

# AIRCRAFT ACCIDENT REPORT

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ADOPTED: September 4, 1963

RELEASED: September 10, 1963

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WEST COAST AIRLINES, INC., FAIRCHILD F-27, N 2703  
GREAT SALT LAKE, UTAH, JANUARY 17, 1963

## SYNOPSIS

A West Coast Airlines, Inc., Fairchild, model F-27, N 2703, crashed into Great Salt Lake, Utah, on January 17, 1963, about 1553 m.s.t. The aircraft was destroyed by impact and its three occupants died from exposure and drowning.

This was a pilot training flight of a company captain for a type rating check in the Fairchild F-27. It was being given by a company check pilot. Upon satisfactory completion, the trainee captain was to be issued an F-27 type rating by an FAA inspector who was aboard to monitor the check. During a simulated emergency descent the aircraft crashed into the lake.

The probable cause of the accident was the crew's lack of vigilance, for undetermined reasons, in not checking the descent before striking the water.

## Investigation

This flight was designated by West Coast Airlines, Inc., (WCA) as Pilot Training Flight No. 703. It was for the purpose of rating a company DC-3 captain for F-27 aircraft.

N 2703 arrived at Salt Lake City Municipal Airport January 17, 1963, at 1431<sup>1</sup>/<sub>1</sub> as West Coast Flight 752 from Seattle, Washington, with stops at Yakima, Pasco, Walla Walla, all in Washington; Lewiston, Montana; and Boise and Twin Falls, both in Idaho. The flight had been uneventful and there were no carryover discrepancies entered in the aircraft's flight log.

After completion of turnaround servicing, N 2703 departed the West Coast Airlines ramp at approximately 1506 with Company Check Pilot Instructor William Harvey Lockwood, Trainee Captain Elmer J. Cook, and FAA Carrier Inspector Buell Z. Davis aboard.

A flight plan was prepared and signed by Captain Lockwood. It listed Elmer J. Cook as the first officer, FAA Inspector Buell Z. Davis as a crew member, and specified that the flight would be in the local area, under VFR conditions, and of 1 hour and 30 minutes duration. At departure Captain Cook occupied the left pilot seat, Captain Lockwood the right pilot seat, and Inspector Davis the observer's (jump) seat.

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<sup>1</sup>/<sub>1</sub> All times herein are Mountain Standard based on the 24-hour clock unless otherwise noted.

The aircraft carried approximately 2,500 pounds of fuel which was ample for the intended flight. The aircraft's computed gross weight was 28,310 pounds, approximately 7,000 pounds less than maximum allowable for takeoff, and its center of gravity was within prescribed limits.

Flight 703 took off at 1510 and remained in the traffic pattern for a practice landing which was made at 1517. At 1522, Flight 703 made a second takeoff and was last observed three miles south of the airport by the local controller in the tower. The tower clearance for this takeoff was the last radio contact with the flight.

The next known sighting of Flight 703 was from the air by the crew of Western Airlines Flight No. 38. At 1531 they observed it at an estimated altitude of 8,000 feet mean sea level (m.s.l.) descending to an estimated altitude of 7,000 feet m.s.l. with the left propeller feathered. It was headed southeasterly, and in the vicinity of the southern tip of Antelope Island in Great Salt Lake, some 10 miles west-northwest of the airport.

Several minutes later, the ground controller in the Salt Lake City Tower observed Flight 703 for a few minutes. He saw it approaching the airport from the west at an estimated altitude of 8,000 feet above the ground. It appeared to be flying level as it came approximately over him, continuing a few miles to the east and over Salt Lake City. It then made a right turn to a west-northwesterly heading and continued in that direction until the controller discontinued watching it at a point approximately five miles west of the airport. He did not notice anything unusual about the aircraft's appearance or performance.

The next observation of Flight 703 was by a motorist near the southeastern shore of the Great Salt Lake who saw it at an estimated 3,000 feet above the ground descending. He estimated the time of his initial observation to be 1550. The aircraft appeared to be on a northwesterly heading making a normal descent considerably west of the Salt Lake City Airport and continued descent until it appeared "to actually go into the lake itself." He did not see any splash; his position was about six miles from where the wreckage was later found.

The official U.S. Weather Bureau observation at Salt Lake City Municipal Airport at 1555 on the day of the accident was: Ceiling estimated 12,000 feet broken, high overcast, visibility 12 miles, temperature 34 degrees F., dewpoint 2 degrees F., wind from south-southwest at 5 knots, altimeter setting 30.05, smoky, snow showers of unknown intensity east. Weather conditions were not appreciably different an hour earlier nor an hour later.

At 1700, the Salt Lake City Flight Service Station (FSS) received a request from the Salt Lake City Air Route Traffic Control Center (ARTCC) to initiate a call to Flight 703 on all available frequencies. There was no reply from Flight 703 to these calls. At 1758 the Salt Lake City FSS received information from the Salt Lake City ARTCC that West Coast Flight 703 was overdue and unreported.

On January 18, 1963, at approximately 1140, one body and aircraft debris were seen floating in Great Salt Lake. This floating debris was 10.4 nautical miles from the Salt Lake City Very High Frequency Omni Directional Range (VOR) on the 248-degree radial. Early next morning the other two bodies were sighted and all three were recovered from the lake.

Complete autopsies, including toxicological and histological examinations, were performed on all three bodies. Abrasions and contusions in the anterior iliac (lap) regions were found on all three bodies. The pathologist stated "they apparently represent belt marks." Toxicological examinations conducted by the Armed Forces Institute of Pathology did not reveal anything which could have contributed to the accident. The injuries noted caused no internal damage to produce death. The higher salt content on the left side of the heart indicated that salt water was taken into the lungs. Autopsy reports listed exposure and drowning as the cause of death in all three cases. The saline solution and water temperature of Great Salt Lake at the time of the accident were about 27 percent and 24 degrees F., respectively

The wreckage of N 2703 was located by a Navy search aircraft on January 23, approximately 15 miles west of the Salt Lake City Municipal Airport and 6 miles offshore. The water depth in this area is about 25 feet.

The aircraft struck the lake on a westerly heading, and its wreckage was strewn on the lake bottom over an area about 450 feet long by 250 feet wide. Inclement weather and the lack of suitable salvaging equipment hampered recovery of the wreckage which was not concluded until February 9, 1963. An estimated 97 percent of the wreckage was recovered and was taken to a hangar at Hill Air Force Base at Clearfield, Utah, where it was examined.

Impact compression folds in the fuselage nose and the separation of the lower skin and structure revealed the attitude of the aircraft to be approximately 11 degrees nose-down at time of impact. The aircraft structure and its control systems manifested no failure or jamming prior to impact. There was no evidence of inflight fire or collision with any foreign objects, internal explosion or decompression. The landing gear uplock mechanisms were intact and the downlock mechanisms were destroyed at impact. The wing flap actuators were in the fully extended position (flaps fully down) at impact.

The engines were completely disassembled at Hill Air Force Base. There was no sign of operational distress in either engine. There was evidence of low rotational speeds with correspondingly low shaft horsepower on both engines at time of impact. Fuel was found in the fuel systems of both engines. The levers on the propeller control units and flow control units, interconnected with the high pressure fuel cocks, were found in the "run" and "open" positions, respectively. The throttle controls on the propeller controller units and flow control units were all found in the one-third open position. Fuel samples were taken at the last refueling stop of N 2703 from the storage tank and the refueler truck at Boise, Idaho. These samples were analyzed at the Shell Oil Company Anacortes Refinery Laboratory, Washington, under Board observation. The samples conformed in all respects to the specification requirements for Aero Shell Turbine Fuel 640. No significant contamination was found.

Teardown examination of the propeller assemblies under Board supervision revealed no indication of failure prior to impact.

Angular measurements of the elongation of the location dowel hole on bottom bearing plates were obtained and revealed that the propeller blade angles of both propellers were slightly greater than the fine-pitch (low-pitch) limit of 20.8 degrees.

The cockpit and cabin air-conditioning mixing valve was found set at one-third open to cabin heater air and two-thirds open to cabin flow air. The cabin heater assembly was tested for combustion chamber leakage by applying 5 p.s.i. air pressure to the chamber with the inlet and exhaust ports blocked. Leakage caused the initial air pressure to drop to zero in 10 seconds. Further tests of this cabin heater assembly were conducted at West Coast Airlines' maintenance base at Seattle, Washington, and the Janitor Aero facility at Columbus, Ohio. These tests showed the major leak to be at a crack where the crossover passage was welded to the combustion chamber. The heater was operationally tested following replacement of the igniters, and air samples taken at this time showed no evidence of carbon monoxide in the ventilating airstream.

The instrument flight shield (hood) was found fastened in place before the left windshield. The smoke mask for the pilot occupying the left seat was missing from its normally stowed position and was not recovered. The smoke mask for the pilot in the right seat was in its normally stowed position. The microphone on the left was unplugged but still hanging on its hook, and its male jack fitting was badly corroded. The landing gear control handle was down with the latch locked. The gust lock handle was in the off position. The left altimeter had a setting of 30.04 and indicated 2,345 feet; the right altimeter had a setting of 30.22 and indicated 580 feet. The left clock was stopped at 2:53, the right at 2:53½. The company's policy required the clocks to be set on Pacific Standard time. The right fuel quantity indicator read 1,290 pounds, while the left indicator read 1,400 pounds. This aircraft was not equipped with an autopilot.

All of the aircraft's maintenance records were reviewed. The records indicated only routine maintenance during the six months period prior to the accident. All discrepancies in the aircraft's flight log, which was recovered from the wreckage, were noted as having been corrected. No satisfactory explanation can be given for the difference between the two altimeter settings.

#### Flight Recorder

The flight recorder with its tape was recovered undamaged from the wreckage and the tape was read by Board personnel. The recorder on the WCA F-27 aircraft derives its electrical power from 28-volt direct current and 115-volt alternating current, single phase. The recorder is automatically activated when flat pitch (ground func) is terminated and, conversely, turned off when flat pitch is selected. The circuitry responds to the propeller buzzer cut-out relay and controls AC power to the flight recorder. The tape indicated that this recorder operated continuously during the entire flight.

Examination of the tape traces during the final 127 seconds prior to impact established the following: Flight 703 started a descent from 7,498 feet m.s.l., 127 seconds prior to impact, and continued this descent to the lake's surface which is 4,180 feet m.s.l. The average rate of descent was 1,566 feet per minute. The airspeed varied between 102 and 113 knots, with an average of 107.8 knots. The magnetic heading varied between 268 degrees and 278 degrees. The vertical acceleration was almost constant at .95 g.,<sup>2/</sup> with some variations between 1.1 g. and .8 g. The flight recorder tape revealed no evidence of an attempted flareout just prior to impact. (See Attachment A.)

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<sup>2/</sup> g. an acceleration equal to the acceleration of gravity.

Flight tests were conducted in another A-27 aircraft with landing gear and wing flaps down, with a gross weight approximating that of N 2703 at the time of the accident. Two descents were made at an airspeed of 109 knots and a rate of descent of 1,580 feet per minute. To maintain this rate of descent and airspeed, 30 p.s.l. torque pressure on each engine was required. This power setting resulted in approximately 10,500 r.p.m. on each engine, and a deck angle of 9 degrees nose-down.

West Coast Airlines' Flight Training Manual requires that a satisfactory simulated emergency descent be demonstrated on type rating checks. The simulated emergency descent maneuver is performed as follows: The check pilot tells the trainee pilot to make such a descent, whereupon the latter passes control of the aircraft to the check pilot. The check pilot reduces power to idle and lowers the landing gears and flaps. Meanwhile, the trainee pilot dons his smoke (oxygen) mask and turns on 100 percent oxygen, unplugs his hand microphone, plugs in his smoke mask microphone and establishes communication. He then resumes control of the aircraft and establishes an airspeed of 129 knots which results in a rate of descent of about 2,700 feet per minute. The maneuver is to be terminated by the check pilot as soon as practicable after a satisfactory rate of descent is established. The WCA Flight Training Manual does not specify either an entering or a terminating altitude for this maneuver.

### Analysis

The Board concludes that the maneuver being attempted at the time of the accident was a simulated emergency descent. This belief is based on witness statements and physical evidence. A simulated emergency descent was one of the prescribed maneuvers to be performed during the subject flight. Correlation of witness statements with traces on the flight recorder tape revealed that this maneuver had not been performed prior to the final descent. The extended landing gear, the fully extended wing flaps, the missing left smoke mask, the unplugged lefthand microphone, the throttle controls, the low shaft horsepower on both engines, and the instrument flight shield being in use are all compatible with a simulated emergency descent. The tape of the flight recorder manifested a relatively uniform, but unexplained, airspeed and a rate of descent markedly less than that prescribed for a simulated emergency descent. Examination of the tape traces, particularly of the heading trace which showed slight and continuous corrections to a 270-degree heading, coupled with the fact that the aircraft was not equipped with an automatic pilot can only mean that the aircraft was being controlled up to the moment of water impact.

The possibility of a defective or malfunctioning control system was considered. However, examination of the entire system revealed no evidence of any jamming or binding of any control. The operational integrity and continuity of all control systems at the time of impact, was established. The aircraft structure manifested no failure prior to impact and there was no evidence of inflight fire, collision with any foreign object, internal explosion or decompression.

Engine and/or propeller malfunctioning was also evaluated as a possible causal factor. Flight tests conducted subsequent to this accident clearly showed that the aircraft would have had to have some power on at least one of the engines, in order to maintain the airspeed and rate of descent indicated on the flight recorder tape. However, both engines exhibited evidence of low rotational speeds, with correspondingly low shaft horsepower, at impact. Also, engine controls and propeller blade pitch angles were found in positions compatible with normal low engine power. There was no sign of operational distress in either engine or in the propellers. Therefore,

the Board believes that both powerplants were capable of normal operation at time of impact.

The possibility of pilot incapacitation was explored. However, post mortem examinations revealed no evidence of any incapacitation. Further, the toxic examinations showed that all three occupants were wearing seat belts at time of impact and died, not of injuries received in the accident but of exposure and drowning.

The weather was good and could not have been contributory to the accident, the exception that the light southerly wind would have been conducive to a near calm water surface. Such a surface could have been dangerously deceptive if used to gauge altitude. The direction of flight was toward a low afternoon sun and consequent glare could also have made altitude reference from the water more difficult.

As the left altimeter had been set to read within 10 feet of correct altitude (30.40" rather than 30.05"), it was correct for all practical purposes. There was no way to account, except by inadvertence, for the right altimeter being set too high by about 180 feet.

In the light of the foregoing and in conjunction with the lack of any radio message indicative of trouble, there appears to be no explanation of why the aircraft was flown into the water other than simultaneous preoccupation or lack of vigilance, of all three crew members. The following is offered as the most likely explanation.

1. The trainee on the left would not have been primarily concerned with altitude. Instead, he should have been principally concerned with increasing his airspeed and rate of descent. According to the tape heading trace, he was devoting considerable attention to maintaining a heading. In accordance with company training manual he normally would have been expected to continue descent until advised otherwise by the check pilot. The instrument flight shield before him would surely have been removed had there been any actual operational trouble.

2. The check pilot on the right must have believed it best to let the trainee continue descent, hoping that the trainee would momentarily establish the required higher airspeed and greater rate of descent. To continue with this hypothesis the process may have been carried so far that it was not possible to recover, considering the probable deceptiveness of the water surface. This theory presumes, of course, that the captain was either not watching his altimeter or knowingly was so low that he struck the water while his altimeter, inadvertently set to read 180 feet high, still showed a positive altitude above the lake surface.

3. The FAA Inspector, in the observer's seat, must also have been unaware of the dangerously low altitude possibly for the same reasons as the check pilot. There remains also the possibility that he was engrossed in paperwork, perhaps in connection with the subject flight.

As a result of this accident the Civil Aeronautics Board, on July 17, 1966, recommended to the Administrator of the Federal Aviation Agency that FAA Training Manuals of air carriers prescribe terminating altitudes for simulated emergency descents to provide safeguard against the hazardous prolongation of such descents.

Probable Cause

The probable cause of the accident was the crew's lack of vigilance, for undetermined reasons, in not checking the descent before striking the water.

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 GILLILLAND  
Member

## S U P P L E M E N T A L   D A T A

### Investigation

The Civil Aeronautics Board was notified of the accident immediately after occurrence. An investigation was started at once in accordance with the provisions of Title VII of the Federal Aviation Act of 1958, as amended.

### The Carrier

West Coast Airlines, Inc., is a Washington corporation with its principal business office at Seattle, Washington. 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.

### Flight Personnel

Captain William Harvey Lockwood, age 42, had flown a total of 15,509 hours, of which 578 had been in F-27 aircraft. Of that 578 hours, 457 had been as instructor. Captain Lockwood had passed his six-months proficiency check on the F-27 on July 25, 1962, with above-average grades. He held all requisite certification and ratings.

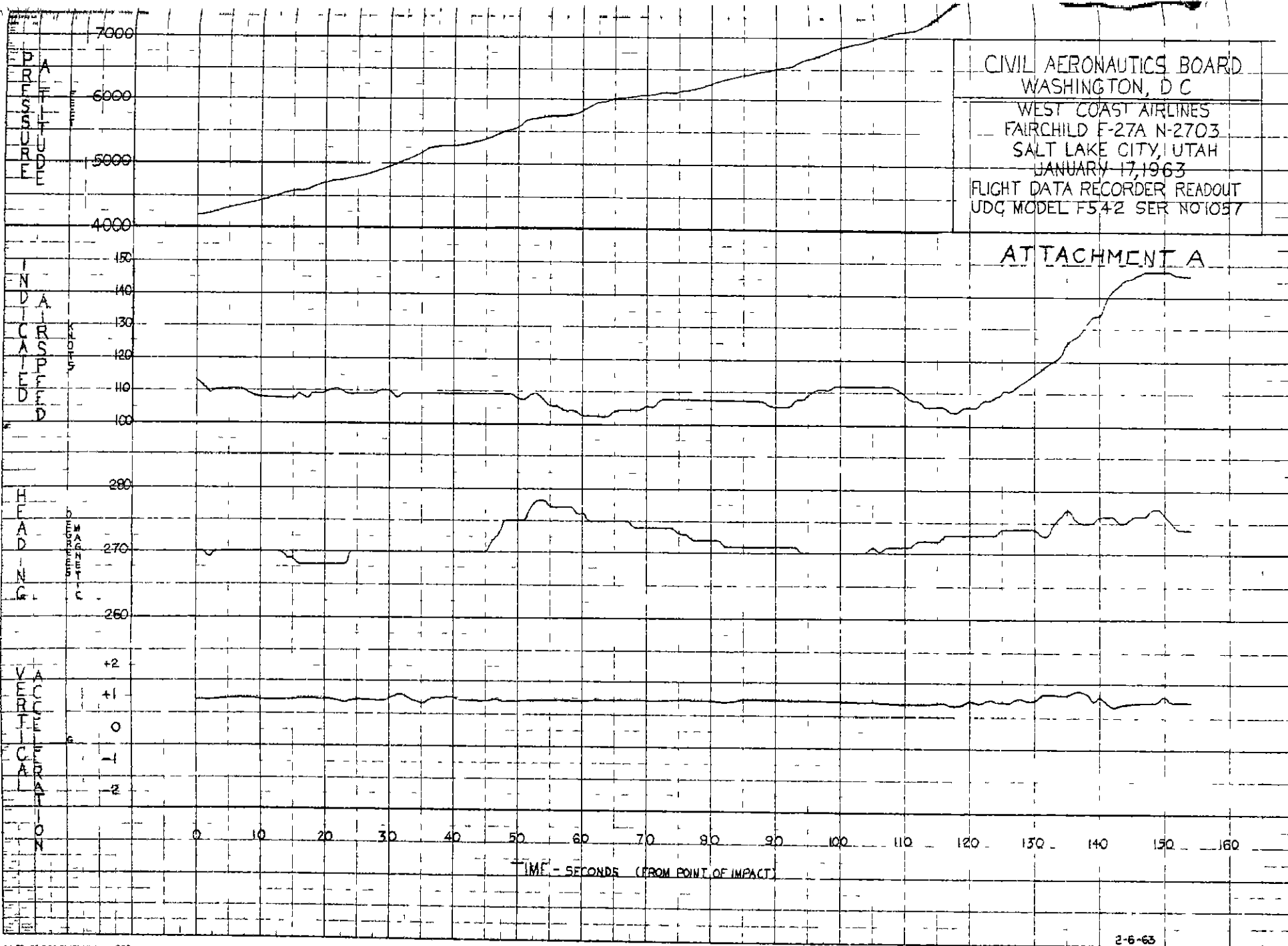
Captain Elmer J. Cook, age 46, had flown a total of 14,460 hours, of which 10:15 had been in F-27 aircraft in connection with his current training for a type rating. He held an air transport certificate with a rating for DC-3 aircraft.

Mr. Buell Z. Davis, age 45, was employed by the Federal Aviation Agency as an Operations Inspector. He had piloted aircraft a total of 8,795 hours, of which 62 had been in F-27 aircraft. He had attended the F-27 factory school at Hagerstown, Maryland, and subsequently had taken refresher training on that aircraft.

### The Aircraft

The aircraft was a Fairchild model F-27 built in July 1958. It had a total flying time of 11,708 hours. All checks and maintenance were current. The engines were Rolls Royce Dart RDA6 MK511, and the propellers were Rotol model R175/4-30-4/13E.





CIVIL AERONAUTICS BOARD  
 WASHINGTON, D C  
 WEST COAST AIRLINES  
 FAIRCHILD F-27A N-2703  
 SALT LAKE CITY, UTAH  
 JANUARY 17, 1963  
 FLIGHT DATA RECORDER READOUT  
 JDC, MODEL F542 SER NO 1057