File No. 1-0003

C I V I L A E R O N A U T I C S B O A R D
ACCIDENT INVESTIGATION REPORT

Adopted: June 24, 1954 Released: June 29, 1954

ZANTOP FLYING SERVICE, NEAR KANSAS CITY, MISSOURI, JANUARY 20, 1954

The Accident

At approximately 0708, 1/ January 20, 1954, a DC-3A, N 49551, owned and operated by Zantop Flying Service, Jackson, Michigan, crashed near the Kansas City, Missouri Municipal Airport. All three members of the crew, the only persons on board, were killed. The aircraft was destroyed.

History of the Flight

On January 20, 1954, at 0252, N 49551, departed Jackson, Michigan, for Atlanta, Georgia, with a planned intermediate stop to discharge cargo at Fairfax Airport, Kansas City, Kansas. This was a cargo flight designated as Trip 40-2011; the crew consisted of Captain William D. Speaks, pilot in command, Captain Edward F. Kaseiak and First Officer Byron R. Williams.

Prior to departing Jackson, the crew went to the CAA Communications Station on the airport and reviewed the weather sequence reports and en route forecast and Captain Speaks also telephoned the U. S. Weather Bureau office at Detroit, Michigan, to obtain more detailed information. Following the review of the weather data, an IFR (Instrument Flight Rules) flight plan to Kansas City, Kansas, was filed which indicated a cruising altitude of 10,000 feet, estimated elapsed time of four hours plus 20 minutes with seven hours of fuel on board and Springfield, Missouri, as the alternate airport.

1/ All times herein are Central Standard and are based on the 24-hour clock.

According to company records, the weight of the aircraft at takeoff was under the allowable gross weight of 26,900 pounds and the load was distributed so that the center of gravity of the aircraft was within approved limits.

Routine position reports were made and when over Burlington, Iowa, at 0536, the flight was cleared to the Liberty Non-Directional Beacon, 16 miles northeast of Kansas City, to descend to and maintain 2,500 feet. At 0627, ARTC (Air Route Traffic Control) cleared the flight to the Kansas City, Missouri ILS (Instrument Landing System) outer marker to maintain 2,500 feet and to contact approach control when over Liberty. Twenty-nine minutes later, at 0656, the flight reported being over Liberty and approach control gave it the 0635 Kansas City, Missouri weather as follows: ceiling measured 600 feet, overcast, visibility 1-1/2 miles, light freezing drizzle, fog, and altimeter setting 29.89. At this time approach control also verified that the aircraft was to land at the Fairfax Airport, Kansas City, Kansas, and immediately gave it the 0655 Fairfax Airport weather report: ceiling measured 600 feet, overcast, visibility 2 miles, light freezing drizzle, light snow, fog and wind northwest 30 m.p.h. This airport is one and one-half miles northwest of the Kansas City Municipal Airport and across the Missouri River. The flight was then cleared to make an ADF approach to Fairfax for a landing on Runway 31 and was requested to report leaving the outer marker.

N 49551 reported leaving the outer marker inbound at 0705 and was advised to contact the Fairfax Tower. The flight complied and requested the wind direction and runway in use. The tower replied that the runway was 31, the wind was from the north-northwest 20-30 m.p.h. and gusty, and the altimeter setting was 29.88. A few seconds later the tower also advised that the high intensity approach lights at the Kansas City Municipal Airport were on and

if too bright, would be turned down. The flight's acknowledgment was negative and there was no further radio contact.

At approximately 0755 the wreckage was located by the Kansas City Municipal Airport patrol 400 feet north and 156 feet west of the approach end of Runway 17 of that airport. 2/

Investigation

First contact with the ground was made by the right main landing gear when it struck the top of a mound of dirt which jutted 21 feet from the east bank of the Missouri River. The river at this point is approximately north and south. It was determined by examination of the wreckage and the ground marks that at the time of impact the aircraft was in a nose-high slightly left wing low attitude on a heading of approximately 60 degrees. The lower left side of the aircraft's center section and fuselage struck the river bank next and the airplane then slid 60 feet farther.

The aircraft's fuselage was heavily damaged from the nose to the main cabin door and beyond this point was distorted.

Both wings, with their ailerons and flaps attached, remained connected to the center section. Five feet of each wing inboard from the tip was bent upward about 10 degrees. A portion of the leading edge of the right wing was crushed inward to the front spar. The flaps were badly crushed; however, it was determined that they were extended to the one-quarter down position when the accident occurred.

The aircraft was equipped with deicer boots. When examined an hour after the accident approximately one-half inch of clear ice was observed on the

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2/ - See attached chart.

leading edges of the wings. The crazed pattern of this ice indicated that the deicer boots had been in operation prior to the accident. Ice, similar in amount to that found on the wings, was also found on the leading edge of the horizontal stabilizer.

The center section was heavily damaged and the fuel and alcohol tanks were ruptured and distorted. The deicer distributor valve was torn from its mounting and damaged. It was determined that the landing gear was extended at the time of the accident.

Control positions, subject to change by impact in some cases, were as follows: left throttle open, right closed; left mixture - auto-lean, right between auto-lean and idle cutoff; carburetor air, left and right cold; landing gear, neutral; flaps, neutral; wing deicer boot control on; the ignition, master and pitot heat switches were "on."

It was determined that Captain Speaks was occupying the left pilot seat at the time of impact; it was impossible to determine which pilot was in the right seat.

The pilot seats and the jump seat were torn from their attach fittings. The pilot's and copilot's safety belts were fastened at the time of impact and failed in the webbing at the seat belt anchor. The jump seat belt was found unbuckled and undamaged.

Examination of the airframe and control systems revealed no evidence of malfunction or structural failure before impact.

The left propeller blades were intact in the hub and bent forward. The blades were set at approximately 27 degrees. The blades of the right propeller were bent rearward and twisted severely. The setting of the right propeller blades was 18 degrees. These propeller settings are not positive

indication of the setting prior to impact as both propellers were torn from the engines and sustained considerable damage. The condition of all propeller blades indicated that the propellers were rotating at impact. The propellers were equipped with deicing equipment. It was not possible to determine if this system was operating at the time of the accident.

Both engines and nacelles were damaged. The right engine separated from the aircraft; the left engine did not. The damaged engines were given a teardown inspection and no evidence was found to indicate any malfunction or structural failure prior to impact.

A chronograph wrist watch, stopped at 0708, was found at the scene.

A large cold air mass was moving southeastward into the Plains States at 0000, January 20, 1954. A wave type low center located in extreme southwest Kansas was moving rapidly northeastward in the transition zone of the cold air mass. At the time the flight departed Jackson, Michigan, the cold front extended southwestward from central Wisconsin through southeastern Iowa, northwest Missouri to approximately Topeka, Emporia and Wichita, Kansas. The cold front passed Kansas City about 0355 and at the time the flight reached Kansas City, the cold front was approaching Columbia, Missouri, 100 miles to the east. Showers and thundershowers were preceding the front. A narrow band of rain showers existed immediately behind the front, changing to freezing drizzle and snow farther back of the front. The temperature gradient to the rear of the front was extremely steep.

Captain Speaks, before departure, was advised by FAWS (Flight Advisory Weather Service), Detroit, that conditions upon arrival at Kansas City could not be expected to be better than the area forecast. This forecast indicated icing in below freezing temperatures with the freezing level at 8,000 feet

plus an additional freezing layer at the surface with moderate to heavy icing in the low clouds. The flight crossed the cold front near Burlington, Iowa, and as it progressed temperatures below freezing were encountered. Moderate ice and moderate turbulence were experienced for the remainder of the flight after passing Kirksville, Missouri. The weather at Springfield, the alternate at the time of the approach to Kansas City was: ceiling measured 2,000 feet, broken clouds, visibility 15 miles and wind from the south-southwest 15 miles per hour and was also well above minimums throughout the entire flight.

The crew flight kits contained current CAA Flight Information Manuals and this manual describes the ADF approach for Fairfax Airport. The ADF procedure requires the use of the Bluff Fan Marker (3.7 nautical miles inbound - course 184 degrees from the outer marker) and specifies a right turn at the Bluff Marker to 224 degrees. This turn is 0.8 nautical miles from the approach end of Runway 22. Manual minimums for the ADF approach to Fairfax are 700 feet and one mile.

Investigation disclosed that all crew members had previously landed at Fairfax Airport but it could not be ascertained under what weather conditions this experience had been gained. However, the tower controller asked the pilot during his approach whether he was acquainted with the missed approach procedure and he replied that he was.

Two ground witnesses south of Fairfax Airport observed the aircraft flying overhead at an estimated altitude of 100-200 feet above the ground. These witnesses observed the aircraft making a left-hand pattern rolling violently from side to side while descending. They described the motion of the aircraft as wallowing. One witness, an aircraft mechanic, stated the aircraft appeared to be out of control.

The other witness, located farther along the pattern, stated he thought the aircraft would crash before getting back to the airport. Both witnesses testified to the freezing drizzle, slippery ground conditions, low ceiling and poor visibility. They lost sight of the aircraft when it disappeared to the east behind ground structures.

Investigation disclosed that all CAA navigational and landing facilities in the Kansas City area were checked after the accident and found to be operating normally.

Analysis

When the flight was in the vicinity of Liberty, Missouri, it received the latest Kansas City Municipal and Fairfax Airport weather information which indicated that the ceiling at both these airports was 100 feet below the company's prescribed minimums with freezing drizzle at the surface. This report was received by the pilot nine minutes prior to the start of the approach at the outer marker. Therefore, it is evident the pilot started the approach with full knowledge that if the approach was continued, he would be descending below his approved minimums and into known icing conditions. The weather at the alternate, Springfield, throughout this period was above minimums with respect to both visibility and ceiling. Why the pilot elected to land under these conditions instead of proceeding to his alternate is not known.

It is the responsibility of a pilot to be familiar with the Civil Air Regulations pertaining to instrument approaches. 3/ This is especially true

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3/ CAR 42.56 "INSTRUMENT APPROACH. No instrument approach procedure shall be executed or landing made at an airport when the latest United States Weather Bureau report for that airport indicates the ceiling or visibility to be less than that prescribed by the Administrator for landing at such airport ..."

since CAA control tower personnel assume only the responsibility of traffic separation.

The evidence indicated that the pilots were not only familiar with the Kansas City area but also with the procedures involved in making an ADF approach to Fairfax Airport. The initial portion of this approach was apparently normal; however, the aircraft crashed while circling to land on Runway 31. During the entire approach the ceiling was reported as being 100 feet below the company's authorized minimums.

The banking of the aircraft, observed immediately prior to the crash, could have been due to the approach being made at low air speed with deicer boots in operation. At low air speeds portions of the wing can stall due to the cycling of the deicer boots.

Study of all available weather data indicates that icing conditions and turbulence were encountered near Burlington. However, when the descent was made to 2,500 feet after passing Burlington, above-freezing temperatures together with light turbulence were encountered. Between Kirksville and Liberty the flight entered a cold air wedge which was behind the cold front. This air was below freezing temperature and throughout the remainder of the flight moderate turbulence and moderate to heavy icing conditions existed. Ice accumulation would require a higher than normal air speed to continue a safe landing approach. In addition, wing deicer boots due to their pulsation would cause considerable loss of lift if the aircraft were flying at a low air speed. Therefore, it is probable that deicer boot operation and ice accretion in this case caused loss of control at an altitude too low to effect recovery.

Findings

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

1. The aircraft, crew members and the company were properly certificated.

2. The load was distributed so that the center of gravity of the aircraft was within the approved limits.

3. The flight was properly dispatched.

4. The flight was routine to the Kansas City area.

5. The crew was briefed fully on en route and terminal weather.

6. At Kansas City the crew acknowledged receipt of landing instructions and airport weather.

7. The ceiling at the Fairfax Airport during the approach was 100 feet lower than CAA prescribed minimums.

8. While attempting a circling approach to Runway 31 the flight encountered conditions of restricted visibility.

9. The aircraft had accumulated ice during the approach and descent in sufficient quantity to adversely affect control.

10. Deicer boots were operating during the approach thereby increasing the stalling speed.

Probable Cause

The Board determines that the probable cause of this accident was the loss of control of the aircraft at an altitude too low to effect recovery, which loss of control resulted from an accumulation of ice and the use of deicer boots at low air speeds.

BY THE CIVIL AERONAUTICS BOARD:

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ OSWALD RYAN

/s/ JOSEPH P. ADAMS

Josh Lee, Member, did not participate in the adoption of this report.

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board was notified of the accident at 0800, January 20, 1954. An investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. A Special Investigation was ordered by the Board and depositions were taken February 9-11, 1954, in Kansas City, Missouri, and Jackson, Michigan.

Air Carrier

Zantop Flying Service, a partnership under the laws of the State of Michigan, maintains its principal office at Jackson, Michigan. The partnership held an operating certificate as a commercial operator issued by the Civil Aeronautics Administration.

Flight Personnel

Captain William D. Speaks, age 33, was employed by Zantop Flying Service on August 14, 1953. He held a valid airline transport certificate with an appropriate rating for the aircraft involved. His total flying time was 5,333 hours of which 2,091 were in DC-3 aircraft. His last CAA physical examination was taken on November 2, 1953.

Captain Edward F. Kaselak, age 39, was employed by Zantop Flying Service, November 5, 1953. He had a total of 5,337 flying hours of which 1,120 were in DC-3 aircraft. He held a valid airline transport certificate with an appropriate rating for the aircraft involved. His last CAA physical examination was taken November 16, 1953.

First Officer Byron R. Williams, age 31, was employed by Zantop Flying Service, November 11, 1953. He had a total of 5,619 flying hours of which

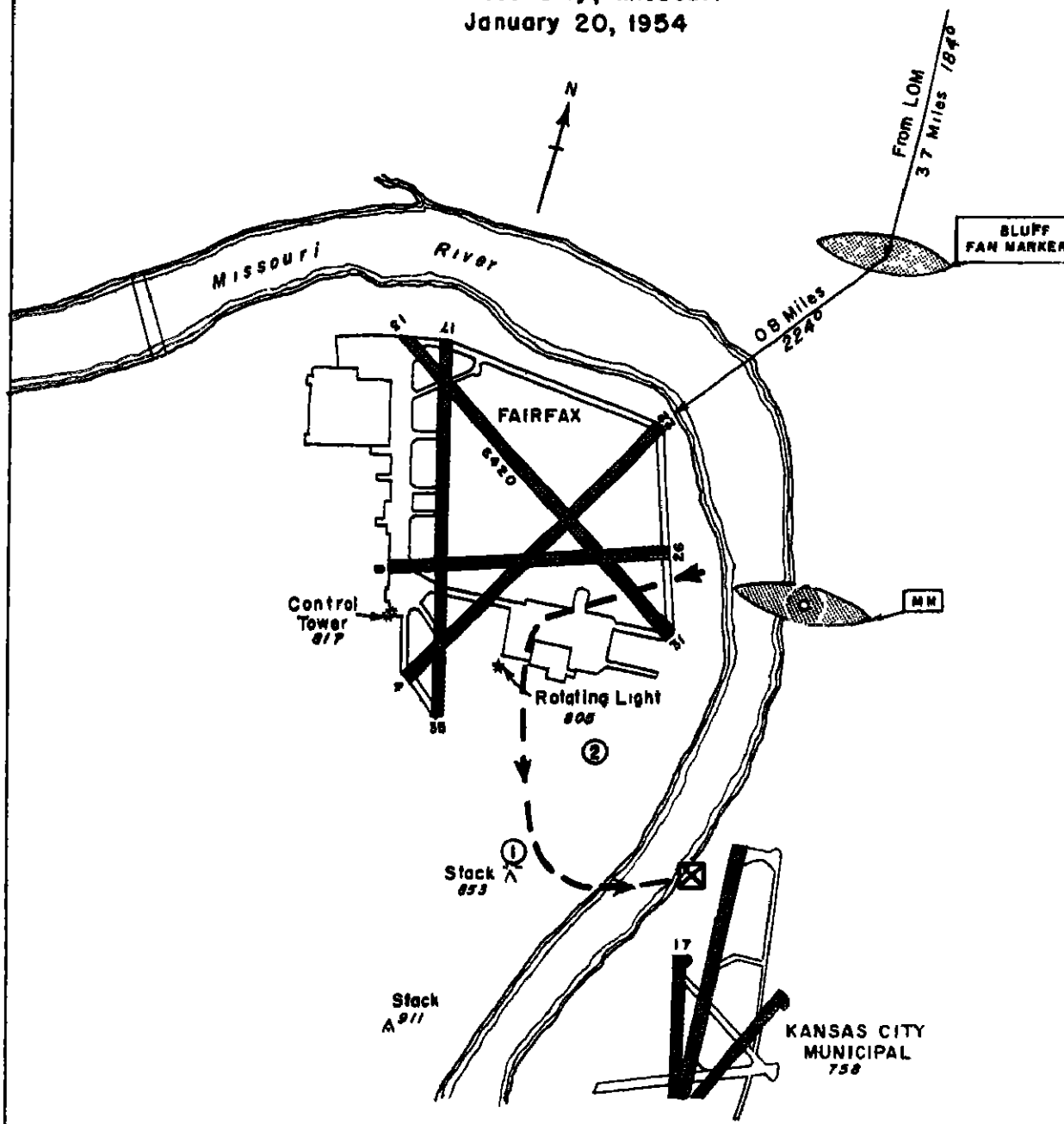
1,658 were in DC-3 aircraft. He held a valid airline transport certificate with an appropriate rating for the aircraft involved. His last CAA physical examination was taken September 3, 1953.

The Aircraft

N 49551, a Douglas DC-3A, was manufactured June 2, 1942, and was purchased by Zantop Flying Service, April 21, 1953. It had a total flying time of 24,786 hours and 1,010 flying hours since last overhaul. It was equipped with Pratt & Whitney R-1830-92 engines and Hamilton Standard propellers. The engines had accumulated 384 hours since overhaul.

PROBABLE FLIGHT PATH AND LOCATION OF WRECKAGE

Zantop Flying Service, N49551,
Kansas City, Missouri
January 20, 1954



① ② Eye Witnesses

Probable Flight Path

Accident Location

56485