



**Aviation Safety Council
Taipei, Taiwan**

**MANDARIN AIRLINES FLIGHT AE737
AIRCRAFT TYPE FOKKER50
COLLIDED WITH UNI AIR AIRCRAFT
TYPE MD90 IN TAIPEI SONGSHAN
INTERNATIONAL AIRPORT DURING
GROUND MOVEMENT**

Executive Summary

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On September 21, 2001, at 21:00 Taipei Time (UTC 13:00), Mandarin Airlines Flight AE737 , aircraft type Fokker 50, ROC registration number B-12272, pushed back from aircraft stand 15 in Taipei SongShan International Airport, flight destination Taichung .

When the aircraft was pushed back to the vicinity of the taxiway and just before taxied, at 21:11, collided with UNI Airlines, aircraft type MD90, ROC registration no.B-17920, moving from aircraft stand 24 to aircraft stand 10 during pushed back.

There were two pilots, three cabin crew and sixteen passengers on the Mandarin aircraft when the occurrence happened; there was one maintenance personnel in the cockpit of the UNI Air aircraft, as for ground staffs, there were a tow-tractor driver and one headset man.

No casualties in the occurrence, both aircrafts suffered partial damages.

Not long after the collision, the two aircrafts received instructions from controllers to tow and taxi back to their original parking stands.

Findings related to the probable causes

1. UNI Air did not dispatch enough staffs for aircraft ground movement; No wing walker near right wingtip when the accident happened.
2. The tow tractor pushed the aircraft backwards with its rear end,

therefore the tow-tractor driver had to turn his head to monitor the pushback route, it was not easy to observe obstacles behind the aircraft.

3. During pushback, the headset man sat in the backseat of the tow tractor, visibility was poor and did not monitor the conversation between the air traffic controller and the maintenance personnel to inform the tow-tractor driver to stop pushback in time, hence unable to discover the Mandarin aircraft parked on the apron and ready for taxi, therefore leading to the collision.

Findings Related to the Risks

1. The controller cleared UNI Air MD90 to push back before the Mandarin Airlines FK50 taxied away, and the UNI Airlines aircraft did not follow the later issued "Hold position" clearance by the controller.
2. The location of Taipei Airport Control Tower could not easily monitor actual aircraft movements on the aprons in visual condition at night.
3. By the time of the occurrence, daily supervision and management mechanism were not established. For instance, inspect if the staff rotation schedule arranged by ground handling operators complied with the norms, supervision and management items such as if duties were performed according to standards, all were not listed in the working content or check card by the flight operation department .
4. Civil Aeronautics Administration Air Transport Division, Flight

Standards Division, Airport Flight Operation Division etc., all had different recognitions for the responsibilities of monitoring the aviation ground handling operators; the supervision of ground handling operators was not completely executed.

5. Civil Aeronautics Administration had held ground handling agency coordination meeting for multiple ground safety incidents which affected aviation safety. All airlines, ground handling operators, every division of CAA and airport staffs joined the coordination. The result of the coordination meeting listed all items that should be done by the responsible unit, which were not completely implemented.

Other Findings

1. Pilots, air traffic controllers and tow-tractor drivers possessed valid licenses.
2. The work and rest factors of the air traffic controllers had no relations with this accident.
3. The taxiways were within the service area of ATC, but “ Air Navigation and Weather Services CKS Approach Control Tower/ Taipei International Airport Flight Operation Division Working Agreement (10.1.1999) “ had assigned the taxiways in the aprons to Flight Operation Division, but actually they were still controlled by Taipei Airport Control Tower, leading to inexplicit responsibilities and error occurred .
4. Civil Aeronautics Administration bylaws and detailed breakdowns of responsibilities lacked for explicit norms of responsibilities, job separations and connections etc. for

relevant units involved in the supervision of aviation ground handling, such as Air Transport Division, Flight Standard Division, and Airport Flight Operation Division etc. . .

5. Although Airport Flight Operation Division belonged to the execution units of supervising ground handling operation, however it still lacked for legal basis, explicit supervising plans and operation procedures etc., which was not able to exert the execution function completely.
6. Part of airport aprons did not implement standard apron guidelines defined by ICAO, and the airport manager did not regulate the procedures that the aircrafts needed to follow guidelines of the aprons when pushback.
7. The method of protecting passengers to pass aprons safely was not included in the airport management operation regulations, potential safety risk factors existed.
8. The spacing between some aprons in the airport was insufficient, which was not complied with ICAO standards.

Safety Recommendations

To UNI Air

1. When executing aircraft pushback/movement operations, indeed carry out manpower dispatch and operations according to standard operating procedures of the operation manual.
2. Review the operation regulations of aircraft pushback by tow tractors, to ensure tow-tractor drivers are able to maintain good eyesight during aircraft movement operations.

3. Review the SOP of duty, responsibilities, communication channels and methods for aircraft pushback/ movement personnel in the operation manual.

To Civil Aeronautics Administration (CAA)

1. Review “Air Navigation and Weather Services CKS Approach Control Tower/ Taipei International Airport Flight Operation Division Working Agreement” and clarify the management and safety responsibilities among all units.
2. Explicitly define the pushback routes of aircrafts from aircraft stands, and establish related safety regulations.
3. Explicitly define norms of responsibilities, job differentials and connections among all units for relevant units involved in the supervision of ground handling service, such as Air Transport Division , Flight Standards Division and Airport Flight Operation Division etc. , and define related supervising plans and working procedures according to the work property and responsibilities of ground handling service monitoring and supervision , to be used as guidelines of executing inspections .
4. Review the airport guidelines and aprons spacing to comply with the ICAO standards and establish procedures for following apron guidelines.

Improvement actions According to UNI Air Operation Manual content amendment (excerpt)

1. Add Cockpit Crew Pushback Operating Procedures in the service manual, maintenance related manuals, including communication methods between the cockpit maintenance

personnel, tower and headset man, and the monitoring of ground control channel, to understand the towing status nearby.

2. The wing walker should be equipped with whistles and batons (night flashlights).
3. When pushing back, the tow-tractor driver should face the aircraft and watch out for pushback status.
4. The dispatch number for pushback staffs should be : 4 members for pushback with passengers { tow tractor driver , headset man (maintenance personnel) , one man by each wingtip } , 3 members for pushback without passengers { tow tractor driver ,headset man (operator) , and one man by the wingtip}
5. The manpower deployment situation of service OIC.
6. The annual training project for ground service, including essence training and emergency response , establish correct concepts (full alert during pushback , absent without leave is not allowed)

General rules for aircraft ground movement operation

“When carrying out aircraft ground movement operation, maintenance personnel must be in the cockpit to control in case of emergencies. Except tow-tractor driver and the headset man, one safety man as well as chock man should be dispatched. The security guard should be equipped with a whistle, a baton (use flash baton during nights); to react to safety concerned situations in time. Extra safety men should be dispatched depending on the condition during aircraft pushback/movement operations in

crowded areas. “

Notes for aircraft pushing/towing/movement (excerpt)

“6.4 Push the aircraft out of the apron backwards is prohibited. Before the pushback operation, the headset man need to confirm the clearance gesture from the safety man / chock man, then the tow-tractor driver can be instructed to push back.

1.5 Dispatch regulations for aircraft push/tow/movement personnel :

1.5.1 During aircraft pushback/towing or entering hangars or narrow areas : four personnel should be dispatched , a headset man(A) , a tow-tractor driver (B) , left wing man as well as chock man (C1) and right wing man (C2) .

1.5.2 When towing aircrafts on the taxiways or spacious areas without safety concerns : dispatch 3 personnel , a headset man (A) at the left side of the aircraft , a tow-tractor driver(B) and a wing man as well as chock man (C) at the right side of the aircraft .

1.5.3 When towing/moving aircrafts for maintenance into hangars or narrow areas : dispatch at least one extra wing man from the maintenance department , the aircraft tow/moving operation should be instructed by a senior maintenance personnel , the maintenance personnel should also be the right wing man , around 16 meters from the headset man by the left wingtip to assist safety considerations .

The above mentioned personnel should be positioned in accord with the directions when sitting on the aircraft, all airports when conducting the aircraft pushing/towing operations, the pushing/towing/moving, runway direction could be changed due to the factors of airport terrain or winds, therefore the operation personnel can adjust the direction of positioning timely.”

Improvement actions According to to CAA

The 「Air Navigation and Weather Services CKS Approach Control Tower/ Taipei International Airport Flight Operation Division Working Agreement」 has been reviewed, the contents of the agreement were amended on April 15, 2002, redefine the controlling responsibilities for cars and aircrafts on the airport operation areas and runways/taxiways , to clarify the management and safety responsibilities among all unites .

Explicitly define the operation areas for aircraft pushback routes from the aprons, and establish the timing for clearance-issuing and related safety regulations for aircraft pushback, and listed as the operation requirements for controllers.

Relevant units involved in the supervision of ground handling service, such as Air Transport Division, Flight Standards Division and Airport Flight Operation Division etc., have explicitly defined responsibilities, job separations and connections among all units etc..

The CAA extremely thinks highly of the implementation and clarification of the division affairs, the bylaws of the CAA was amended and published on July 19, 2001, and the detailed breakdown of stratified responsibility lists of the CAA are being amended every year, the latest version was released on September 28, 2001. In 2002 all divisions were demanded to conduct a thorough review of their own business and submit a research proposal. Until September 24, 2002, the meeting for researching and amending bylaws and detailed breakdown of stratified responsibilities were held four times on July 2, July 9, August 23

and September 6 of 2002, 39 items of the division affairs were clearly clarified, the meeting for the discussion of thorough amendment of the organization structure of the CAA will be continuously held afterwards, in order to actually divide the business responsibilities among all divisions, and between the CAA and the subsidiary organizations .

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