



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

2194A

Date: January 17, 1990

In reply refer to: A-90-3 through -6

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On September 27, 1989, Grand Canyon Airlines, flight Canyon 5, a de Havilland DHC-6-300, Twin Otter N75GC, crashed during its attempted landing at the Grand Canyon National Park Airport, Tusayan, Arizona. The 2 crewmembers and 8 of the passengers were fatally injured; of the remaining 11 passengers, 9 sustained serious injuries and 2 sustained minor injuries. No fire occurred.

According to the Federal Aviation Administration (FAA), Grand Canyon National Park Airport is the second busiest airport in Arizona during tourist season, providing more than 80 flights per day to about 650,000 passengers each year. Canyon 5 was operating as a sightseeing flight under 14 CFR 135 from the airport.

The first officer was flying the airplane, and the captain was providing the tour narration. The flight was routine until its arrival back to the airport. Canyon 5 reported 5 miles northwest of the airport in accordance with normal control tower procedures. At 0948:30 local time, the local controller cleared the flight to land. At 0948:34, the flight acknowledged the clearance. This was the last known transmission from the flight. The two air traffic controllers on duty in the tower described the approach as normal, and each diverted his attention from Canyon 5 on short final to locate traffic that was entering the traffic pattern. When they looked back at Canyon 5, it was off to the right of the runway and angling back toward the runway. It continued to climb as it passed the tower and reached an altitude of about 150-200 feet. The airplane then entered a steep left bank to the left of the runway and struck a power line, disrupting airport electrical service. About 0952 the airplane crashed into some trees on a hill on the east side of the runway. Just before final impact, the control tower personnel activated the crash alarm/siren and telephoned 911, but the alarm and the call (near the end of the conversation) were interrupted by the loss of electrical power.

The flight crew of American West Airlines flight 1080 was holding short of runway 21 waiting for their IFR clearance when Canyon 5 made its approach. The crew observed the airplane in a normal attitude, about 5 feet above the runway, as it flew about 1,000 feet down the runway. The first officer observed the airplane bounce on the runway in a normal attitude, but stated that it "looked like [it was] struggling with lots of wind but there was not much wind." He said that if there had been 10-15 knots of wind, the crew of flight 1080 would have felt the effects of it on their airplane. He expected Canyon 5 to touch down again and glanced into the cockpit of 1080 for about 5 seconds. When he saw a large cloud of red dust in his peripheral vision he looked at Canyon 5 and called the captain's attention to it. Canyon 5 was emerging from the dust cloud in an unusually nose high attitude and climbed to about 150-200 feet. The left wing began to drop as the airplane drifted to the left and appeared to be "tail walking" (nose high and oscillating about the vertical axis). Canyon 5 slowly lost altitude as it continued in a steeper angle of bank, and the nose dropped as the airplane rolled to a near-vertical left bank. According to interviews of the flight 1080 crew after the accident, there did not seem to be any reaction from aircraft rescue and firefighting (ARFF) vehicles; about 90 seconds later they asked the tower, "...are you aware of the problem?" The tower controller advised that they were, but that they were having difficulty contacting "Crash 1" (aircraft rescue equipment). The crew notified the America West operations agents on the company frequency to see if they could do anything to help. About 1000, the crew saw a yellow ARFF crash truck as it passed their position, about 8 minutes after the accident.

The Safety Board's continuing investigation of the Canyon 5 accident has found serious deficiencies in the ability of the airport personnel to respond with ARFF equipment in accordance with 14 CFR 139 and thereafter to perform effective rescue and firefighting operations. The deficiencies included late notification of the accident, due to inadequate communications, a lack of required firefighting training, lack of knowledge of the DHC-6-300 airplane, the lack of a mutual aid plan, and the inadequacy of FAA certification inspections for compliance with 14 CFR 139. The airport's ARFF service was certificated by the FAA under 14 CFR 139 as an Index A airport.

When the electrical power and telephone service were lost, the control tower's siren alarm and the 911 telephone call were interrupted. Four airport maintenance personnel, who were also assigned ARFF duties, were to respond with two ARFF vehicles, but remained unaware of the accident until about 0957 when the emergency generator was manually started and the power and telephone service was restored. Although the tower was equipped

with a battery-powered VHF radio, the tower controllers could not communicate with local agencies because telephone service was interrupted. Finally, neither the acting airport manager nor the airport's maintenance personnel had personal radios and thus could not be notified of the accident by the tower until the power was restored.

When electrical power was lost, the acting airport manager, who was unaware of the accident, had to unlock two outer doors and one inner padlocked door before he could manually start the emergency generator. He then contacted the tower by telephone and was informed of the accident; he departed for the scene of the accident in his airport vehicle, preceded by Crash 1, about 0959. Maintenance personnel who heard the siren/alarm after electrical power was restored contacted the tower from the ARFF trucks; they were told of the accident and its location. They obtained clearance to enter the taxiway and encountered no difficulties en route to the accident. On-scene, one of the maintenance workers extinguished a small brush fire (with the fire truck turret) caused by the downed power line, and another maintenance worker climbed a hill on foot to get to the airplane. He assisted survivors until units from the USDA Forest Service, the Grand Canyon National Park Service, and the National Park Lodges arrived about 1001. The National Park Service, U.S. Department of the Interior, took charge of the rescue operations. Although two of the four maintenance persons were emergency medical technicians (EMT's), they could render only limited assistance to the survivors because insufficient emergency medical equipment was carried on their trucks. After arriving on scene, one of the maintenance persons had to return with a pickup truck to the ARFF garage for backboards that had been inadvertently left behind after arriving on scene.

The most severely injured survivors were transported by helicopter to the Flagstaff Medical Center about 70 miles away. The last survivor arrived at the hospital about 1205.

The airport maintenance workers did not disconnect the airplane's battery when they arrived at the scene because they had not received aircraft familiarization training required by 14 CFR 139.319 and, thus, did not know where the battery was located. Only two of the four workers had received any firefighting training, which consisted of viewing slides of structural firefighting. None of the maintenance workers had participated in a live fire drill as required by the FAA. In addition, the Safety Board's investigation found no records to show that any of the maintenance workers had received the minimum required ARFF training.

The airport emergency plan, coordinated with local agencies in July 1985, contained no written agreements with the agencies that would provide medical, firefighting, and law enforcement assistance during airport emergencies. Yearly reviews of the plan and a table top exercise of the plan had not been conducted as required by 14 CFR 139.325.

No records were found to show that a full-scale emergency plan exercise had been held in the 3 years preceding the accident.

The Safety Board believes that improvements could be made at the Grand Canyon National Park Airport that would enable the ARFF service to respond in a more timely and effective manner. The lack of timely notification of the assistant airport manager and airport workers was caused by the loss of the airport's electrical power. Had the stand-by electrical generator been equipped with an automatic start feature, electrical power would have been available almost immediately after disruption of the main power source, and the alarm siren would have been heard much sooner. Also, battery-operated, hand-held radios would permit voice communications between the control tower and key airport employees. Radios could have discrete channels for communications between tower and airport personnel and for responding to off-airport agencies. Cellular telephones for the control tower and for the airport would enable calls to the emergency 911 number and direct communications with off-airport agencies. Alternatively, the present telephone system of the control tower could be provided with a battery-operated, stand-by electrical system to ensure telephone communications should the airport electrical power be interrupted. A one-call telephone notification system could also improve airport communications. Such a system would enable control tower personnel or the airport manager to notify, with one call, each other, the 911 emergency number, and the senior airport ARFF person. This one-call system is adaptable for use with personal voice pagers or cellular telephones for the airport manager and the senior ARFF person.

The FAA requirements for initial and recurrent training of ARFF personnel are diverse and extensive and, thus, necessitate a recordkeeping system to ensure that all persons complete the required training. To better comply with the ARFF training requirements, an ARFF Training Officer could be designated as the person responsible for ensuring that all training is conducted within the required time and that appropriate training records are maintained. Also, this person would ensure that cross training is provided among ARFF personnel and mutual aid agencies.

Mutual aid agencies located off airport grounds could, through tours conducted by the Training Officer, become familiar with the entry points for their vehicles, locations of access roads and taxiways, terminal entry points, locations of fuel storage and other hazardous materials, and other important features of the airport.

Finally, the airport emergency plan should specify who is to be the on-scene commander during the response to an aircraft accident. Following the crash of Canyon 5, National Park Service personnel arrived on scene, relieved the airport ARFF personnel, and took command. Although this arrangement was adequate for this accident, the arrangement may not be appropriate in other situations such as an accident and fire involving a de Havilland Dash 8 airplane that currently operates from the Grand Canyon airport and carries up to 43 people.

Therefore, the National Transportation Safety Board recommends that the Arizona Department of Transportation, Grand Canyon National Park Airport:

Install an auto-transfer start system on the emergency electrical generator for automatic start-up of the generator if commercial electrical power is lost. (Class II, Priority Action) (A-90-3)

Provide an alternate form of voice communication independent of commercial electrical power, and alternate telephone systems for the control tower and key airport employees. (Class II, Priority Action) (A-90-4)

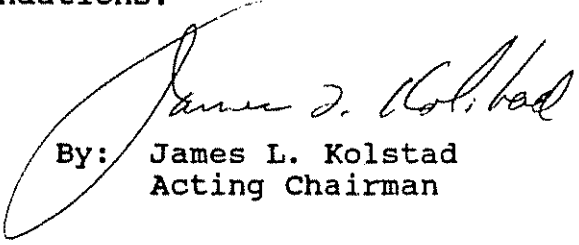
Develop mutual aid agreements with off-airport firefighting, law enforcement, and medical agencies and conduct airport familiarization tours for these agencies. (Class II, Priority Action) (A-90-5)

Qualify at least one airport aircraft rescue and firefighting employee as Training Officer or trainer to be responsible for training other employees, maintaining appropriate records, and providing familiarization tours for mutual aid agencies. (Class II, Priority Action) (A-90-6)

Also in conjunction with its continuing investigation of this accident, the National Transportation Safety Board issued Safety Recommendations A-90-1 and -2 to the Federal Aviation Administration.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations A-90-3 through -6 in your reply.

KOLSTAD, Acting Chairman, BURNETT, LAUBER, and DICKINSON, Members, concurred in these recommendations.



By: James L. Kolstad
Acting Chairman