

B-28017 Occurrence Investigation

Executive Summary

On June 16, 2014, a Far Eastern Air Transport MD-82 passenger airplane, flight number FE061, registration number B-28017, flew from Songshan Airport to Kinmen Airport to execute a scheduled passenger transportation mission. The flight departed with 2 flight crew members, 4 cabin crew members and 98 passengers, totally 104 people.

The pilot seated at the left hand side as the pilot flying. The copilot seated at the right hand side as the pilot monitoring. The airplane took off from runway 10 at 0752 Taipei time and departed Songshan Airport by standard instrumental departing procedures. At 0756, the airplane climbed through altitude 7,700 feet. The flight crew reported to the System Operation Control Center about airplane took off time and scheduled arrival time; while at the same time, the flight crew knew that the visibility of destination airport was below minimum landing standard. At 0802, the airplane reached altitude 20,000 feet and changed to level flight. After finishing captain broadcasting, the flight crew listened to Automatic Terminal Information Service (ATIS) system and knew that the visibility of destination airport was changed to 2,800 meters. At 0816, the airplane descended to altitude 19,000 feet. At 0818, the airplane obtained permission from Kaohsiung approach to land on runway 24 via radar guidance. During descent, at 0833 the flight crew listened to ATIS again. Weather information at that time was: visibility 2,800 meters, wind direction 170 degrees, wind speed 22 knots, wet runway condition and using runway 24 to land. At 0835, Kaohsiung approach informed flight

crew about using runway 06 to land suggested by the Air Traffic Control (ATC) tower. The flight crew replied due to wind speed over limit, they did not acknowledge the suggestion from the ATC tower. Then, based on weather information, the flight crew calculated tail wind speed and found that it did not over wind limitation of runway 06. The flight crew thought they could approach to land using runway 06. Therefore, the crew applied for runway 06 Instrument Landing System (ILS) approach. Kaohsiung approach then immediately provided wind direction and wind speed (160 degrees, 22 knots) information to the crew; and requested for confirmation whether the crew applied for runway 06 ILS approach or not. The crew replied positive. At 0845, the flight crew communicated with Kinmen ATC tower. Kinmen ATC tower then reported wind direction 160 degrees, wind speed 19 knots to the crew and the airplane was cleared to land.

Cockpit Voice Recorder (CVR) transcript revealed that during the before landing check procedures, the flight crew had moved spoiler lever to armed position. During continuously approach, the crew had mentioned about strong tail wind and requested the ATC tower to reconfirm wind information. The ATC tower replied were: wind direction 160 degrees, wind speed 22 knots. At 0850, the copilot called out that ground was visible. Later on, the pilot requested the copilot to turn on the wiper and the copilot turned wiper speed to “fast”. At 0851:03, the pilot disengaged auto pilot and called out “strong wind and shower of rain”. At that time, the altitude was about 500 feet and the distance to runway was about 1.6 knots. At 0851:27, the pilot disconnected auto throttle. At 0851:51, the pilot called out “don’t retard, don’t retard, don’t retard”. At 0851:57, CVR transcript had recorded the sound of spoiler activation. At 0852:00, the pilot called out “throttle is closed, sir reverse”. At 0852:02, Flight

Data Recorder (FDR) “Flight/Ground” parameter turned into “Ground” mode. At 0852:05, “Flight/Ground” parameter had temporarily turned into “Flight” mode then returned to “Ground” mode. From 0852:19 to 0852:29, FDR data showed that the output of thrust reverse was increased. The maximum engine pressure ratios of left and right engines had reached 1.7 and 2.1 respectively.

The flight crew expressed that the airplane touched down at 2,500 feet from the displaced threshold of runway 06. The landing was normal but had a strong cross wind. The pilot kept engine power to approach and landing and retarded throttle to idle before touch down. Upon touch down, the spoiler was extended and then retracted. Because the pilot was busy in cross wind correction, the pilot did not manually re-extend the spoiler. After the airplane touched down, the pilot did not use fully thrust reversers to reduce speed. Because airplane speed reduction was slow, the pilot applied full thrust reversers and brakes after the airplane passing through about half of the runway. But the airplane still could not be stopped before the end line and ran into the safety zone of runway 06.

During the operations of landing and speed reduction, the airplane did not collide with any ground facility. The airplane was not damaged either. After the incident, the investigation team together with FAT maintenance personnel performed inspection and test of the airplane. From the download data of airplane digital flight navigation computer, there was no fault record during the incident flight. The test results of airplane systems related to speed reduction were all normal.

The Aviation Safety Council (ASC) is an independent agency responsible for civil aviation, public aircraft and ultra-light vehicle occurrences investigation. According to the Republic of China Aviation

Occurrence Investigation Act and referencing to the related content of Annex 13 to the Convention of International Civil Aviation Organization (ICAO), the ASC launched an occurrence investigation by law. The organization or agency been invited to join the investigation team included: Civil Aeronautics Administration of Ministry of Transportation and Communications, Far Eastern Air Transport, National Transportation Safety Board of United States of America and airplane manufacturer, the Boeing company.

In accordance with procedure, the draft investigation report was revised by the ASC Board members on January 27, 2015, in the 30th Board meeting. The draft report then distributed to related organizations and agencies for comments. The draft investigation report was revised and approved by the ASC Board members on April 28, 2015, in the 32th Board meeting.

Based on the factual information gathered during the investigation and the results of analysis, 10 findings and 6 flight safety recommendations were obtained, Far Eastern Air Transport finished actions were 5 as stated below.

Findings related to probable causes

1. The airplane approached and landed with 21 knots right cross wind condition. The airplane did not perform firm landing and had phenomenon of delay landing. After airplane touched down, the flight crew did not retard the throttle to flight idle immediately due to the operations of cross wind correction and trying to keep the airplane on runway center line. The flight crew lacked of situational awareness when landed on a wet runway and strong cross wind conditions. The flight crew did not re-extend the spoiler after it was retracted. The

flight crew did not apply optimized thrust reversers and maximum brakes in time such that performance of airplane speed reduction was affected after landing. The airplane ran over the end line of runway 06 finally.

Findings related to risk

1. In May 2012, a Far Eastern Air Transport MD-82 passenger airplane had a similar runway overrun occurrence at Magong airport. To prevent runway overrun occurrence from happening again, Far Eastern Air Transport revised its Flight Operation Manual by adding takeoff and landing distance calculation form and the confirmation of landing distance during approach briefing. The flight crew still unfamiliar with the aforementioned landing distance calculation form, referencing to wrong configuration setting and wrong calculation during summing up the landing distance calculations.
2. The airplane touched down at 2,500 feet from the displaced threshold of runway 06 which closed to the touch down zone critical point as specified in the Flight Operation Manual. It might be due to strong cross wind during landing and the flight crew concentrated on the operations kept the airplane on runway centerline. Therefore, the flight crew did not have time to judge whether the airplane landed over touch down zone or not.
3. While the flight crew checked speed reduction related configuration settings before landing, the flight crew did not call out speed and configuration checks. During glide slope interception phase, the flight crew did not call out those of heading, altitude and slope of miss approach settings. When the airplane reached decision altitude, the flight crew did not call out landing or go around. After airplane

touched down, the pilot monitor neither called out no spoiler nor carried out thrust reverser standard call-out. The omission of this standard call-out procedure might affect subsequent airplane speed reduction.

4. Current Far Eastern Air Transport Flight Operation Quality Assurance system operational settings about the monitoring of airplane long flare was different from those specified in the document. Current type of monitoring may not be able to monitor the risk of occurrence of airplane long flare during landing.

Other findings

1. Qualifications of the flight crew complied with current civil aviation regulations. There was no evidence to show that the flight crew had any influences from drugs during the incident flight.
2. The incident flight was nothing related to the airplane airworthiness or weight and balance.
3. The possibility to occur hydroplaning during landing and the factor of speed reduction related system failure that affected the performance of airplane speed reduction can be precluded.
4. During the period after the aircraft was restoring its airworthiness status and the time the occurrence happened, the Flight Operation Division of Far Eastern Air Transport did not find some setting bias in the Flight Operation Quality Assurance data base and the problem of wrong conversion formula used for brake pedal parameter.
5. According to Boeing document, the airplane recorded neither time parameter nor frame counter. Time system of the Flight Data Recorder was based on a sync word counted every 4 seconds. Under this

condition, the judgment of routine flight date and time of Flight Operation Quality Assurance system might be affected. If the synchronized word lost due to airplane encountered temporarily electrical power loss, time changes will be indistinguishable. This will affect the judgment of occurrence.

Safety recommendation

Safety recommendations derived as the result of this investigation are listed. Safety actions that have been accomplished, or are currently being planned by the stakeholders as the result of the investigation process are listed right after the recommendations. It should be noted that the Safety Council has not verified the safety actions.

Safety recommendation to Far Eastern Air Transport

1. Follow those flight operation related manuals to enhance flight crew's situational awareness and related trainings about landing on wet and slippery runway.
2. Examine current monitoring functions of Flight Operation Quality Assurance system and reinforce the monitoring of those items related to runway overrun and runway veer off, such as airplane touch down point, long flare, spoiler and the operations of thrust reverser.
3. Review the procedures of Flight Data Analysis Program, reinforce management mechanism of DFDAU Interface Control Document to ensure the correctness and integrity of recorded data.

Safety recommendation to Civil Aeronautics Administration, Ministry of Transportation and Communications

1. Supervise Far Eastern Air Transport to follow those flight operation related manuals to enhance flight crew's situational awareness and related trainings about landing on wet and slippery runway.
2. Supervise operators of civil aviation by following current related regulations and referencing to those actions done by US and European countries to enhance monitoring functions of Flight Operation Quality Assurance system; and reinforce the monitoring of those items related to runway overrun and runway veer off.
3. Supervise Far Eastern Air Transport to review the procedures of Flight Data Analysis Program and management mechanism of DFDAU Interface Control Document to ensure the correctness and integrity of recorded data.

Safety actions accomplished by Far Eastern Air Transport

1. Issued flight operation note 14-OM-52 to pilots, focusing on those precautionous items when landing on wet and slippery runway with strong cross wind.
2. In the recurrent training curriculum of year 2015, except significant items of wet and slippery runway operation that stated in adverse weather operation, reiterated precautionous items about wet and slippery runway in training guidance.
3. Incorporated Boeing DFDAU Interface Control Document into controlling list and periodically check to ensure its newest revision.
4. After the occurrence, Far Eastern Air Transport sent email service request to Boeing about the problem of wrong wiring diagram showed in Aircraft Maintenance Manual chapter 31-31. Boeing revised the wrong wiring diagram of Aircraft Maintenance Manual and published

on February 2015.

5. Communicated and coordinated with Teledyne Controls to discuss about the revisions of Flight Operation Quality Assurance system database and software.