

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED: November 13, 1959

RELEASED: November 24, 1959

GENERAL AIRWAYS, INC., DC-3, N 17314, Near
KERRVILLE, TEXAS, FEBRUARY 1, 1959

SYNOPSIS

A General Airways DC-3 crashed shortly before midnight near Kerrville, Texas, on February 1, 1959, during a civil air movement (CAM) of 25 military personnel from Boise, Idaho, to Lackland Air Force Base, San Antonio, Texas. Three of the 28 occupants, including the captain and the reserve captain, then acting as copilot, were killed, four were seriously injured, and 21 received minor injuries.

The final segment of the flight was from Pueblo, Colorado, where the U. S. Weather Bureau Station furnished weather briefing. Icing prevailed and was to continue. An IFR flight plan specifying cruising at 9,000 feet was filed.

Departure from Pueblo was at 1800^{1/} and at 1916 the flight requested an altitude change from 9,000 to 7,000 feet, reporting light icing. ARTC approved at 1945. Shortly thereafter the flight again reported light icing. An involved series of radio contacts ensued as ice accretion became worse, then critical, then incapacitating. A privately used airport at Kerrville, Texas, was staffed and lighted. An attempt to land there failed and the aircraft was crash-landed nearby. Previously alerted fire fighting apparatus and ambulances were sent to the site.

Investigation revealed no significant mechanical defect and no unpredicted weather conditions. The Board believes that this accident resulted from the pilot pressing into known and dangerous icing conditions until the aircraft was crash-landed.

General Airways, Inc., a CAB certificated supplemental air carrier, surrendered its FAA operating certificate shortly after the accident pending FAA re-evaluation of the carrier's operations. The FAA later restored the certificate.

Investigation

The crew of N 17314 was comprised of Captain Woodrow Orien Epps, Reserve Captain Harvey Hitt, and Copilot Wilbur Wittliff. After a rest period of approximately 12 hours they started duty at McGuire Air Force Base, New Jersey, early in the morning of January 31, 1959, and were on continuous duty for more than 40 hours until the accident at approximately 2337, February 1, 1959. The following table details their movements as a team from the time of departing McGuire

^{1/} Unless otherwise noted all times are central standard based on the 24-hour clock.

AFB until the accident. Greenwich time (Z) is used in this table for clarity as the flight traversed three domestic time zones.

FROM	DEPART	ARRIVE	ACCUMULATIVE		ELAPSED	TIME ON GROUND
			FLIGHT TIME	FLIGHT TIME		
			H. M.	H. M.	H. M.	H. M.
McGuire AFB to Columbus, Ga.	1226Z/31	1714Z	4:48	4:48	4:48	
						0 50
Columbus, Ga. to Columbia, S.C.	1804Z	1947Z	1:43	6:31	7:21	
						1 09
Columbia, S.C. to Dallas, Texas	2056Z	0221Z/1	5:25	11:56	13:55	
						1 56
Dallas, Texas to El Paso, Texas	0417Z/1	0758Z	3:41	15:37	19:32	
						1 25
El Paso, Texas to Boise, Idaho	0923Z	1508Z	5:45	21:22	26:42	
						1 50
Boise, Idaho to Pueblo, Colo.	1658Z	2226Z	5:28	26:50	34:00	
						1 34
Pueblo, Colo. to Kerrville, Texas	0001Z/2	0537Z/2	5:37	32:27	41:11	

At the time of this accident the crew, having been on continuous duty for more than 40 hours of which more than 32 hours had been in flight, were in violation of Section 42.48, Part 42, of the Civil Air Regulations. This violation existed at the time of departure from Boise, and at the times of arrival at and departure from Pueblo.^{2/}

^{2/} The applicable portions of Section 42.48 of the CAR which governed this operation are:

42.48 Flight time limitations for pilots on large aircraft. The following limitations shall be applicable to pilots serving on large aircraft.

(a) Individual pilot limitations.

(1) A pilot may be scheduled to fly 8 hours or less during any 24 consecutive hours without a rest period during such 8 hours.

(2) A pilot shall receive 24 hours of rest before being assigned further duty when he has flown in excess of 8 hours during any 24 consecutive hours.

(3) A pilot shall be relieved from all duty for not less than 24 consecutive hours at least once during any 7 consecutive days. (Con. next page.)

For the flight from Boise to Pueblo to Lackland Air Force Base the load consisted of twenty-five members of the Idaho Air National Guard, 597 pounds of baggage, and the three pilot crew. Prior to departure a flight plan was filed with the FAA combined station-tower facility to use Victor Airway 4 at 9,000 feet, IFR, to Malad City, Idaho, with the intention of refueling at Malad City without landing. The estimated time en route to Pueblo was given as five hours and 30 minutes, with Salt Lake City as an alternate airport. The flight plan also indicated sufficient fuel for six hours and 30 minutes.

Investigation of the actual amount of fuel on board reveals discrepancies. A fuel receipt and the statement of the man who refueled the aircraft at Boise indicate that a total of 413 U. S. gallons of fuel were placed on board. This party states, in substance, that the rear or auxiliary tanks were empty and, in compliance with Captain Epps' instructions, he pumped 100 gallons of fuel into each of the rear tanks and completely filled the main or front tanks, each with a capacity of 202 gallons. Therefore, there was a minimum of 604 gallons on board N 17314 at the completion of refueling at Boise on February 1, 1959, prior to departure for Pueblo.

A weight and balance form was completed by the crew for the flight from Boise to Pueblo. It indicated that there were 400 gallons of fuel in the front tanks and 100 gallons of fuel in the rear tanks, a total of 500 gallons. There is therefore a discrepancy of 104 gallons in the amount of fuel actually on board. This resulted in an increase of fuel weight from 3,000 pounds to 3,624 pounds, an error of 624 pounds. This also increased the actual gross weight at takeoff from 25,493 pounds, as indicated on the weight and balance form, to 26,117 pounds.

As stated, the flight plan filed for the flight from Boise to Pueblo indicated fuel sufficient for six hours and 30 minutes. At the average consumption of 87 gallons per hour, used by the carrier in flight planning, there must have been at least 565 gallons on board. Although the flight plan, the weight and balance form, the fuel receipt, and the statement of the serviceman are not in agreement, it is apparent that the aircraft was over its permissible takeoff weight upon departing Boise (elevation 2,858 feet). The amount of this overweight was approximately 517 pounds, computed from data in the operating manual approved for the carrier's use by the CAA (now FAA).

2/ continued:

(4) A pilot shall not fly as a crew member in air carrier service more than 100 hours during any 30 consecutive days.

(5) A pilot shall not fly as a crew member in air carrier service more than 1,000 hours in any one calendar year.

(6) A pilot shall not do other commercial flying if his total flying time for any specified period will exceed the limits of that period.

(7) Time spent in any deadhead transportation shall in no case be considered as part of a required rest period.

(c) Aircraft having a crew of three pilots.

(1) A pilot shall not be scheduled for duty on the flight deck in excess of 8 hours in any 24-hour period.

(2) A pilot shall not be scheduled to be aloft for more than 12 hours in any 24-hour period.

(3) A pilot shall not be on duty for more than 18 hours in any 24-hour period.

As far as could be determined, the weights of oil, passengers, crew, and baggage were correctly entered on the weight and balance form for the Boise-Pueblo flight.

The aircraft departed Boise at 1058 after receiving the proper ARTC clearance. It proceeded routinely to Pueblo, Colorado, via Burley, Malad City, Rock Springs, Rawlins-Cherokee, Laramie, Denver, and Colorado Springs, arriving at 1626. This flight of five hours and 28 minutes would, at 87 gallons per hour, have consumed 476 gallons. The quantity of fuel remaining at Pueblo must have been approximately 118 gallons.

The aircraft was refueled at Pueblo. A fuel receipt and a statement by the serviceman indicate that a total of 500 gallons was placed on board. The serviceman stated that he filled the two main tanks and put 100 gallons into each of the two rear or auxiliary tanks. He further stated, in substance, that there were 622 gallons on board the aircraft upon completion of the refueling.

The weight and balance form for the flight from Pueblo to Lackland Air Force Base did not carry a destination. This form indicates a total of 380 gallons of fuel in the front tanks, but did not carry an entry showing any fuel in the rear or auxiliary tanks. Fuel weight entered was 2,280 pounds. However, computations and the statement of the serviceman indicate a total of approximately 622 gallons of fuel, or an apparent discrepancy of 242 gallons weighing 1,552 pounds. Therefore, the gross weight at takeoff from Pueblo was 26,322 pounds rather than 24,870 pounds, as shown on the weight and balance form. The maximum allowable takeoff weight from Pueblo (elevation 4,725 feet) was 24,950 pounds. The aircraft, therefore, was overweight upon departing Pueblo by a computed 1,372 pounds.

The flight plan filed prior to departing Pueblo carried an estimated time en route of four hours and 30 minutes with fuel for five hours and 30 minutes. This conflicts with the amount of fuel entered on the weight and balance form, since at 87 gallons per hour 380 gallons would be used in four hours and 22 minutes. This is actually less than the estimated time en route shown on the flight plan. The aircraft was airborne for approximately five hours and 37 minutes from takeoff until the accident. Icing conditions requiring increased power prevailed for at least the final one and one-half hours. Therefore, at the time of departure from Pueblo, there was more fuel on board than shown on the flight plan, and much more than the 380 gallons shown on the weight and balance form.

As far as could be determined, all other weight items were correctly computed and entered on the weight and balance form for the Pueblo-Lackland Air Force Base flight.

Either Captain Epps or Reserve Captain Hitt obtained a weather briefing by telephone from the U. S. Weather Bureau Station at Memorial Airport in Pueblo for the Pueblo-Lackland portion of the flight. This unrecorded briefing, according to testimony of the Weather Bureau, was comprehensive in regard to the probability of widespread icing conditions. The pilot, who did not identify himself, displayed considerable interest in the expected weather and questioned the observer extensively. An IFR flight plan was then filed by telephone with the FAA combined station-tower facility. It contained the following: Point of

departure, Pueblo; first intended landing, Lackland Air Force Base; alternate airport, San Antonio International Airport; cruising altitude, 9,000 feet by Victor Airway 81 to Lubbock, Texas; Victor 76 to San Angelo; Victor 68 to San Antonio; true airspeed at cruising altitude, 150 knots; estimated time en route, four hours plus 30 minutes with fuel for five hours plus 30 minutes; proposed time of departure, 1735; radio equipment VHF transmitter and VHF receiver.

ARTC then issued the following clearance: "ATC CLEARS NECTOR 17314 TO THE LACKLAND AIRPORT MAINTAIN NINE THOUSAND VIA VICTOR 81 LUBBOCK FLIGHT PLAN ROUTE." This was transmitted to N 17314 from the Pueblo Tower and was acknowledged. N 17314 was cleared for takeoff and was off at 1800. Eight minutes later it reported to Pueblo as at 9,000 feet. At 1812 it called Pueblo estimating Tobe Omni at 1813. This was the last radio contact between N 17314 and the Pueblo facility.

At 1838 the FAA ATC station at Trinidad, Colorado, received a position report from N 17314 as over the Tobe Omni at 1836 estimating Dalhart at 1915. The flight reported over Dalhart at 1916 at 9,000 feet estimating Amarillo at 1945. At this time the pilot reported encountering light icing and requested a change in altitude to 7,000 feet. ARTC did not approve this request.

The flight reported over Amarillo at 1945 at 9,000 feet, estimating Lubbock at 2027 and again requested a change in altitude to 7,000 feet. This request was approved by ARTC and the flight reported passing through 8,000 feet at 1956.

At 2022 the flight called Lubbock Radio and reported as ten minutes north of the Lubbock VOR encountering light icing at 7,000 feet. Weather and terminal forecasts for Big Spring, San Angelo, Kelly Field, San Antonio, and Austin, Texas, were requested. The weather was requested for Wichita Falls, Texas, and Oklahoma City, Oklahoma. This information was transmitted to the flight by Lubbock Radio and indicated above minimum conditions at several locations with best conditions at Wichita Falls and Oklahoma City, both within range.

At 2031, N 17314 reported over the Lubbock VOR and requested a change to the minimum en route altitude (5,100 feet). The El Paso ARTC Center, through Lubbock Radio, advised the flight of icing conditions at lower altitudes until after San Angelo. However, N 17314 again requested 5,100 feet, and ARTC cleared it to that altitude. N 17314 acknowledged and this was the last radio contact between the aircraft and Lubbock Radio.

The flight reported over Big Spring at 2115 at 5,100 feet estimating San Angelo at 2158. Then, and again at 2138, the flight was asked if a higher altitude was desired. It advised being in severe icing and using climb power to maintain altitude. In answer to a request, the San Angelo and Junction weather was transmitted to the flight. Both were above minimums with light freezing drizzle. ARTC records indicate that the flight reported over San Angelo at 2158 at an altitude of 5,000 feet, estimating Junction at 2229, experiencing severe icing. The pilot reported, in substance, that he did not believe he could make San Antonio owing to shortage of fuel.

At 2215 the San Antonio ARTC Center requested Trans-Texas Airways to have its agent at Kerrville, Texas, proceed to that airport and put runway lights and radio beacon in operation in the event N 17314 landed there. Kerrville

Airport is five miles southeast of Kerrville, at an elevation of 1,590 feet m. s. l. There are two runways, one 2-20, 4,050 feet in length and the other, 12-30, 4,400 feet. Runway 30 is lighted and approved for instrument approach procedures using the radio beacon, a MHW-class facility owned and operated by Trans-Texas Airways. This facility is not charted and the approved approach procedures, as published by the Jeppesen Company, are for the exclusive use of Trans-Texas. The radio beacon, identification EVR, frequency 310 kc., is 2.7 statute miles on a magnetic bearing of 120 degrees from the approach end of runway 30.

At 2219, N 17314 advised the San Angelo ATC Station of ice one and one-half inches thick on the aircraft's landing lights, and at 2220 requested 4,000 feet, being unable to maintain 5,000 feet. At this time N 17314 was advised that the freezing level was approximately 5,000 feet over Junction and lowering toward San Antonio, and was also advised concerning the Junction airport facilities.

At 2227 the flight advised Junction that it was at 4,000 feet, unable to maintain 5,000 feet. At 2229 it advised being at 4,000 feet and descending. At 2231 the pilot reported having regained 4,000 feet and having passed Junction Radio at 2230. At this time Junction Radio relayed the Kerrville Airport information to N 17314.

At 2243 the pilot advised Junction that he was at 3,600 feet. At 2246 Junction relayed the Kerrville weather to the flight as ceiling 700 feet, visibility one mile. At 2249, Junction heard the pilot report that the aircraft was stalling and that he had "less than 100^{3/4}." At 2250 Junction transmitted the Kerrville Airport data and the Kerrville "H" facility DF approach procedure to N 17314.

Communication was established on 120.5 mc. between the San Antonio ARTC Center and N 17314 at 2257. At 2302, N 17314 advised the San Antonio Center it was at 3,600 feet, unable to pick up the Kerrville beacon, and was "awfully low on gas."

Meanwhile, the Trans-Texas agent at Kerrville, having been alerted, proceeded to the Kerrville Airport. He turned on the lights on runway 30, determined that the radio beacon was in operation, and took a weather observation at 2245. The latter, given by direct line to the San Antonio Center, was: Measured ceiling 700 feet, overcast, visibility one mile, light drizzle, fog, temperature 32 degrees, dewpoint 31. The Trans-Texas ground staff at Kerrville could not establish direct contact with N 17314, since Trans-Texas transmits on 128.9 mc. and this frequency was not available on N 17314.

The San Antonio Center had alerted the Kerrville Fire and Police Departments, and fire apparatus and several ambulances were standing by at the Kerrville Airport for emergency.

In an effort to maintain continuous contact with N 17314, the San Antonio Center utilized a USAF aircraft, AIREV^{4/} 54759, as a relay station. It was in flight near Austin, Texas. At 2313, AIREV 54759 reported N 17314 as over Kerrville, attempting an approach, and that the pilot had reported intermittent

^{3/} Airspeed in knots.

^{4/} Air Evacuation.

stalling. At 2317, N 17314 requested and received a repeat of the Kerrville instrument approach procedure, relayed through AIREV 54759.

Previously, at 2311, persons in the vicinity of the Kerrville Airport heard an aircraft overhead. At 2319 lights of an aircraft were seen south-southeast of the airport and then seen to pass over the airport on a northwest heading. At 2325, AIREV 54759 reported that N 17314 had missed the first approach to Kerrville and would make a second attempt. Three minutes later lights of an aircraft were again seen south-southeast of the airport. AIREV 54759 at 2331 reported that N 17314 was on a second approach to Kerrville and then relayed the Kerrville 2245 weather observation to N 17314. At 2339, AIREV 54759 reported being unable to maintain radio contact with N 17314.

At 2347, a person living near the Kerrville Airport called the San Antonio Air Traffic Control Tower and reported that at approximately 2337 an aircraft passed over his house and that he then heard an explosion. He gave his location. This information was relayed to Kerrville Airport. Ambulances and fire equipment proceeded to the accident scene, extinguished the fire and took survivors to hospitals in the Kerrville area.

The crash site is at an elevation of 1,535 feet m. s. l. in moderately hilly, wooded terrain 6.8 statute miles bearing 123 degrees T. from the Kerrville Airport, and 4.4 statute miles bearing 118 degrees T. from the Kerrville radio beacon. It is in the approximate area where a procedure turn from an outbound heading to an inbound heading would normally be made for a prescribed DF approach to Kerrville Airport.

At impact the cockpit was demolished by contact with trees. Captain Epps, Reserve Captain Hitt, and one passenger received multiple severe injuries, which in all probability were instantly fatal. The third pilot, W. H. Wittliff, in the cabin, was seriously injured and momentarily pinned in the wreckage until extricated by one of the passengers. The twenty-four surviving passengers were injured in varying degrees. They and the third pilot, Wittliff, with assistance, quickly got out and clear of the aircraft as fire broke out.

Copilot Wittliff was not on pilot duty during the Pueblo-Kerrville flight. Shortly after takeoff he went to sleep in the cabin. He was the only pilot to survive and as none of the passengers were pilots, and as there were no ground witnesses, his testimony is most enlightening. Portions of it are here quoted:

"I did not awaken until I heard the sound of the engines revving which was approximately forty-five minutes before the accident. This was my first indication that we had any unusual problems. The Captain explained that we had been picking up ice for about an hour previous to that. The revving of the engines at this time was for the purpose of flicking ice off the propellers. When we first went forward we were holding an approximate air speed of 120 knots with cruise power 29 inches and 2050 r. p. m.

"In a few short minutes the air speed slipped from 120 knots to 115, to 110 and finally 100 at which time as nearly as I can recall the pilot added power to 35 inches and 2250 r. p. m. which brought the air speed up to around 115 to 120 knots. The icer boots were engaged and ice on the leading edge of the wings came off which further increased the air speed. We were somewhere between Big Springs and Junction at this time.

"At this time the Captain knew that the fuel supply was getting to be critical in getting in to San Antonio. The ice and extra drag had used more fuel; he called for weather reports from several of the airports closest to us and, while I was only hearing snatches of the conversation, I gathered more of the area was reporting freezing rain and low visibility; San Antonio was the first station that had an on course that was reporting above freezing temperatures; so, he decided to continue on to San Antonio and look for emergency airports on the route. The only emergency airport available seemed to be Kerrville which was some 50 miles short of our destination. By the time we were a few minutes short of Kerrville airport the pilot had tuned in the homer at Kerrville and found we were receiving it properly and at this point made the decision to attempt to land at Kerrville rather than continue on to San Antonio since the fuel supply was getting real critical by this time. At this point we were flying at 4,000 feet presumably to have been cleared to that altitude; we were allowed some few feet less than 4,000 feet in that section which would put us approximately 2,000 feet above the terrain. We went to the homer at that altitude and then took an outbound heading for a normal descent and approach; completed the procedure turn, returned to the homer and from there to the airport descending continuously. I don't believe anyone in the cockpit saw the airport though we must have been close. Ice was covering the front windshield entirely and the only visibility was from the side window which the pilot was able to open and could look out from; although unable to see the airport, we had at this time contact conditions and could see the ground. I remember passing over a highway and car lights being visible below. Fuel supply by this time was so low that the gauges could hardly be regarded as reliable.

"The pilot decided to make a second attempt at an approach but rather than follow recommended approach altitude maintained his contact with the ground rather than climb back into the overcast. Somewhere during the second approach attempt the pilot made his decision to bring the plane in for a wheels up belly landing rather than risk the possibility of the fuel running out during blind conditions in the overcast, the re-entry of which would be necessary if we were to go through a normal approach procedure. When he had made that decision, I went to the rear to warn the passengers to keep their seat belts tightly fastened and at the first sign of any emergency to put their heads in their laps. I returned forward and the pilot was still searching for a spot to set down. About this point one of the engines sputtered and was out of fuel. A few seconds later we were making our forced landing. I had taken a seat on the floor facing the rear just behind the bulkhead at the rear of the pilot.

"When the plane finally stopped sliding I was on my back and pinned under an assortment of debris."

Passengers confirm ice accretion on wing surfaces and cabin windows but were generally unaware of operational matters. The commander of the military aircraft which served as a relay station, stated:

"After contact was established with the distressed aircraft he reported that he had 'six feet of ice on the aircraft and was stalling out every two minutes.' We relayed the Beacon frequency and the description of the let down at Kerrville to the distressed aircraft. After making an approach we were told by the distressed aircraft that he would try again. San Antonio Center called and said he had been seen from the ground at Kerrville directly over the airport.

We relayed this to the distressed aircraft - he reported that the windshield of his aircraft was iced over and they could not see out. Several more calls were made to the aircraft with no response then an answer that 'We're busy now Air Evac.' - Then silence."

The "six feet of ice . . .," an obvious exaggeration, was probably for emphasis.

A review of weather conditions shows that temperatures over northern Texas were below freezing at all levels with a pronounced temperature inversion. At 1800 on February 1, this inversion at Amarillo was approximately 7,000 feet. Below this altitude the mean temperature was about 10 degrees Fahrenheit whereas between 7,000 and 10,000 feet the mean temperature jumped to a value of about 25 degrees Fahrenheit. A similar inversion existed at San Antonio at this time. Between 1,000 and 3,000 feet, the temperature at San Antonio was close to the freezing point whereas above freezing temperatures existed in the layer from 3,000 to 10,000 feet.

Under these conditions the most adverse icing conditions would have followed the slope of the inversion from 5,000 feet near San Antonio rising to the levels immediately above and below 10,000 feet over extreme northern Texas.

The briefing from the Weather Bureau at Pueblo was by field interphone between 1635 and 1650. It consisted of a reading of 1600 hourly weather reports for 13 stations along the route to San Antonio, the terminal forecast for San Antonio, pertinent excerpts from the area forecasts issued by Denver, Fort Worth, and New Orleans, plus a flash advisory issued by Albuquerque. The briefing concluded with the Winds Aloft Analyses for Pueblo, Amarillo, Abilene, and San Antonio. All of the weather data utilized in this briefing clearly indicated widespread low ceilings, restricted visibilities, snow, freezing precipitation and icing conditions existing along the route. Weather Bureau Forecast Offices at Denver, Albuquerque, Fort Worth, El Paso, and San Antonio had covered the conditions accurately and exhaustively in area forecasts, terminal forecasts, and even in flash advisories which had been issued throughout the day by each forecast office.

At the time of first contact with the ground the aircraft was heading about 75 degrees true; left-wing low by about 10 degrees and descending at approximately a 10-degree angle. These figures are readily reconciled with Copilot Wittliff's statement and point to the aircraft being about halfway through a turn from downwind to approach and descending.

As the aircraft slid along the ground, numerous parts, including both engines, were torn free before the aircraft came to rest on a heading of about 44 degrees true after sliding 208 feet.

There was about a 40-minute lapse between crash and arrival of fire apparatus. As a consequence a great deal of the physical evidence was destroyed by fire, as were all records being carried. It was not possible, for example, to determine the position of the wing flaps, nor was it possible to determine why the windshield de-icers were not effective. Wing de-icers apparently were functioning and testimony of the carrier's maintenance personnel indicates that they should have been in good condition. The landing gear was up.

Examination of powerplants indicated that both were capable of normal operation at the time of the accident. Propeller shim plate markings indicated blade angles of approximately 18 degrees at impact for both propellers which is a power-off condition as the low pitch stops were set at 18 degrees. This also conforms to Copilot Wittliff's statement concerning the captain's intention to land wheels up.

General Airways, Inc., is a member of the Independent Airlines Association, Washington, D. C. This flight was contracted to General Airways by the U. S. Department of Defense through that association, which functions as a bidding agent only. The association does not govern the scheduling of flight operations nor the dispatching of individual members. It does coordinate movements with the military and bus companies. All other matters regarding individual flight operations are handled by the member concerned. Under terms of the working arrangement between the Association and General Airways, the latter was paid a flat 90 cents per mile for all CAM flights regardless of load and assumed all en route incidental expenses, including the housing and feeding of military personnel being transported.

Investigation disclosed other economic matters concerning the carrier's operation which relate to this accident. Crews are frequently away from their base at Portland, Oregon, for extended periods. While away, the captain functions not only as captain but becomes his own dispatcher, his own chief of operations and the carrier's fiscal agent carrying a sizeable amount of cash. He is not required to clear operational or other matters with his home office and did not do so during the series of flights culminating in this accident. He is almost entirely on his own even to the extent of paying all en route expenses of fuel, maintenance, housing and feeding of passengers (on CAM flights), and all other operating costs. Less than 90 days prior to this accident General Airways had entered into bankruptcy proceedings in the Oregon courts. At the time of the accident the company's staff and operation had been sharply curtailed.

Crew salaries are based solely on distance flown and are 5 cents per mile for the captain, 3-1/2 cents for the reserve captain, and 2-1/2 cents for the copilot. The maximum earnings for these three pilots flying 1,000 hours per year at an assumed average DC-3 speed of 150 knots would be \$7,500, \$5,250, and \$3,750 annually. In addition, the carrier pays its crews per diem of \$9.60.

Analysis

The Civil Air Regulations establish minimum safety standards. In this accident multiple breaches of regulations were entailed.

As is evident from the table of flight detail in Investigation these three pilots had exceeded the regulatory limit of flight duty upon arrival at Boise. Even at that time a degree of pilot fatigue must have set in. Pilot fatigue, which may engender a decrease in competence and diligence, could have been a factor in an overweight takeoff from Boise.

The time on the ground at Pueblo was relatively short and it may reasonably be expected that an increased level of pilot fatigue prevailed upon departing Pueblo. The reason for the overload upon departing Pueblo may have been an anticipation of added and unforeseeable flight time because of the questionable weather ahead or an indifference to regulations.

Economics could have been a factor in departing Pueblo in the face of a critical weather picture rather than remaining overnight. Laying over would have obligated the carrier to furnish lodging and two additional meals to 25 persons. The total cost of this has been estimated at about \$250.

The action of the captain in getting so far into a bad situation could be attributable to indifference to elementary rules of flight safety, coupled with severe economic compulsion.

Captain Epps was highly experienced with 15,000 hours of piloting, 9,000 of it in DC-3's. This, combined with the weather briefings he obtained, should have alerted him to the fact that by decreasing altitude as he did he would be staying in clouds, with below freezing temperatures and severe icing conditions. The changing of altitude from 9,000 feet to 7,000 feet early in the flight because of icing appears to have been the start of his trouble. He could safely have gone elsewhere: landing in the panhandle section of Texas (at Amarillo) or a diversion to the east (Fort Worth-Dallas) would have been an understandable and safe course of action.

Certainly there was nothing lacking in ground help; personnel of Air Route Traffic Control went to the greatest possible lengths in helping and in getting others to help. The overall effort displayed by ground personnel and the military during the latter portion of this flight is distinctly praiseworthy.

Conclusion

This accident was a considerable length of time in the making and was fully preventable. The facts show that operational supervision demanding compliance with regulations was completely lacking and that Captain Epps demonstrated disregard for the Civil Air Regulations. The flight went to and beyond its point of safe diversion despite exemplary efforts by FAA personnel to help. This captain pressed on to complete a mission long after good judgment called for discontinuing the flight.

The inevitable conclusion is that economic factors rather than the basic principles of safe flight were dominant.^{5/}

Probable Cause

The Board determines that the probable cause of this accident was the captain's poor judgment in continuing into known and dangerous icing conditions.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE (Chairman)
/s/ CHAN GURNEY (Vice Chairman)
/s/ HARMAR D. DENNY (Member)
/s/ G. JOSEPH MINETTI (Member)

^{5/} The FAA imposed civil penalties against General Airways on April 3, 1959, for violation of CAR 42.48 (c) 1, 2 and 3, (duty time) and CAR 42.71(b) (takeoff weight).

S U P P L E M E N T A L D A T A

Investigation and Taking of Depositions

The Civil Aeronautics Board was notified of the accident approximately two hours after its occurrence. An investigation was immediately initiated in accordance with the provisions of Section 701 (a) (2) of the Federal Aviation Act of 1958. Depositions were taken at Portland, Oregon, on March 3, 1959, and at Pueblo, Colorado, on March 6, 1959.

Carrier

Douglas DC-3, N 17314, was owned by General Airways, Inc., an Oregon Corporation. The company is a supplemental air carrier and was issued interim authority as such by the Civil Aeronautics Board on January 16, 1956. It was subsequently awarded a five (5) year temporary certificate of convenience and necessity which became effective March 30, 1959. The company also had an air carrier operating certificate issued by the Civil Aeronautics Administration. This latter was voluntarily surrendered to the Federal Aviation Agency shortly after this accident. The company engages in general passenger and freight transportation and at the time of this accident, owned and operated two DC-3's and one DC-4.

Flight Personnel

Captain Woodrow Orlen Epps, age 42, held a currently effective airman certificate with an airline transport rating. He was rated for DC-3's and DC-4's. His last physical examination (first class) was current, as were his last equipment and instrument checks. Captain Epps had flown a total of 15,009 hours, of which 9,373 hours had been in DC-3's, and had been employed by General Airways, Inc., since April 1951.

Reserve Captain Harvey Hitt, age 38, held a currently effective airman certificate with airline transport and DC-3 ratings. His last physical examination (first class) was current as were his last equipment and instrument checks. Mr. Hitt had flown a total of 3,872 hours, of which 3,100 had been in DC-3's. He had been employed by General Airways, Inc., since August 1954.

Copilot Wilbur Wittliff, age 42, held a current airman certificate with commercial and instrument ratings. His last physical examination (first class) was current as were his last equipment and instrument checks. Mr. Wittliff had flown a total of 2,937 hours, of which 1,062 has been in DC-3's. He had been employed by General Airways, Inc., since October 1957.

The Aircraft

Douglas DC-3, N 17314, was owned and operated by General Airways, Inc. It was certificated to operate under the transport category in accordance with a manual prepared by American Airmotive, Inc., which was approved for General Airways' use by the CAA. The aircraft had a total usage of 49,051 hours. Its last major inspection had been 6,215 operational hours prior to the accident. Its last line maintenance had been 42 operational hours prior to the accident. The engines were Pratt and Whitney model R-1830-92, serial Nos. BP431523 and

BP437769 for left and right. The total times on these engines are not readily determinable although the left had 37 operational hours since overhaul and the right had 109 hours. Propellers were Hamilton Standard model 123E50-505, serial Nos. P 10099 and 156985 for left and right. Both had 1,967 hours of operation since overhaul.