Executive Summary

On May 16, 2012, a Far Eastern Air Transport flight number FE025 passenger flight, a MD-82 aircraft with registration number B-28037 took off from Songshan Airport for Magong Airport. There were 3 flight crew members, 4 cabin crew members and 165 passengers, total 172 people on board.

The departure flight with captain A occupied the left seat as pilot flying (PF), captain B occupied the right seat as pilot monitoring (PM) and the first officer occupied the observer seat as safety pilot. The aircraft took off from Runway 10, followed a standard instrument departure procedure and leveled at altitude 18,000 feet at 1011:38.

At 1022:41 the aircraft was 49 nautical miles from Magong Airport, the aircraft began to descend. At 1034:15 the aircraft was cleared for VOR approach for Runway 02 by (air traffic control) ATC at altitude 2,000 feet. At 1035:59 and 1036:23 respectively, Magong tower notified crew that the wind direction was 140 degrees, wind speed was 2 Knots and wind direction was 140 degree, wind speed was calm wind on Runway 02. At 1036:30 the crew was notified that a weather system was approaching from southwest of Magong Airport, flight crew should pay attention to the turbulence. At 1037:02 the aircraft was about 3.5 mile from Runway 02 at altitude 760ft, PM called out *"runway in sight, good"*. At 1037:17 and 1037:20 respectively, the PM called out *"the tailwind is too strong"* and *"we should go around".* At 1037:22 the flight crew notified Magong tower that due to strong tailwind they went around and requested another approach. Magong tower requested them to follow the public miss approach procedure.

At 1038:31 the aircraft reported to Kaohsiung Approach. At 1040:50 the aircraft reported that the aircraft went around due to strong tailwind and unstable wind direction. At 1043:18 Kaohsiung Approach notified the aircraft weather information provided by Magong tower, the wind direction was 190 degrees, wind speed was 13 knots with gust up to19 knots, and the wind direction was variable. At 1043:26 the aircraft requested Runway 02for ILS approach. At 1048:52, the aircraft reported to Magong tower again. The Magong tower notified that the wind direction was 190 degrees and wind speed was 11 Knots on Runway 02, while the aircraft was

5 miles on final Runway 02 at altitude 1,700feet.

At 1050:52 the aircraft touched down on Runway 02. At 1050:58 the brake pressure having been built up to 2,700 PSI, and both flight crew called out *"the aircraft could not stop"*. Subsequently the aircraft overran and stopped at about 328 feet (100 meters) beyond the runway end lights at 1050:31. Then the engines were shut down and aircraft was towed to parking position. The aircraft was not damaged and all persons on board were safe.

The ASC is an independent organization responsible for civil, 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 Aviaton Organization (ICAO), the ASC launched an occurrence investigation by law. The organization or agency being invited to join the investigation team included: Civil Aeronautics Administration (CAA), Far Eastern Air Transport. The Final Report was reviewed and approved by the ASC's 11th Council Meeting on May 28, 2013.

There are 18 findings in total and 5 safety recommendations issued to the related organizations in the report.

Findings related to probable causes

1. During the first approach, the flight crew evaluated and decided to go around due to the strong tailwind. During the second approach flight crew did not pay attention to the wind information provided by the air traffic control, and they did not assess the influence of tailwind for safe landing. They continued the approach as a result of the aircraft overrunning the runway. It showed that the flight crew lacked of situational awareness to perform a tailwind landing.

2. Flight crew realized that during ILS final approach if the control tower suggested the flight crew to adopt a VOR approach, the best way was to go around and requested for another approach. The flight crew did not request so but continued the ILS approach. It showed that while encountering a suggestion to change the approach from the tower, the flight crew did not response correctly and immediately.

3. Flight recorder data showed that the tailwind was around 21 knots while the autopilot was disengaged, and the tailwind was about 14 knots while the main landing gears touched down. It showed that during the second approach and landing the tailwind exceeded the 10 knots tailwind limitation as specified in the Flight Operations Manual for landing.

Findings related to Risks

1. The Automated Weather Observing System of tower showed that since 1041 the tailwind was 10 knots or above on Runway 02 with gust up to 19 knots, but the tower did not change the runway in use.

2. According to the Flight Operation Manual of Far Eastern Air Transport, *"if the first go around is due to weather condition, flight crew should request holding and request approach clearance after the weather condition is stabilized, but only one re-try is allowed. While at the same time, the flight crew should keep checking remaining fuel quantity and follow the rule returning back to the departure airport or diverting to an alternate airport as early as possible"*. If it does not result from the influence of weather condition, the re-try for another approach is not limited to only once. Flight crew's incorrect recognition might cause the stress that they shall returning back if the landing could not be accomplished. While the aircraft did ILS final approach, the workers and ground vehicle were moving in the critical and sensitive area of localizer. The risk of tracking inaccurate flight path and glide slope could exist.

3. As for the transition of aircraft control while the occurrence occurred, the pilot monitoring did not follow the rules "during the transition of flight control, both pilot should use the standard callouts, "You have control" and "I have control", and verified by each other to complete the transition", as specified in the Flight Operations Manual, which resulted in cognitive error of pilot flying. The pilot flying was still controlling the aircraft's direction while the pilot monitoring took over control.

4. Due to cloud ceiling was 200 feet at the time, the approach controller asked whether the flight crew accepted VOR approach or not, flight crew did not use standard communication terminology to respond to ATC, as a result of the controller misunderstanding the aircraft was conducting a VOR approach. Flight crew used non-standard terminology was likely to cause misunderstanding.

5. Reference to the estimated landing distance chart in MD-80 Aircraft Flight Manual and the "Good Reported Braking Action" chart for wet runway, under the conditions of FE025 with the strong tailwind at that time, the estimated landing distance was longer than the available landing distance of Runway 02 at Magong Airport.

Other Findings

1. The flight crew were certificated and qualified in accordance with the Civil Aeronautics Administration requirements. No evidence indicated any preexisting medical conditions that might have adversely affected the flight crew's performance during the occurrence flight. The weight and balance of the aircraft was within the limitation.

2. Far Eastern Air Transport did not recruit sufficient flight operations relevant managers who were required by the Flight Operations Manual due to the streamlining personnel policy. The B-757 Fleet Chief Pilot deputed as the Junior Vice President of the Flight Operations Division. The positions of the Deputy Junior Vice President and Manager of the Flight Operations Division remained vacant. In addition, the Flight Operations Division did not recruit sufficient relevant engineers as well.

3. The principal operations inspector of CAA for Far Eastern Air Transport provided an oral recommendation to recruit required flight operations relevant mangers prior to the occurrence, rather than an official recommendation of inspection.

4. The Flight Operations Manual and Administration Handbook of Flight Operations Division had different requirements for the position of the Flight Operations Division Deputy Junior Vice President and deputy policy of the Flight Operations Division Junior Vice President.

5. The approach controller advised the flight crew to change from ILS approach to VOR approach in rapidly changing weather conditions, and did not consider the time required for crew to change procedure as well.

6. The “Magong Airport ILS permitting procedure in low visibility/low ceiling condition” of the Air Navigation and Weather Services was not provided to the airlines, it is adverse to the pilot’s preparation at time of bad weather.

7. There was no abnormal record being found after reviewing flight and maintenance log for the previous month before the occurrence. The records of airworthiness directives revealed that the airworthiness directive was all complied with airworthy requirement.

8. Flight and maintenance records revealed that there was no record regarding the engine pressure ratio inconsistence of 2 engines, or angle inconsistence of 2 thrust levers in the cockpit. For the previous 5 days before the occurrence, Far Eastern Air Transport did not find the defect of engine pressure ratio, and thrust lever angle inconsistence of 2 engines during the test flight after the completion of C Check.

9. The reason caused the inconsistencies of engine pressure ratio and thrust lever angle should be, that during the deployment of left and right engine thrust reversers Far Eastern Air Transport did not follow related content of aircraft maintenance manual to incorporate the engine dynamic rigging procedures into check list during deployment of thrust reversers, such that maintenance personnel could not perform related checks and correct the defects in time. Far Eastern Air Transport could not

discover the inconsistence of engine pressure ratio and thrust lever angle might be due to the static test of thrust lever angle did not integrate with the dynamic test of engine pressure ratio during the deployment of thrust reversers.

10. Based on two friction measurement result for Runway 02/20 conducted before and after the occurrence within two weeks, the average mu values of one third runway or each100 meters were all higher than maintenance or minimum limitation recommended by Annex 14 of ICAO or Civil Aerodrome Design and Operation Guidance.

Safety Recommendation

To Far Eastern Air Transport

1. Enhance flight crew's training on situation awareness during approach, the standard operation procedures for transition of flight control, the tailwind landing speed limitation and go around procedure.

2. Enhance flight crew's training on using standard communication terminology to communicate with air traffic controllers to avoid misunderstanding.

3. Review the employment status of flight operation staff to meet the requirements as specified in those flight operation related manuals.

To Civil Aeronautics Administration

1. Supervise the enhancement training of Far Eastern Air Transport on flight crew's situational awareness during approach, the standard operation procedures of the transition of flight control, the tailwind landing speed limitation and go around procedure.

2. When changing the approach, air traffic controller should consider the safety of different approaches, and required time for crew to change procedure. The choice of runway in use

should comply as specified in the air traffic management procedures.