



**Aviation Safety Council
Taipei, Taiwan**

**AIR OPERATIONS, NATIONAL FIRE
ADMINISTRATION, MINISTRY OF
INTERIOR. REGISTRATION NO.NFA901
UH-1H HELICOPTER ACCIDENT
DURING TAKEOFF PHASE**

Executive Summary

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On March 1, 2003, at 15:47 Taipei time, Air Operations, National Fire Administration, Ministry of the Interior (Air Operation), a UH-1H helicopter, registration number NFA901, conducted casualty carrying service for the Alishan Mountain Railway accident. Departing from the apron by Chushan Sunrise Platform with 4 crew members, and 9 injuries (including 3 children), a total of 13 people was on board. When the helicopter was around 30 feet high above ground, after tail rotors struck the tip of the trees east of the departure location, it lost control and crashed in the groves on the slope. Two incidents caused the fatal of 2 people, 5 were serious injuries, 5 were minor injuries and unharmed, one person status unknown, and the aircraft was destroyed.

Findings related to the probable causes

1. When the pilot of NFA901 took off at high altitude, he did not follow the “weight and balance calculation chart” data established by Air Operations to control the aircraft, the weight and balance was outside the limitations of hovering altitude limits for the aircraft, horsepower required was insufficient after departure leading to the loss of control and crashed after striking the tree.
2. Due to the needs of missions and domestic search and rescue, the Air Operations conducted duties with insufficient flight training systems, standards and manuals, and under the condition of incomplete flight trainings at high altitude.

Findings Related to the Risks

1. The Flight Operation Management Regulations and procedures of Air Operations were incomplete.
2. The implementation of casualty transportation responsibilities and task distribution for flight crew was incomplete in the Standard Operating Procedures of Air Operations.
3. Air Operations did not establish complete pilot proficiency qualifications and standards which were conformed to the needs of duties.
4. Air Operations did not completely carry out crew resource management trainings; the accident did not make use of crew resource management well to effectively conduct boarding control.
5. Air Operations did not establish complete payload control standards and procedures.
6. The crew chief did not receive data of the remaining available payload weight before cabin passengers boarded, and was unable to control cabin passenger numbers.
7. When carrying out evacuation operations with large numbers of injuries, the crew chief was not able to simultaneously take care of the safety clearance of the tail rotor area and the boarding control of cabin passengers.
8. The planning for stretcher configurations, restrictions, and relevant procedures etc. of Air Operations and Special Search and Rescue Team was not detailed enough.
9. The emergency evacuation procedure of Air Operations was incomplete.

10. Air Operations did not establish cabin safety inspection procedure, such as providing briefings or written instructions of emergency equipments, informing or assisting passengers to fasten seatbelts or harnesses, and confirming the completion of cabin preparations.
11. The number of cabin passengers aboard exceeded the total number of available seatbelts and fixed slings on deck.
12. The inspection procedure for examining random fire extinguishers was not carried out indeed.
13. The on-site command on the apron was inappropriate, causing the limited air-transported evacuation resources unable to be well used.
14. The on-site apron commanding personnel did not establish proper moving lines for casualty transportations, did not keep the apron clear properly, and had single-aircraft apron ready for two helicopters to take off and land simultaneously, which affected the disposal of the pilot.
15. Before the accident, the pilot training manual of Air Operations was incomplete, therefore the trainings and examinations lacked for standard basis, the execution plan was incomplete.
16. Our country still lack of management laws and supervising regulations for public aircrafts.
17. Our country still lack of supervisory authorities for public aircrafts.
18. There was no dedicated flight safety management department in Air Operations, the flight safety management system and

education trainings were incomplete, which affected the promotion of flight safety operation.

19. When relevant organizations examined the staffing of Air Operations Provisional Office, the required professional background and experiences of flight related personnel were not listed.

20. When pilots and crew chiefs of Air Operations who concurrently ran flight operation business and management , their results were affected by the following factors :

- i. The Air Operations did not have guaranteed flight hours system, pilots who were also concurrently responsible for business must conduct duties and trainings at the same time , time was limited , hence the establishments of relevant regulations, manuals, procedures, and etc... Lacked dedicated personnel to be responsible of.
- ii. Pilots who were also concurrently responsible for business did not acquire official authorizations or orders.
- iii. Pilots and crew chiefs were belonged to district divisions. When leaving for other districts for business, they still needed to conduct their own duties.
- iv. Pilots and crew chiefs had to communicate with current supervisors about their concurrent jobs, and promotions could be started after agreements were obtained, however, the supervisors (including director, deputy director, section chief and captain etc.) also served concurrently, the time of cooperation was limited.

21. The common operation standards, responsibilities and procedures of Air Operations and Special Search and Rescue Team were not complete, which affected the results of cooperation.

Other Findings

1. The activities and rest time of the captain, the first officer and the crew chief 72 hours before the accident were normal; No evidence revealed that during the accident, they were affected by physical or mental factors.
2. The quality assurance mechanism of outsourcing operation of Air Operations was incomplete.
3. There was no malfunction indication of engine and rotors from takeoff to the occurrence of the accident.
4. Public aircrafts were not required to install FDR by laws; the accident aircraft did not install FDR.
5. The GPS system receiver used by the pilot was placed inside and nearby the cockpit windshield, the openness was insufficient and was affected by rotors, therefore the received signal was unstable.
6. ATC and meteorological condition had no relations with this accident.
7. The flight operation procedures of Air Operations did not include the calculation of the Center of Gravity of the aircraft, the Center of Gravity before flight was not confirmed to be within regulated limits.

8. The weather information recorded in the duty briefing card was not conformed to the information provided by weather office at the base.
9. The medications in the first aid kit on the aircraft were all expired; the management and inspection procedures were not implemented.
10. Air Operations did not establish random flashlights deployment and usage management measures.
11. Air Operations helicopter followed the maintenance system from Army Air Corps, and did not adjust maintenance items and Maintenance Management and Control System according to the newly increased duty equipments.
12. Air Asia's maintenance operation for Air Operations was conducted by the contract with Air Operations, which was not confined by Civil Aviation Act.
13. Air Operations did not clearly stipulate the physical examination systems and physical standards for pilots and crew chiefs.
14. Air Operations did not establish license issuing management system for pilots and crew chiefs.
15. The examining results of Air Operations flight related documents were ineffective, and there was not any proper manual management mechanism.

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1. Review trainings, rating and regulations for maneuvers at high altitude and narrow terrain for helicopter pilots. Ensure pilots are familiar with the consult and usage of the aircrafts performance data.
2. Review regulations for helicopter cabin safety and payload control to enhance passenger safety.

Safety Recommendations

To Air Operations, National Fire Administration, Ministry of the Interior

1. Review trainings, rating and regulations when operating at high altitude for helicopter pilots, and ensure pilots are familiar with the consult of aircraft performance data, and indeed maneuver according to the performance data and limitations. (ASC-ASR-05-01-001)
2. Establish complete systems for requirement planning, amendments, examinations and managements etc. of aviation related documents. (ASC-ASR-05-01-002)
3. In order to provide the basis of trainings, examinations and executions, establish proper training related standards, manuals and procedures according to duty requirements for flight crew as soon as possible... (ASC-ASR-05-01-002)
4. Establish completed payload control standards. (ASC-ASR-05-01-004)
5. Establish completed CRM training standards for flight crew. (ASC-ASR-05-01-005)

6. Establish license issuing management system for flight crew. (ASC-ASR-05-01-006)
7. Establish periodical physical examination systems and physical standards for flight crew. (ASC-ASR-05-01-007)
8. Build up flight safety management department directly under supreme supervisors as soon as possible, and establish complete flight safety management systems. (ASC-ASR-05-01-008)
9. Establish complete quality assurance mechanism for outsourcing maintenance operations. (ASC-ASR-05-01-009)
10. Establish complete cabin safety inspection procedures, including safety declaration, seatbelts, cabin ready report procedures, fire extinguishers, smoke masks, first aid kits, flash lights, and etc... (ASC-ASR-05-01-010)
11. Consider to establish complete cabin stretcher deployment plan, restrictions and related procedures when a large number of injuries have to be evacuated. (ASC-ASR-05-01-011)
12. Consider the installation of FDR on the type of aircraft. (ASC-ASR-05-01-012)
13. Establish complete common operation standards, responsibilities and procedures with Special Search and Rescue Team, National Fire Agency, Ministry of the Interior, to enhance task distributions and cooperation between Special Search and Rescue Team members and flight crew. (ASC-ASR-05-01-013)

To Special Search and Rescue Team, National Fire

Administration, Ministry of the Interior

1. Establish complete common operation standards, responsibilities and procedures with the Provisional Office of National Airborne Service Corp., Ministry of Interior. (ASC-ASR-05-01-014)
2. Provide proper trainings of flight safety education and CRM for Special Search and Rescue Team members. (ASC-ASR-05-01-015)

To National Fire Administration, Ministry of Interior

1. Review the preparation of air evacuation operation for injuries, enhance trainings, regulations and procedures for ground commanding staffs, such as triages, casualty moving line planning and helicopter takeoff/landing commanding, control, and etc... (ASC-ASR-05-01-016)

To Ministry of Interior

1. Establish management and supervisory mechanism for belonged aircrafts as soon as possible. (ASC-ASR-05-01-017)
2. Review the required professional competence for all belonged flight crew positions. (ASC-ASR-05-01-018)

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