File No. 5181—46

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted October 8, 1947 Released October 9, 1947

AMERICAN AIRLINES, INC., ASHLAND, MISSISSIPPI—AUGUST 25, 1946

The Accident

American Airlines' Douglas DC-3, NC-88826, designated as Special Flight 26, crashed five miles WSW of Ashland, Mississippi, at 2210* CST, August 25, 1946, during a special practice flight The two pilots, the sole occupants of the aircraft, were fatally injured and the aircraft was demolished by impact and fire.

History of the Flight

During the evening of August 25, 1946, Flight 26 was scheduled for a routine training flight of approximately three hours duration in the Memphis, Tennessee, local area. Prior to departure, the flight advised the Memphis control tower that its operations would be conducted in accordance with visual flight rules on all legs of the Memphis radio range at an altitude of 4,000 feet. The aircraft departed Memphis Municipal Airport at 2110 and no subsequent radio contacts were had with the flight by the company station, Memphis Tower or Memphis Radio.

Shortly after midnight, American Airlines was informed by the Memphis AAF Air-Sea Rescue Group that an aircraft had crashed near Ashland, Mississippi. Since subsequent attempts by the company station to contact the aircraft by radio were unsuccessful, the assistance of Memphis Tower and Memphis Radio was requested at approximately 0140 Numerous attempts made by these stations to contact the flight were also unsuccessful When it became apparent that the aircraft was overdue and had probably been involved in an accident, company personnel were dispatched to Ashland and the aircraft which had crashed in that area was identified as Flight 26.

*All times referred to in this report are Central Standard and based on the 24-hour clock.

Investigation

The aircraft had crashed in wooded, rolling terrain five miles WSW of Ashland, Mississippi. Impact with the ground had been made in an extremely nose-low attitude and, as a result of severe impact, the structure of the aircraft was disintegrated and parts were scattered over a wide area. Indicating the severity of impact, the left propeller hub and the reduction gear assembly were buried in the hard ground a depth of more than eight feet. Fire had broken out immediately after impact consuming the major portion of the fuselage and center section. Examination of the wreckage and testimony of witnesses indicated that no fire was evident prior to impact. No evidence of failure of the primary aircraft structure or control systems was indicated Both landing gear and flaps were found in a retracted position.

Captain McLemore Elder and Captain William C. Stehle were scheduled for Flight 26 for the purpose of practicing flight maneuvers preparatory to taking a CAA air line pilot's semi-annual flight check The pilots were to divide the flight time equally and neither had been designated as captain of this flight.

At the time of departure from Memphis, the aircraft was properly loaded with respect to both maximum gross weight and center of gravity. However, 850 pounds of ballast weight had been placed on the floor in the rear of the cabin opposite the passenger's door. The ballast, which was contained in 25-pound sacks, was not secured in any manner At the time of take-off, the aircraft had 804 gallons of gasoline aboard and would have consumed less than 100 gallons prior to the accident.

At the time of the accident, the weather in the vicinity of Ashland was reported as high, thin, broken clouds,

visibility 12 miles, wind NE 7 miles per hour. Some stars were visible, but the moon did not rise until approximately five hours after the accident. From the description of the weather by witnesses, it was determined that the night was clear although this portion of Mississippi was very dark, few lights being located in that area.

The investigation disclosed that the artificial horizon and the turn indicator on the co-pilot's instrument panel were electrical instruments. These instruments had been installed by the company in NC-88826 for service test. Although at least one pilot had reported these instruments as being inoperative while the aircraft was on the ground, they appeared to operate satisfactorily during flight. Alternate inverters were not installed in the electrical system nor did the aircraft possess an alternate electrical source for these instruments. The electrical instruments could be turned off in flight by actuating the circuit breaker in the main junction box.

The directional gyros in both pilot and co-pilot instrument panels and the artificial horizon and turn indicator on the pilot's instrument panel were actuated by suction. During the previous three days, several comments had been recorded in the Pilot's Maintenance Reports indicating that the directional gyro on both the pilot's and co-pilot's sides of the instrument panel were precessing excessively and that the pilot's instrument tumbled occasionally, even though its operating limits were not exceeded. The directional gyro in the co-pilot's instrument panel was replaced two days before the accident. However, the pilot of the flight immediately following the replacement reported this newly installed instrument as being "inoperative". Both instruments were subsequently reported as functioning improperly, but they were not replaced because of the lack of serviceable instruments at Memphis.

Discussion

The attitude at impact indicates that, prior to the accident, the aircraft had been in an almost vertical dive and the complete demolition of the structure resulting from impact indicates very high speed. It is apparent, therefore, that the aircraft was not under normal control at the time of impact.

There doubtless was some deficiency in the suction-actuated flight instruments in this aircraft. Whether this deficiency was confined to the two directional gyros or whether some difficulty may have been present in the suction system is not known. It is probable that the irregularity reported in the electrical flight instruments was due to a lack of familiarity on the part of the crew with respect to the operation of this type instrument. Since no alternate source of electrical energy existed in the event of failure of some component in the electrical system of which the co-pilot's artifical horizon and turn indicator were a part, it would appear that particular caution should have been exercised in assuring the satisfactory operation of the suction-actuated instruments. The absence of the moon and the darkness of the terrain rendered the use of flight instruments essential even for normal flight. It is apparent in this instance that, in view of the defective directional gyros, the instrumentation of the aircraft was not complete and that, in recovery from unusual attitudes not exceeding the design limitations of the instrument, the pilot would very likely be denied the use of at least the directional gyro.

During the course of this flight, the pilots were expected to practice recovery from unusual maneuvers similar to those contained in CAA flight checks. While it appears that the unusual attitude of the aircraft at the moment of impact may have resulted from a voluntary maneuver by one of the pilots, recovery from which was not completed, the possibility of loss of control from some other factor not apparent in the investigation cannot be eliminated.

The fact that the ballast in the passengers' compartment was unsecured created the possibility of a serious shifting of balance during unusual attitudes. While the maximum possible movement of this ballast would probably not alter the center of gravity beyond approved limits, a sudden shift during an unusual maneuver may have produced a forward movement of the aircraft center of gravity location of almost 12 inches. Such a change in center of gravity would have had an appreciable effect on "trim", and the resulting change in control forces would obviously have complicated an attempt by the pilot to recover from

an unanticipated severe change in attitude. Some laxity must be charged to the company, therefore, for its failure to assure that the condition of the aircraft and its contents was suitable for the flight activity contemplated.

As a result of the investigation of this accident, it appears that the aircraft, for reasons not determined, entered an unusual attitude from which recovery was not completed. Recovery in this instance may have been complicated by unsecured ballast or defective instruments, or both.

Findings

On the basis of all available evidence, the Board finds that

1. The aircraft and crew were properly certificated for the flight
2. Flight 26 was arranged as a pilot training flight for the purpose of practicing maneuvers in preparation for a CAA airline pilot's semi-annual check.
3. Eight hundred and fifty pounds of ballast was lying unsecured on the rear cabin floor.
4. Neither directional gyro was functioning properly.
5. During the course of the flight, the aircraft, for reasons not determined, entered an unusual attitude from which the pilots did not recover.
6. The aircraft struck the ground in almost a vertical dive and at high speed, as a result of which the aircraft was demolished and both pilots killed.

Probable Cause

The Board determines that the probable cause of this accident was the loss of control of the aircraft during an unusual attitude. Neither the reason for the initial loss of control nor the reason for the pilot's failure to recover has been determined.

BY THE CIVIL AERONAUTICS BOARD.

/s/ J. M. LANDIS
/s/ OSWALD RYAN
/s/ HARLLEE BRANCH
/s/ JOSH LEE
/s/ CLARENCE M. YOUNG

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SUPPLEMENTAL DATA

Investigation

The Civil Aeronautics Board was notified of the accident at 0700, August 26, 1946, and investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. Air Safety investigators of the Board's Atlanta office arrived at the scene of the accident at 1130 the same day.

Air Carrier

American Airlines, incorporated under the laws of the State of Delaware and maintaining its general offices in New York, New York, operates as a scheduled air carrier under the provisions of a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the Civil Aeronautics Act of 1938, as amended.

Flight Personnel

Captain McLemore Elder, age 36, of South Whitehaven, Tennessee, had been employed by the company since March 2, 1946. At the time of the accident he held an airline transport pilot rating and had accumulated a total of 6,770 hours' flying time, of which 4,270 hours had been obtained in DC-3 equipment. Captain William Campbell Stehle, age 32, of Memphis, Tennessee, was employed by American Airlines January 6, 1940. At the time of the accident he held an airline transport pilot's rating and had accumulated a total of 5,835 hours' flying time, of which 5,051 hours had been obtained in the type aircraft involved.

Aircraft

The Douglas DC-3C, NC 88826, had been flown a total of 3,462 hours of which approximately 73 hours had been accumulated since the last 230-hour check. It was equipped with two Pratt and Whitney Model 1830-92 engines on which Hamilton Standard hydromatic propellers were installed. The left engine had been operated a total of 1,945 hours with 451 hours since last overhaul. The right engine had been operated a total of 1,855 hours with 451 hours since last overhaul. The gross weight of the aircraft at the time of take-off was considerably less than authorized maximum.