

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED: November 13, 1962

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CONTINENTAL AIR LINES, INC.,
VICKERS-ARMSTRONGS VISCOUNT MODEL 812, N 243V,
AMARILLO MUNICIPAL AIRPORT, AMARILLO, TEXAS,
JULY 8, 1962

SYNOPSIS

A Continental Air Lines Vickers-Armstrongs Viscount Model 812, N 243V, was landed wheels-up, almost immediately following takeoff from the Amarillo Municipal Airport, Amarillo, Texas, on July 8, 1962, at approximately 0706 c.s.t. There were no serious injuries to any of the 13 passengers or 3 crew members. The aircraft was destroyed by fire.

After normal lift-off and landing gear retraction, the captain was momentarily distracted by rainwater from the window channel falling on his left shirt sleeve and he inadvertently allowed the aircraft to settle until Nos. 2 and 3 propellers struck the runway. No. 4 engine and propeller were damaged by pieces of metal thrown from the No. 3 propeller. Increasingly severe vibration, a rapidly developing right wing heaviness, and sudden and excessive rise of exhaust gas temperatures of Nos. 2 and 3 engines dictated an immediate emergency landing. This was effected, wheels up, in a harvested wheatfield approximately 6,930 feet beyond the end of runway 21 and in a direction 21 degrees to the right of its extended centerline.

The Board determines that the probable cause of this accident was the captain's diversion of his attention during takeoff which allowed the aircraft to settle to the runway striking the Nos. 2 and 3 propellers.

Investigation

Continental Air Lines Flight 210, a Vickers-Armstrongs Viscount Model 812, N 243V, was scheduled between Amarillo and Houston, with stops at Lubbock, Midland, San Angelo, and Austin, all in Texas.

Takeoff gross weight for the aircraft was computed as 57,464 pounds, well below the maximum of 63,430 pounds allowable for this flight and the center of gravity was located within limits. Fuel on board at departure from Amarillo weighed 10,230 pounds and was evenly distributed in the four main tanks. There were no discrepancies noted during the preflight inspection made prior to this flight, nor did the aircraft log carry any pilot complaints for several preceding flights.

There were 13 passengers aboard, including 3 infants, and a crew of 3 which consisted of Captain Lawrence A. Lauratis, First Officer Edward C. Gorman, and Stewardess Linda N. Howard.

Flight 210 departed the ramp at 0652^{1/}, and was cleared to runway 21 which is 13,500 feet long by 300 feet wide. The airport elevation is 3,607 m.s.l. net. The V₁ and V₂ speeds^{2/} were computed for this runway under the existing conditions as 92 knots and 109 knots, respectively.

The flight received an Instrument Flight Rules clearance, in accordance with its flight plan, which cleared the flight to proceed to the Lubbock VOR via Victor airway 81, to maintain 8,000 feet and to contact Lubbock Approach Control when over the Plainview Intersection. At 0702 the flight was cleared for takeoff. The flight acknowledged the clearance, taxied down the taxi strip to runway 21, and immediately commenced a rolling takeoff into a 12-knot wind. Captain Lauratis made the takeoff from the left seat.

According to groundwitnesses and passengers, the takeoff roll and initial lift-off were normal. The Tower local controller stated that the aircraft climbed to an altitude of 20 to 50 feet. A passenger with piloting experience recalled that after climbing 30 to 40 feet the aircraft settled to the runway and he heard "the sound of metal hitting the concrete," and the aircraft then resumed its climb straight ahead. Board investigators determined that the Nos. 2 and 3 propellers struck the runway at a point 5,434 feet from the threshold of runway 21.

The captain stated that the rotation was at 105 knots and lift-off at 109 knots on orders from the captain the copilot put the landing gear selector lever in the "up" position. The captain further stated that immediately after lift-off he had become momentarily distracted by rainwater from the window channel falling on his left shirt sleeve but did not remember the aircraft settling to the runway. In addition, he stated that he first sensed trouble because of a severe vibration and an overtemperature condition of the Nos. 2 and 3 engines. At this time the copilot gathered No. 2 propeller upon the captain's order. The aircraft continued in a climb to an altitude variously estimated as from 150 to 400 feet.

Several passengers reported seeing fire on the right wing in the area of Nos. 2 and 4 engines. This fire was observed immediately after the aircraft contacted the runway and it continued throughout the duration of the short flight. The Tower local controller stated that smoke began trailing from one of the engines on the right side immediately after the aircraft had settled to the runway and fire appeared in this area when the climbout was resumed. He attempted to advise the flight of this condition, but received no reply.

Vibration was increasing, the No. 3 engine was indicating extreme overtemperature, and the control of the aircraft was becoming more difficult. The captain elected to execute an emergency wheels-up landing in an open field slightly to the right of the departure end of runway 21. He actuated the flap lever to raise the flaps from their 20-degree position. The aircraft contacted the ground slightly on the right wing down and in a somewhat nose-high attitude on a heading of approximately

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

^{2/} V₁ is defined by CAR as the critical-engine-failure speed used in the determination of the takeoff distance required at which the critical engine is assumed to fail.

V₂ is defined by CAR as the takeoff safety speed used in the determination of the takeoff flightpath at which the climbout, following takeoff, can be safely executed with one engine inoperative and with the airplane in the takeoff configuration.

275 degrees magnetic. It slid for approximately 850 feet, yawed to the right, and came to rest upright on a heading of 345 degrees magnetic. The time of impact was 0706, as recorded in the control tower.

Approximately 90 seconds after the aircraft came to a stop, all occupants successfully vacated the cockpit and cabin. The first officer, who was first to leave the airplane, attempted to open the cockpit-cabin door, which he found jammed, so he immediately left through the right cockpit sliding window, on the side of the aircraft which was burning, and moved around to the main entrance door on the left forward part of the aircraft.

At this time the captain, hearing a clamor in the passenger cabin, forced open the cockpit-cabin door and activated the main entrance ramp door latch mechanism. He then kicked the steps partly down, assisted from the outside by the first officer, and jumped out.

The captain directed a lady passenger to throw her baby to him and then jump. After placing the baby a safe distance from the aircraft, he returned to the main entrance ramp, then proceeded to the rear emergency door, which he found open, and at this time learned that all cabin occupants were out and safe. He instructed everyone to leave the wreckage area.

As soon as the airplane came to a stop, the stewardess decided that since the fire was closest to the forward or coach section of the cabin it would be better to use the rear exit. However, she found the exit area in the right rear cluttered with galley equipment that had fallen to the floor during the landing, so she opened the left rear door throwing out a trash bin and a coffee jug which partly obstructed this exit. With the aid of a male passenger, she began assisting women and children through the door. Before leaving the cabin the stewardess went forward to the coach section and led back to the rear some passengers who were undecided whether to use the front or rear exit. After stepping to the ground, she met the flight crew coming from the front of the wreckage area and a count of the passengers showed all present.

After impact, the fire in the right wing area became more intense and spread, largely consuming the aircraft. Fire and rescue equipment from the Amarillo Air Force Base, located on the same airport, reached the scene at 0710 and extinguished the fire.

The 0655 weather observation made by the U. S. Weather Bureau at Amarillo Municipal Airport was: 6,000 feet scattered; estimated 10,000 broken; visibility 12 miles; temperature 70 degrees F; dewpoint 63 degrees F; wind southwest 12 knots; altimeter setting 30.12 inches; pressure rising rapidly; lightning in cloud and cloud to ground east, rain showers of unknown intensity all quadrants, occasional light rain showers.

Board investigators established security over the wreckage area and, at their request, Air Police from Amarillo Air Force Base maintained that security until investigation was completed.

Two parallel series of propeller gouges and some propeller blade fragments were found on the concrete surface of runway 21. The gouges started 5,434 feet from

the threshold of runway 21 and continued, nearly equally spaced on both sides of the runway centerline, for distances of 140 feet 10 inches for the left-hand series, and 140 feet 5 inches for the right-hand series. There were 49 propeller gouges to the left of the centerline and 47 to the right - those to the left made by No. 2 propeller and those to the right by No. 3. The average longitudinal distance between the marks was 2 feet 11 inches. However, the initial spacing of the left series was 2 feet 6 inches; of the right, 2 feet 7 inches. These runway gouges were quite prominent, deep, and freshly made. A propeller blade tip approximately eight inches long from the No. 3 propeller was found 60 yards to the right of the runway abreast of the gouged area.

Investigation of the wreckage area disclosed small bits of molten aircraft alloy which were found beginning 2,640 feet short of the main wreckage. The particles became progressively larger along the groundpath of the aircraft. Approximately 900 feet short of the main wreckage and before the aircraft had made ground contact, the earth was scorched from the burning of a large quantity of aviation fuel. The No. 4 propeller made first ground contact 898 feet short of the wreckage. There was evidence of progressively deeper blade slashes of propellers Nos. 3, 2, and 1. The main wreckage was 6,930 feet west-southwest of the departure end of runway 21.

The nose gear and left main landing gear were found in the retracted and locked position; the right main landing gear was up but extensive fire in the right wing area precluded positive determination of whether it had been locked.

The continuity of the elevator control system was intact up to the cockpit, but fire had precluded determination of its integrity within the cockpit. The rudder control tube had melted due to ground fire at fuselage station No. 381. There were numerous breaks in the aileron control system, all caused by extreme heat. All trim tab surfaces were found in neutral positions.

All throttles were found in the closed position. The landing gear and flap selectors were in the up position; however, the flap surfaces were 20 degrees down, which was the position used for takeoff. The altimeters were found at barometric settings of 30.05 and 30.09 inches Hg. Engine instruments were destroyed by ground fire as were the aircraft's frangible and inertia switches.

Preliminary investigation of the powerplants and their auxiliary components was performed at the accident site. The detailed examination under Board supervision was conducted at the maintenance facilities of Continental Air Lines at Denver, Colorado. This examination of the powerplants did not indicate any evidence of operational distress or failure prior to the initial contact with the runway. The preliminary examination disclosed that the No. 2 propeller was fully feathered; the detailed examination disclosed no evidence of overtemperaturing of that engine.

The No. 3 engine showed excessive overtemperature as evidenced by the burned and melted condition of many of the turbine blades and nozzle guide vanes. In addition, the rear main bearing had failed as a result of being forced rearward by severe axial loading.

The intermediate case of the No. 4 engine had been ruptured on the lower in-board side by foreign metallic objects moving at high velocities. The rupturing of the case also dislodged the combustion chambers from the nozzle box permitting the gas flow to enter the nacelle area. The flow pattern of the soot deposited on the

engine cowling and engine case structure was indicative of an in-flight fire.

The Nos. 1, 3, and 4 propeller pitch changing mechanisms revealed blade angles of 32, 25, and 22 degrees, respectively. The No. 2 propeller was fully feathered. The four blade tips of the No. 1 propeller showed rotational damage from contact with soft ground. The four blade tips of the No. 2 propeller were damaged from rotational contact with a concrete surface. Three of the blade tips of the No. 3 were similarly damaged from contact with concrete; the fourth blade was broken approximately eight inches from the tip. The No. 4 propeller had three of its blades damaged from rotational contact with soft ground; the fourth blade had a sizeable portion missing. The remaining hub portion of this blade showed evidence of having been struck by a foreign object.

The exact point of origin of the fire which occurred in the right wing following propeller contact with the runway could not be positively determined due to the extensive damage caused by the ground fire and impact.

Investigation disclosed that maintenance of the aircraft and all its components, including powerplants, had been satisfactory and was current. Neither Captain Lauratis nor First Officer Gorman stated or implied that there had been any power loss or any other abnormality prior to the onset of the severe vibration.

This aircraft was equipped with a Lockheed Aircraft Service Company flight recorder, model 109-C, which survived both impact and ensuing fire. Analysis of the recorded traces yielded certain flight information from time of starting the takeoff roll until final impact.

The maximum altitude reached after the initial contact was indicated as 345 feet; however, the relatively low altitude change just prior to the aircraft's settling to the runway was not apparent.

The recording initially showed an airspeed increasing to 134 knots. For the next 20 seconds the airspeed tracing, as well as the other tracings, became undecipherable, apparently due to severe vibration. At the end of this 20-second period, the airspeed recording was 135.6 knots. It increased to 139.9 knots and then decreased to 115.7 knots, at which time it and all other tracings became undecipherable.

With respect to vertical acceleration, the record indicated no abnormality during the takeoff roll except for a nine-second period of no fluctuation at all. As mentioned, its indications were undecipherable for a 20-second period.

At the end of that period it showed an extremely unusual and virtually instantaneous fluctuation from 0.04 G to 1.96 G units. It then showed a one G fluctuation unsymmetrically about the one G datum, and this continued until the recording trace again became undecipherable, corresponding in time to the other cessations.

The heading recording first indicated a direction of 170 degrees magnetic, conforming to the direction of the taxi strip. It then showed a uniform average of 210.5 degrees magnetic, compatible with the runway direction, until the aforementioned 20-second interruption. At the end of this period it resumed and maintained an indication of 210 degrees magnetic until it also became undecipherable.

Analysis

The investigation of this accident has disclosed no mechanical item which can be linked to the cause of this accident. The weather conditions were not a factor, the runway was unusually long, the takeoff was very nearly into a 12-knot wind, and the aircraft was well below its maximum allowable takeoff weight and was properly loaded. The explanation of this crash can be attributed to the improper operation of the aircraft. It is concluded that this accident had its inception during the moment of the captain's distraction when the aircraft was inadvertently allowed to settle until Nos. 2 and 3 propellers struck the runway. The chain of events from there on can be reconstructed from the physical evidence.

Computation of airspeed based on spacing of propeller gouges is compatible with the airspeed as recorded by the flight recorder at the onset of the severe vibration and this speed was sufficient to maintain flight. Physical evidence shows that an eight-inch section of blade tip from No. 3 propeller was slung into the propeller disc of No. 4 propeller, breaking off a sizeable portion of a blade of No. 4 propeller. Other flying fragments struck No. 4 engine case, rupturing and decoupling that engine; combustion chambers separated from the nozzle box allowing the egress of high temperature gases. Also the tank area and/or fuel lines of the right wing between Nos. 3 and 4 engines was pierced by other highspeed propeller tip fragments with the resultant loss of much fuel. The attendant contact of fuel and high temperature gases from the ruptured No. 4 engine resulted in an intense and uncontrollable fire. A large quantity of burning fuel poured to the ground causing the previously mentioned scorched area.

The severe vibration which started at the instant of propeller strike was obviously due to high unbalance caused by broken blades on Nos. 3 and 4 propellers. This vibration was intense enough to make the aircraft extremely difficult to control and also make the flight recorder data undecipherable for a 20-second period. Apparently the character of the vibration changed markedly at the end of the 20-second period allowing the flight recorder data again to be decipherable. It should be noted that flight recorder data substantially agree with witness statements.

The sequence of events ending in the destruction of the aircraft started when the propellers initially struck the runway almost immediately after lift-off.

Probable Cause

The Board determines that the probable cause of this accident was the captain's diversion of his attention during takeoff which allowed the aircraft to settle to the runway striking the Nos. 2 and 3 propellers.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILHELAN
Member

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

Notification

The Civil Aeronautics Board, Fort Worth Office, received notification of the accident at approximately 0800 c.s.t., July 8, 1962, from the Federal Aviation Agency's Fort Worth Regional Office. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958.

Air Carrier

Continental Air Lines, Inc., is a Nevada corporation with headquarters at Stapleton Airfield, Denver, Colorado. The company operates as a scheduled air carrier under a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an operating certificate issued by the Federal Aviation Agency. These certificates authorize the transportation by air of persons, property and mail between various points in the United States, including Amarillo, Texas, and Houston, Texas.

Flight Personnel

Captain Lawrence A. Lauratis, age 43, held a current ATR certificate, No. 418460. He was qualified in Douglas DC-3, DC-6, DC-7, Martin 202 and 404, Convair 240, 340, and 440, and Vickers Viscount aircraft. Captain Lauratis possessed a valid first-class medical certificate dated May 21, 1962, with no waivers. He had a total of 16,466 flying hours, of which 1,338 were in Viscount aircraft. His last proficiency check was dated March 21, 1962.

First Officer Edward C. Gorman, age 32, held a current FAA commercial pilot certificate, No. 1201040. His first-class medical certificate was dated February 6, 1962, with no waivers. He had a total of 4,470 flying hours, of which 1,798 were in Viscount aircraft. His last proficiency check was on September 30, 1961.

Both captain and first officer had had adequate rest periods before the start of the subject flight.

Stewardess Linda N. Howard, age 22, satisfactorily completed the carrier's training course for stewardesses during May 1961. Her last proficiency check on the Viscount was on April 26, 1962.

The Aircraft

The aircraft, a Vickers-Armstrongs Viscount Model 812, serial No. 354, was manufactured June 11, 1958. It had a total flying time of 11,164 hours, with 1,179 hours since its last major inspection.

The airplane was powered by four Rolls Royce Model Dart MK525 engines. No. 1 had 714:03 hours since overhaul; No. 2 had 2,359:23 hours since overhaul; No. 3 had 1,179:12 hours since overhaul, and No. 4 had 1,785:57 since overhaul.

The propellers were Rotol Model R179/4-20-4/33 with times since overhaul of 67:25 hours, 2705:50 hours, 1,179:12 hours, and 2,063:33 hours for Nos. 1, 2, 3, and 4, respectively.