Docket No. SA-131 File No. 5413-46

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted November 26, 1947 Released November 28, 1947

WESTERN AIR LINES, INC.—LEBEC, CALIFORNIA, NOVEMBER 13, 1946

The Accident

Western Air Lines' Flight 23, a Douglas DC-3, NC-18645, en route from Las Vegas, Nevada, to Burbank, California, crashed on the north slope of White Mountain, 14 miles south of Lebec, California, at 0341,* November 13, 1946. The aircraft was demolished by impact and subsequent fire, and all 11 occupants were fatally injured.

History of the Flight

Flight 23 originated at Lethbridge, Alberta, Canada, and had made several scheduled stops prior to arriving at Salt Lake City, Utah. At Salt Lake City the crew was changed and the flight continued to Las Vegas. The flight departed Las Vegas for Burbank, November 13, at 0150, on an instrument flight plan to cruise at 10,000 feet, with a standard instrument approach on the Los Angeles radio range and contact flight from Los Angeles to Burbank. Long Beach, California, was the designated alternate airport.

Flight 23 reported passing over Daggett, California, at 0249 at 10,000 feet "on instruments," estimating Palmdale, California, at 0319. The company radio, at the request of Airway Traffic Control, contacted Flight 23 to ask if it would accept a Palmdale crossing of 8,000 feet. Flight 23 acknowledged receipt of this message at 0302 and two minutes later inquired as to the height of the cloud tops over Palmdale and Newhall, California. The flight was informed that it would not be on top of the clouds at 8,000 feet.

An ATC clearance to proceed at 8,000 feet, and to cross Newhall and Los Angeles at this altitude, was transmitted to Flight 23 at 0310. Flight 23 immediately requested the clearance be checked with the company dispatcher as 9,000 feet was the company's minimum instrument altitude over Palmdale While the company dispatcher was checking with ATC on this clearance, an amended ATC clearance was transmitted by the company radio for the flight to cruise at 10,000 feet over Palmdale and 8,000 feet over Newhall. The flight questioned the clearance of 8,000 feet over Newhall, but was informed by the company dispatcher that this was an approved altitude

At 0314, Flight 23 reported passing over Palmdale one minute earlier at 10,000 feet, flying on instruments, estimating Newhall at 0323, and requesting an altitude of 10,000 feet over Newhall in lieu of the previous clearance of 8,000 feet. Before ATC could be contacted with this request, an amended clearance was transmitted to cross Newhall at 8,000 feet, Los Angeles at 4,000 feet and to report when leaving even thousand foot levels between Newhall and Los Angeles

In reply to Flight 23's request for 10,000 feet over Newhall, an amended ATC clearance was transmitted at 0321 to cruise at 9,000 feet over Newhall, the rest of the previous clearance to remain the same. ATC was unable to approve the request for 10,000 feet due to traffic. The 9,000 foot altitude across Newhall was acceptable to Flight 23.

At 0324, Flight 23 reported over Newhall at 9,000 feet. At 0331 the company radio, at the request of ATC, asked Flight 23 to report its altitude. The flight replied that it was at 8,500 feet and that it had started descending at 0330. At 0337, four minutes before the accident, final clearance was issued by ATC and acknowledgement obtained. This was the final contact with the flight.

Investigation

Air search for the missing aircraft was confined to lower levels the day of the 13th due to clouds obscuring all levels above 5,000 feet. The weather began

*All times referred to herein are Pacific Standard and are based on the 24-hour clock.

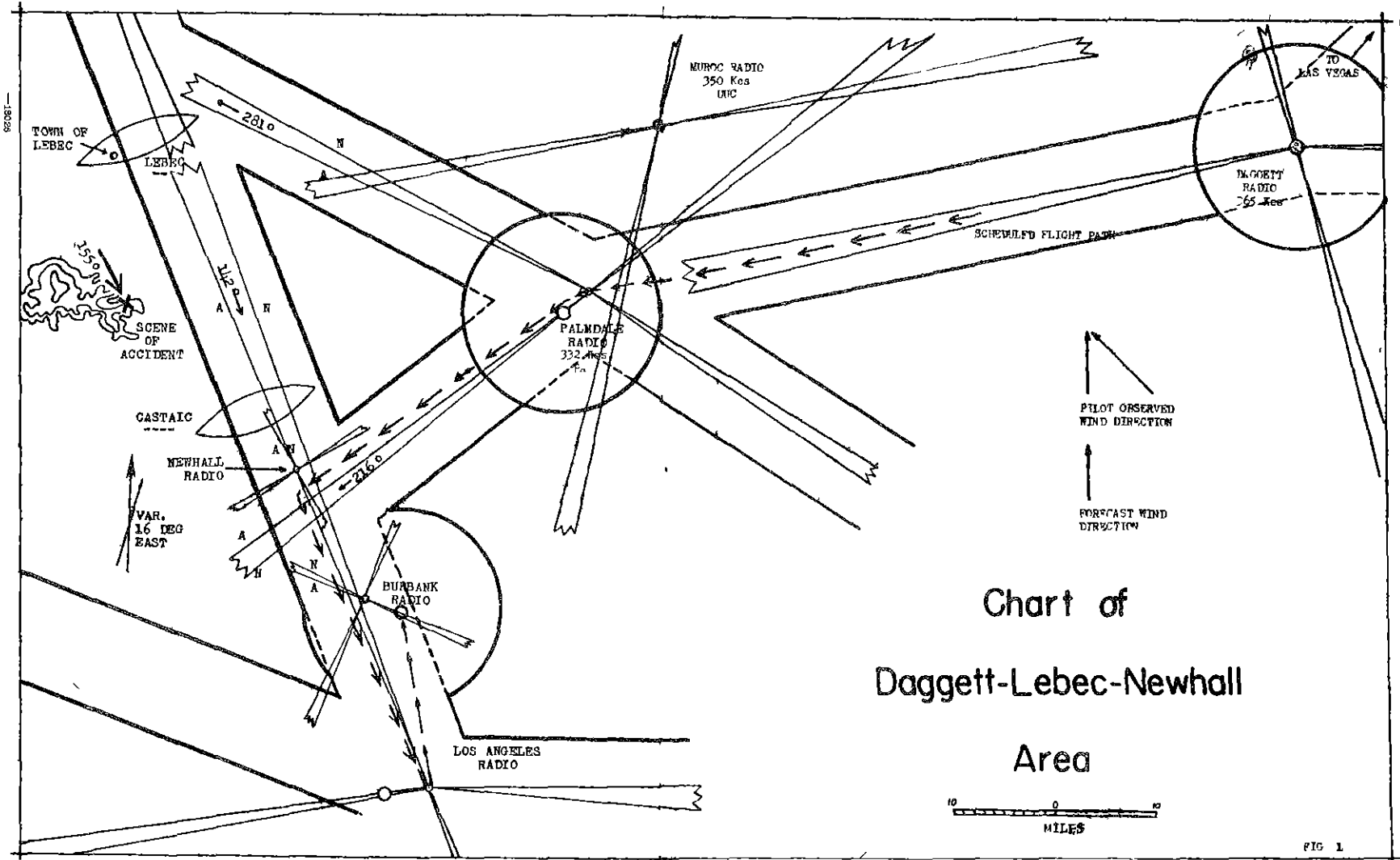


Chart of Daggett-Lebec-Newhall Area

FIG 1

to clear on the 14th, but the wreckage was not discovered until the morning of November 15. The aircraft was barely visible from the air due to the wooded area into which it had crashed and the snow which had fallen since the accident. The wreckage was still smouldering which aided in its location. Due to the isolated location of the wreckage, snow, terrain and other adverse conditions it was not reached until early afternoon of the 18th.

The crash occurred on the northern slope of White Mountain at an elevation of 5,900 feet, approximately 75 feet from the crest, 10 miles west of the center of the northwest leg of the Los Angeles radio range, approximately half way between the Lebec and Castaic fan markers. These fan markers lie across the northwest leg of the Los Angeles radio range, and are respectively 40 and 11 miles north of the intersection of the northwest leg of the Los Angeles radio range and the southwest leg of the Palmdale radio range. The identification signal of the Lebec fan marker is two dashes and of Castaic four dashes.

Initial impact was made with trees which indicated that the aircraft was on a magnetic heading of approximately 155 degrees and that it was in a near level attitude. The aircraft was demolished as it continued through the trees to the ground, and the subsequent fire consumed the major portions of the aircraft and made it difficult to identify many parts.

Examination of the aircraft, engines and radio revealed no evidence of failure or malfunctioning, nor was there evidence of fire before impact. Inspection of propellers and engines indicated power was being developed by both engines on impact. Both of the aircraft's automatic direction finder radio receivers were tuned to the Los Angeles range frequency. Inspection of the company maintenance records indicated that the aircraft was in an airworthy condition prior to origin of the flight.

A study of the barograph card, which was recovered, indicated that a climb was made out of Las Vegas to 10,000 feet. It also indicated that a moderate amount of turbulence was encountered and that the flight continued at the 10,000 foot level until approximately 20 minutes before the accident. At this point the flight line indicated a descent to 9,000 feet, followed by an ascent to 9,700 feet, thence a descent to the point of impact at 5,900 feet. All of these ascents and descents were made at a rate of approximately 275 feet per minute.

Particular attention was given in the investigation to a reported roughness in the right engine while en route from Salt Lake City to Las Vegas. Before departure from Las Vegas the maintenance section at Burbank was informed of the operation of this engine and the approval of the crew chief at Burbank was obtained for the flight to be continued. While en route from Las Vegas to Daggett, in response to an inquiry from the company dispatcher at Burbank as to the operation of this engine, Flight 23 reported it cut out on the left magneto when the carburetor was in the cruise position and that it was "pretty smooth" when the carburetor was in the take-off and climb position. No further discussion ensued regarding the operation of this engine.

Evidence indicates the flight progressed without incident from the time it departed Las Vegas to the time the flight was approaching Palmdale. A study of the transcript of the company radio logs revealed that more than a normal number of radio contacts were made with the flight from the time it approached Palmdale to the time shortly before the accident. The company radio was relaying all messages originated by ATC and the company dispatcher.

Testimony of pilots who flew in the area before and after the accident indicated that static conditions existed, but by the use of the anti-static loop antenna, it was reduced and reception of the radio range signal was possible, except intermittently during periods of excessive static. Testimony of one of the pilots indicated, in addition to the interference caused by static, that other ground and aircraft transmissions caused some delay in Flight 23's radio contacts. Pilot testimony also indicated that only a moderate amount of turbulence was encountered.

The terminal forecast indicated that contact flight rule weather would exist in the Los Angeles area except for occasional instrument conditions due to a lowering of the ceiling. The route forecast indicated that instrument conditions would exist at the clearance altitude of 10,000 feet, contact conditions at lower altitudes at various places en route, and that the mountains in the Lebec-Palmdale-

Newhall area would be obscured by clouds. Rain was indicated at lower levels, snow above 5,000 feet, icing in the clouds above 5,500 feet and light to moderate turbulence was expected over all mountain areas. Forecast winds were from 170 degrees, 30 miles per hour from 5,000 to 7,000 feet and from 180 degrees, 40 miles per hour from 8,000 to 15,000 feet.

The Newhall radio range station had been shut down for installation of simultaneous voice and range equipment. However, the nonoperation of this facility had been made known to airmen, as required, and was broadcast at regular intervals by nearby radio range stations. All other radio range and air navigational facilities were operating normally.

Discussion

It appears, from a study of the company radio log, that the pilots of Flight 23 were very much occupied from the time the flight was first contacted after passing Daggett and until four minutes before the time of the accident in obtaining a clearance to cross over Palmdale and Newhall at an altitude that was acceptable and in receiving a clearance into Burbank. The difficulty of reception was undoubtedly aggravated by static and other transmissions on the same company frequency. Static interference could be reduced on the frequencies that could be received on the anti-static loop antenna of the ADF, but the company operating frequency could not be received on this antenna, therefore, static interference on the company frequency could not be reduced.

Contact terminal conditions continued to exist in the Los Angeles area during the period of the flight and the ceiling was reported to be at least 3,000 feet, and visibility eight miles or better at the time Flight 23 would have arrived in this area. Weather Bureau testimony indicated that winds of 60 miles per hour could have existed over the mountainous area. Pilots flying in the mountainous area within a period of 45 minutes before and after Flight 23, estimated wind velocities of 60 to 80 miles per hour from a southerly and southeasterly direction, but this information was not transmitted to a ground station by them. These other flights, before and after the time of the accident, had successfully flown through the Lebec-Newhall-Palmdale area, and the pilots reported that the weather conditions were substantially as forecast with the exception of the higher winds. This increased wind velocity would have given the flight an increase in right drift.

Full consideration has been given to possible local areas of low pressure readings in the mountainous terrain and to mechanical turbulence due to high wind velocity. It appears very improbable that erroneous altimeter readings in excess of 100 feet occurred from the above cause or that mechanical turbulence, or downdrafts, would have been more than moderate.

The flight was to progress from Palmdale via the southwest leg of the Palmdale range, intercept the northwest leg of the Los Angeles range, and so establish a definite fix before starting the let-down on the Los Angeles range As a double check, another fix could have been obtained while en route to Los Angeles nine miles south of the above fix on the intersection of the northwest legs of the Burbank and Los Angeles ranges. Even if making an additional check by a fix on the Castaic fan marker, the flight's most northerly position should have been this fan marker which is 11 miles north of the intersection of the Palmdale-Los Angeles radio ranges.

Had normal procedure been followed, when proceeding out the southwest leg of the Palmdale radio range, the flight would have made approximately a 90-degree left turn to the inbound heading of the northwest leg of the Los Angeles radio range of 142 degrees after crossing this range in order to follow it into Los Angeles. Since Newhall is located four miles north of this turning point, it is common practice to call the area in the vicinity of the intersection "Newhall." Seventeen minutes elapsed between the time of the position report "over Newhall" and the time of the accident, yet, the scene of the accident is 27 miles northwest of the reported position, and 10 miles to the right of the northwest leg of the Los Angeles radio range. Since the flight would have no occasion to proceed out the northwest leg of the Los Angeles range and as no communication reports were received which would indicate such action, it appears very improbable that the flight was ever over Newhall. The heading upon impact of approximately 155 degrees would indicate that the flight was attempting to intercept the northwest leg of the Los Angeles radio range. Even though the operation of

the Newhall range provides an excellent aid for a pilot to establish a fix and maintain a course, a Western Air Lines' Regional Chief Pilot testified that the lack of this facility did not constitute an undue hazard for the instrument approach into the Los Angeles area.

The flight did not report when vacating 10,000 feet to descend to the crossing altitude of Newhall at 9,000 feet nor did the flight report when reaching or vacating the altitudes of 9,000 or 9,700 feet, or the even 1000-feet levels during the final descent. The final clearance required the flight to report when leaving even 1000-foot levels and it was only at the request of ATC that the flight gave the time that the final descent was initiated and at the time of this report the flight was at 8,500 feet.

The location of the crash suggests that the flight experienced difficulty in following the southwest leg of the Palmdale range or was flying off airways to the right in order to maintain 10,000 feet altitude, the altitude at which the captain desired to cross Newhall. Had the flight remained on the airway, a descent to 9,000 feet would have been required between Palmdale and Newhall. Due to the high velocity of the wind in this area, the drift to the north was much more than anticipated and, as the flight was on instruments, a ground check of the position was not possible.

Furthermore, having crashed 27 miles north of its course at 0341, it appears doubtful that the aircraft could have been over Palmdale, which is directly on course, 28 minutes previously. In attempting to determine what unusual factor could have been responsible for such a deviation, the location of Muroc Radio, 18 miles north and with a frequency of 18 kilocycles above that of Palmdale, suggests the possibility of error in tuning the ADF while proceeding from Daggett to Palmdale. Although there is no positive evidence to support such a theory, it is entirely possible that such was the case, since the ADF would probably be used due to the open quadrant approach to Palmdale.

The frequency of Daggett Radio is 365 kilocycles, Palmdale Radio is 332 kilocycles, and Muroc Radio is 350 kilocycles, therefore, in tuning from Daggett to Palmdale it is possible that the ADF was tuned to a frequency closer to Muroc than Palmdale. As it is common practice to adjust the volume below an audible level on the ADF receiver once the station is tuned in, particularly during static conditions, the identification signal would not be heard and, unless care were exercised in the initial tuning, it would not subsequently become apparent to the pilots that they were tuned to the wrong station. Such an error would have become obvious had the flight had occasion to use the ADF receiver to contact Palmdale Radio, but, since all position reports were made to the company radio at Burbank, such a contact was not necessary. Failure of the pilot to maintain a continuous check on the southwest leg of the Daggett range would be understandable in view of the high static level. The fact that no other navigational check was immediately available to the pilot and that the next routine check, namely Newhall Radio, was inoperative would have rendered such an error particularly dangerous.

Under these conditions indications of passage over either Muroc or Palmdale would be the same. The ADF pointer would reverse its direction and the "Z" marker light would come on. Neither of these indications provides any identification of the station over which passage is being made. Because of the unusual amount of radio communication it appears doubtful that the flight made any attempt to follow the southwest leg of the Palmdale radio range but used only the magnetic bearing of the leg as a heading. Had any attempt been made to navigate along the southwest leg of the Palmdale range, the error in navigation should soon have become obvious.

Whatever the error may have been, it appears that the unusual amount of radio conversation with the company radio, and static preoccupied the pilot, contributing to lax navigation. The short time it would take to intercept the northwest leg of the Los Angeles range, estimated to be 11 minutes, further contributed to the pilot's inattention to the range leg which marked that portion of the route between Palmdale and Newhall. It can be concluded therefore, that the flight crossed the northwest leg of the Los Angeles range in the vicinity of Lebec and that the let-down was started while over the mountains between Lebec and Burbank without establishing a positive radio fix.

The absence of the Newhall radio range gave the pilot no range station on the northwest leg of the Los Angeles range on which to use the ADF and to establish a radio fix in proceeding west from Palmdale or Muroc, therefore, the only radio fix available was the intersection of radio range legs, or a fan marker. In view of the absence of this facility, it would have been expected that the pilot would exercise particular caution in establishing a fix before starting a let-down.

Subsequent to the accident, the southwest leg of the Palmdale range has been moved nine degrees to the north, and this leg now passes over the Newhall radio station instead of 4 miles to the south and Newhall Radio has been designated a compulsory reporting station.

Findings

Upon the basis of all available evidence the Board finds that

1. The air carrier, the aircraft and the crew were properly certificated.

2. There was no failure or malfunctioning of the aircraft, engines or radio disclosed in the investigation. Power was being developed by both engines on impact.

3. The flight experienced light to moderate turbulence.

4. All radio range and air navigational facilities were operating normally with the exception of the Newhall radio range station which was inoperative.

5. Although the Newhall radio range was inoperative, adequate radio facilities were available for instrument flight from Las Vegas to Burbank.

6. Although the flight had reported no difficulty up to the time of the last radio contact at 0337, static conditions and transmissions of other flights on the company radio frequency made the communications of Flight 23 difficult.

7. The flight time from 0320 until 0337, was a period of an unusual amount of radio communication.

8. The winds in the mountainous area were higher than forecast at the altitude at which the flight was conducted.

9. Other flights had been able to navigate safely through and about the area of the scene of the accident.

10. The position report "over Newhall" was in error.

11. The let-down was started without a positive check on the position.

12. The scene of the accident is located 27 miles northwest of the intersection of the southwest leg of the Palmdale radio range and northwest leg of the Los Angeles radio range and 10 miles to the right of the radio range leg on which initial approach let-down was to be made

13. The aircraft was on an approximate heading of 155 degrees at the moment of impact.

Probable Cause

The Board determines that the probable cause of this accident was the action of the pilot in making an instrument let-down without previously establishing a positive radio fix. This action was aggravated by conditions of severe static, wind in excess of anticipated velocities, preoccupation with an unusual amount of radio conversation, and the inoperative Newhall radio range.

BY THE CIVIL AERONAUTICS BOARD

/s/ J M LANDIS
/s/ HARLLEE BRANCH
/s/ JOSH LEE

Ryan, Vice Chairman, did not take part in the decision.

Supplemental Data

Investigation and Hearing

The Civil Aeronautics Board received notification of the accident at 0430, November 13, 1946, and immediately initiated an investigation in accordance with the provisions of Section 702(a)(2) of the Civil Aeronautics Act of 1938, as amended. The Senior Air Safety Investigator of the Board's Santa Monica office was delayed in reaching the scene of the accident until November 25, 1946, due to the distance involved over rough and mountainous terrain, mostly snow covered, to the almost inaccessible location of the wreckage. He was assisted in the investigation by other members of the Safety Bureau staff. A public hearing was ordered by the Board and was held in Los Angeles, California, December 5, 1946.

Air Carrier

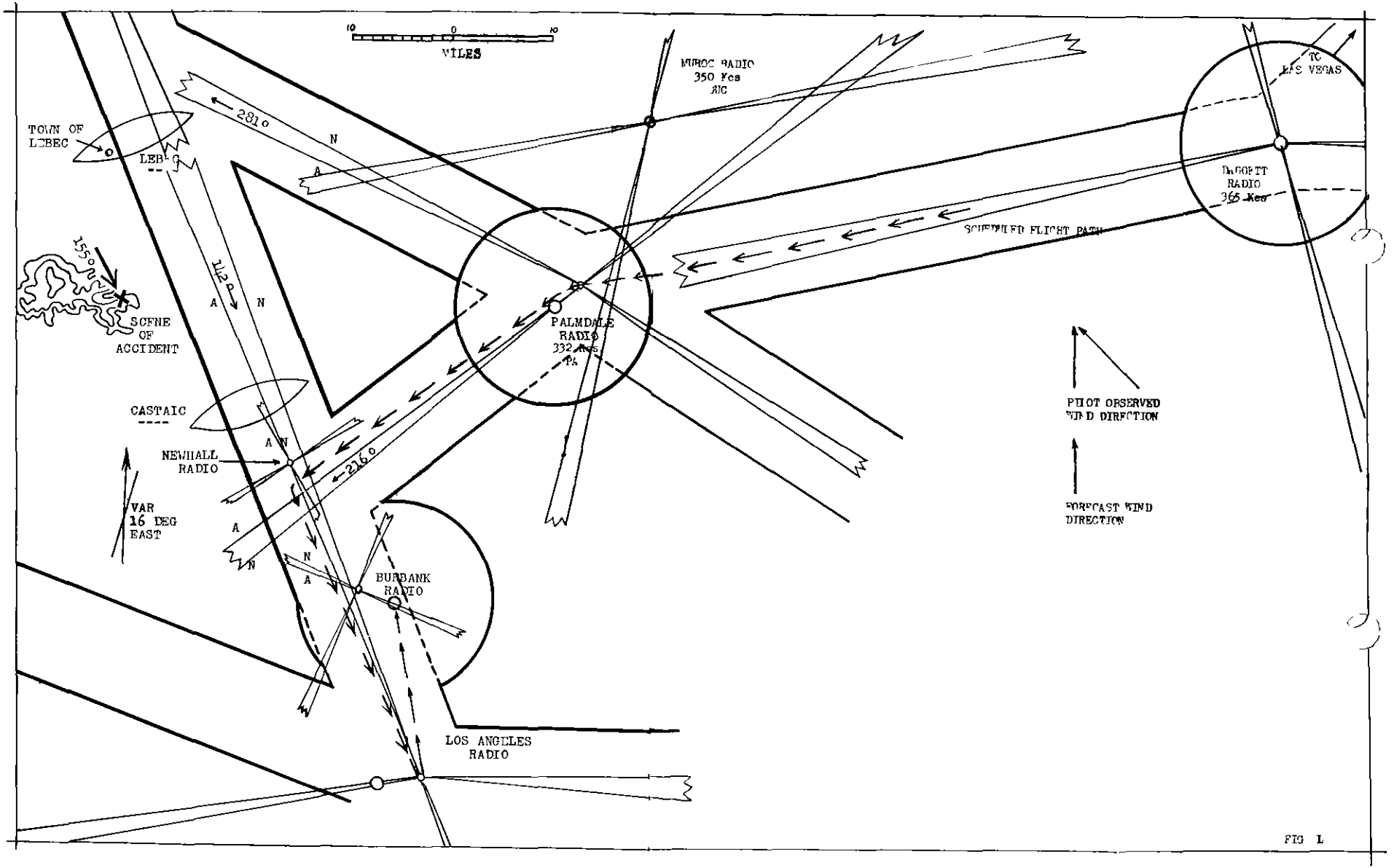
Western Air Lines, Inc., incorporated under the laws of Delaware, with headquarters in Beverly Hills, California, was operating as an air carrier under a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the Civil Aeronautics Act of 1938, as amended. These certificates authorized Western Air Lines, Inc., to transport persons, property and mail between various points in the United States, including Salt Lake City, Utah, Las Vegas, Nevada, and Los Angeles, and Burbank, California.

Flight Personnel

Captain Garrel J. Miller, age 34, of Van Nuys, California, was pilot of the aircraft. Captain Miller possessed a valid air line transport pilot rating and up to the date of the accident had accumulated a total of 4,836 hours of flying time, of which 4,080 hours were obtained in DC-3 equipment. First Officer Theodore S. Mathis, age 25, of Whittier, California, possessed valid commercial pilot, instrument and flight instructor ratings, and had accumulated a total of 3,498 hours, of which 298 hours were as co-pilot in WAL DC-3 equipment. Most of the remainder of Mathis' flying time was obtained in the Army Air Forces. Miss Joan Evelyn Fauntleroy of North Hollywood, California, was stewardess. The captain and first officer were properly certificated for their respective duties and the captain was qualified over the route.

Aircraft

NC-18645, a Douglas DC-3 manufactured in March of 1943, was leased from the War Assets Corporation on June 17, 1945, at which time it was completely reconditioned and overhauled. At the time of the accident it had accumulated a total of 6,229 hours, 4,656 hours of which had been obtained since the last major overhaul. Two Pratt & Whitney S1C3G-R1830-92 engines, equipped with Hamilton Standard propellers, were installed. The left engine had accumulated a total of 14,330 hours, of which 308 hours were obtained since the last major overhaul and 17 hours since the last 125-hour check. The right engine had accumulated a total of 4,160 hours, of which 194 hours were obtained since the last major overhaul and 17 hours since the last 125-hour check. At the time of departure from Las Vegas, the total weight of the aircraft was approximately 2,000 pounds less than the allowable maximum gross weight and the center of gravity was within approved limits.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OF
ACCIDENT
PALMDALE
RADIO
332 Kcs
PA
CASTAIC
NEWHALL
RADIO
216°
PILOT OBSERVED
WIND DIRECTION
VAR
16 DEG
EAST
FORECAST WIND
DIRECTION
BURBANK
RADIO
LOS ANGELES
RADIO

FIG 1