' to adopt measures to prevent an aeroplane's wheel, when sinking into the ground, from striking a hard vertical face.