

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: March 13, 1958

Released: March 19, 1958

NORTHEAST AIRLINES, INC., DOUGLAS DC-3, N 34417
NEW BEDFORD, MASSACHUSETTS, SEPTEMBER 15, 1957

The Accident

At approximately 2046, ^{1/} September 15, 1957, Northeast Airlines Flight 285 crashed during an ILS (Instrument Landing System) approach to runway 5 at the New Bedford, Massachusetts, Airport. Of three crew members, the two pilots were killed and the stewardess was seriously injured. Ten of 21 passengers were fatally injured and 11 were seriously injured. The aircraft, a DC-3, received severe and unrepairable damage.

History of the Flight

Northeast Airlines Flight 285 is a scheduled passenger operation originating at Boston, Massachusetts, and terminating at New York, New York, with intermediate stops serving Hyannis, Nantucket, Martha's Vineyard, and New Bedford, Massachusetts.

On September 15, 1957, the flight originated on schedule, its crew consisting of Captain Vincent L. Pitts, Reserve Captain Roger W. Sweetland, serving as copilot, and Stewardess Nancy J. Lehan. Flight 285 was routine until it reached Martha's Vineyard where it landed at 2007 following a missed approach in poor weather conditions. The flight departed Martha's Vineyard for New Bedford at 2019, about 50 minutes behind schedule, the result of the missed approach, IFR delays, and accumulated minor delays. The flight to New Bedford was in and on top of instrument weather conditions and was conducted according to an IFR (Instrument Flight Rules) flight plan. The clearance given the flight by ARTC (Air Route Traffic Control) through company radio was as follows: "ATC clears Northeast 285 to the New Bedford middle marker, via direct Otis, Red 94, to maintain 4,000, to make climb to 2,500 at the Martha's Vineyard radio beacon before proceeding on course. Report on course and report the Otis radio beacon."

At departure there was sufficient fuel for the flight to New Bedford, and, if necessary, to the designated alternate airport, Boston, with the required reserve upon arrival there. Also, at this time, according to the company load manifest, the aircraft was loaded to a gross weight of 22,443 pounds, well under the maximum allowable of 25,346 pounds. The load was distributed within the center of gravity limitations of the aircraft.

^{1/} All times are eastern daylight based on the 24-hour clock. Altitudes are mean sea level unless otherwise indicated.

At 2024 the flight reported to the company radio at Martha's Vineyard that it was over the Martha's Vineyard radio beacon, "2,500 feet on course." At 2029 it again contacted the company at Martha's Vineyard and reported it was then over Otis at 4,000 feet. A few minutes later Flight 285 contacted the New Bedford tower controller and informed him it was unable to give the Otis report to the company at Boston. The controller took the progress report and requested the flight to contact Providence approach control (Providence controls IFR flights in the New Bedford area). The flight immediately contacted Providence approach control and was cleared to maintain 4,000 feet to the compass locator at the New Bedford middle marker and to report over the marker. This was acknowledged. Immediately thereafter Providence cleared Flight 285 for an approach to the New Bedford Airport and requested it to report leaving 4,000 feet and then switch to the New Bedford tower. At 2036 the flight reported leaving 4,000 feet.

Flight 285 then contacted the New Bedford tower operator and thereafter, at 2038, according to the controller, stated it was starting an ILS approach. The controller gave the flight the latest weather as follows: Indefinite 200, obscuration; visibility one mile; fog; wind southeast 3; altimeter 30.02. He also cleared the flight to land, ILS approach, straight in to runway 5, and requested that it call the tower when inbound at the outer marker.

Following this clearance the captain of another Northeast flight, 275, which had shortly before, at 2031, taken off from runway 23, the reciprocal of 5, gave Flight 285 the following information: "It'll be tight."

Flight 285 reported that it had completed the procedure turn and was inbound over the outer marker. The controller acknowledged this report which was the last communication with the flight. He logged the report at 2046, shortly after it was received.

Investigation

The tower controller, who was alone on duty, watched for the flight to appear over the approach lights after it reported inbound over the outer marker. Northeast ground personnel who were waiting to meet the flight watched for it to land. None of these persons heard or saw the flight.

After a reasonable time for the approach to have been completed the tower controller called the flight several times without response. Because the New Bedford tower did not have IFR responsibility or those radio frequencies, the controller then contacted Providence tower by dropline and requested its personnel to call the flight on approach control, center, and IFR en route frequencies. He also asked them to request Quonset to look for the flight on radar. These actions which, of course, were taken after the accident, were unsuccessful.

The New Bedford controller notified the airport manager, who, suspecting the tragedy, immediately ordered key rescue personnel alerted and drove to the airport from his residence. Upon arrival he drove to the ILS middle marker shack located on the edge of a swamp which lies below the approach area. From this position he heard cries for help coming from the swamp area. The manager attempted to penetrate the swamp but could not because of a stream, the fog, dense undergrowth, and waist-deep mire. He returned to the airport for assistance.

With a doctor and the doctor's wife, the airport manager led other doctors, firemen, and rescue personnel to the middle marker shack. From there, in small groups of two or three, and with disregard for personal safety, the rescuers waded through the stream, undergrowth, and mire and located the accident scene. The airport manager's group was first and began giving medical care about 2245. While this assistance was being given a floodlight truck was moved into position across the stream and fire ladders were fastened together and laid across the water and mire, enabling the emergency personnel to carry out the survivors.

During the night it was learned that one passenger, Mr. Gerald Eland, had saved the stewardess by administering first aid and that he and a 14-year old girl, also deserving mention by name, Nancy Blair, had extinguished a small fire which threatened the entire fuel-soaked wreckage in which several survivors were then trapped.

Investigation at the scene disclosed that initial damage to the aircraft resulted from the nearly simultaneous contact with two large trees, the first with the left wing tip, 49.2 feet above the swamp and the other with the right wing in the area of the landing light, 45.3 feet above ground level. These trees were located about 165 feet to the right of the centerline of the ILS localizer course, nearly 189 feet below the glide path centerline, and about 4,000 feet short of the runway threshold. The magnetic heading at initial contact was approximately 57 degrees. The initial impacts severed the left wing tip at station 359 and destroyed the structural integrity of the right wing, causing it to separate immediately in the landing light area, station 89. The right wing was recovered about 150 feet beyond the tree it struck.

Initial contacts that severed the wing portions, propeller cuts, and marks on the upper tree branches showed that the aircraft was nearly level laterally at impact. The distance between the propeller cuts showed the airspeed of the aircraft was about 93 knots. Consideration of the relative heights of the trees contacted and their locations, together with the computed speed of 93 knots, indicated with reasonable reliability that the aircraft was descending at impact at an approximate rate of 900 feet per minute. There was insufficient evidence to determine the attitude of the aircraft in the pitch plane at impact.

After separation of the right wing the aircraft began a sharp roll to the right and as the aircraft descended it cut a swath through a dense growth of trees. Narrowness of this swath indicated the left wing of the aircraft was nearly vertical in the roll axis.

Initial ground impact occurred when the stub right wing dug into the soft, spongy swamp floor. This caused the aircraft to start a cartwheel motion, during which the right powerplant was torn out and the cockpit area was crushed rearward, left, and upward into and over the upper fuselage shell. The cartwheel continued until the left propeller struck a large tree stump, causing the aircraft to pivot to its right. This whipped the fuselage with such severity it broke into two portions, except for control cables along a line approximately parallel to the fifth row of passenger seats. The pivoting action continued on the outer portion of the left wing until the aircraft was sliding backward along the heading of the wreckage path. The rear portion of the fuselage and the empennage, still facing forward, were thrown and dragged with the center section and forward cabin area. The

wreckage slid to a stop 600 feet from the trees that were initially struck. The final resting place of the wreckage was located nearly opposite the ILS middle marker, 220 feet to the right of the extended runway centerline measured from a point on the extended centerline 3,370 feet from the runway threshold.

During the investigation all major components of the aircraft, including its flight control surfaces, were recovered from the area between the trees initially struck and the final resting place of the main wreckage. Examination of these components disclosed no evidence of fatigue failure. Continuity of the flight control system was established and it was found there were no primary failures of the cables and no evidence to indicate malfunction or failure of the systems. Further, it was determined that all exterior doors and access panels were properly secured at the time of impact.

The lower portions of the right landing gear were torn off during the initial ground impact; the complete left landing gear remained in place. Examination disclosed conclusively that the landing gear was extended at impact. The positioning of the links in the wing flap drive parallelogram linkage was measured and when the amount of extension was compared with an equal amount on another DC-3, it was learned that the flaps were extended to about the three-fourths down setting. The flap cockpit control was positioned in neutral and all flap hydraulic lines were found intact. There was no indication of an asymmetrical flap condition prior to impact.

From the examination of the airframe and its associated systems and components there was no indication that they caused or contributed to the cause of the accident.

Both powerplants were located at the main wreckage site. The No. 2 engine was found under the aircraft center section and evidence showed it had rolled to this position after having been torn out by ground impact, approximately 80 feet from its final resting place. The No. 1 engine was still partially attached to the airframe. Both nose sections and propellers were broken from their respective power sections and both engines received substantial impact damage. There was no evidence of fire in flight and other than the small fire extinguished by Mr. Eland and Miss Blair, there was none following impact.

The engines were pulled away from the other wreckage for examination. The main oil screens and sump plugs were removed and examined for foreign material; none was found. Both engines were rotated by starters and normal gear train action was observed from the front cam compartment rearward to the rear accessory section, including the accessories themselves. A compression check showed normal compression in all cylinders of both engines. Thereafter, the accessories were removed for functional testing and several cylinders were removed to allow examination of the interior of each engine. Testing showed normal operation of the accessories.

Examination of the power case interiors indicated normal lubrication, and there was no evidence of operating difficulties. Boroscopic examination of all the cylinder interiors disclosed no indication of combustion chamber irregularities. The examination of both engines showed they were capable of normal operation prior to impact.

Both propellers were extensively damaged by impact and all blades were bent in varying degree. Examination of the blade pitch-changing assemblies showed they were properly set for a range of 18 degrees, low pitch, and 88 degrees, full feathering. The propeller assemblies were then examined to determine the propeller blade angles. Impact markings on the spider shim plates of the propellers showed that the blades of both engines were positioned about 28 degrees, a clear determination of power development at initial impact.

The No. 2 governor control shaft was partially jammed as a result of impact and the control head bore an impact gouge on its side. The impact gouge was scaled on another control head and the head was installed in a governor on the test stand. The r. p. m. indicated at the ends of the impact mark was 2,088 and 2,114.

Using the 28-degree blade angle indicated by the shim plate markings, the 93 knots indicated by the propeller cuts, and the r. p. m. range shown by the governor control head position, it was possible to determine the approximate amount of engine power being developed. The above factors when compared with test stand information showed that appreciable horsepower was being developed by each engine. Even allowing for variables the amount of power was near maximum for the engines under the conditions existing at the time of the accident.

As already indicated, the New Bedford Airport is equipped with an ILS. The front course of the system is established to runway 5 which is 4,949 feet in length, 150 feet in width, and is 65 feet above mean sea level at its threshold. The runways are equipped with high intensity lights and the ILS runway with low intensity left row approach lights. The latter slope gradually to the runway for a distance of 1,500 feet from the runway threshold. At the time of the accident the approach lights were on and the runway lights were set to the highest intensity.

The ILS is designed to guide pilots to a favorable position for visual landing through instrument weather conditions, which preclude outside visual references. In general, the electronic system consists of radio beams transmitted to provide the pilot with directional and vertical information through cockpit instruments. The localizer course defines the runway centerline extended several miles into the approach zone. The glide path defines a gradually descending path normally intercepted over the outer marker and sloping to runway level just inside the runway threshold. The glide path centerline clears all ground obstructions according to an established obstruction criteria over this distance. At New Bedford the localizer course is marked by outer and middle markers, 3.9 miles and .6 mile, respectively, from the runway threshold. The glide path is normally intercepted at 1,240 feet over the outer marker. The middle marker includes a low frequency compass locator.

In flight the localizer course and glide path centerlines can be followed through instruments. Pilots may determine their relative position laterally and vertically with respect to these centerlines. In flight, without outside visual reference, the pilot may determine progress and position along the localizer course by cockpit visual and audio signals when the outer and middle markers are overhead. Each position is indicated by different light and audio indications.

N 34417 was equipped to utilize the above ILS and also had two ADF's (Automatic Direction Finder) which would "home in" on the compass locator at the middle marker. The aircraft was equipped for operation in instrument weather according to Civil Air Regulations governing air carrier operations.

The ILS procedure at New Bedford requires that the middle marker be overheaded on an outbound course to the outer marker. When the outer marker has been indicated and passed about one minute outbound a procedure turn is required on the south side of the localizer course after which the flight again passes the outer marker inbound along the localizer course, a course of 53 degrees magnetic. Altitude at this marker should be 1,240 feet if the procedure is followed.

From the outer marker to the middle marker, indications from the glide path and localizer course will be received and the aircraft may be controlled directionally and vertically with respect to them. Altimeter information and ADF indications supplement the ILS instruments as a cross check.

The chief pilot of Northeast Airlines testified that the localizer course of the ILS should be well established before reaching the outer marker inbound. He also said that usually one-fourth flap is used during the approach but that as much as one-half might be required with a strong downwind factor. He testified that any more than one-half flap would be considered improper until visual contact had been established with the approach or runway lights, then full flap is used in Northeast procedures for landing. Other pilots also testified that use of more than one-half flap would not be expected except during the final landing approach.

The chief pilot stated that in consideration of the existing weather conditions at New Bedford at the time of the accident, Northeast Airlines' operating procedures dictated strict adherence to the ILS approach procedure and that no other type instrument approach would be acceptable or meet the company requirements.

The ILS approach, as any other instrument approach, may not be continued beyond certain minimums without visual reference to the approach lights, runway lights, or the runway surface having been established. For Northeast Airlines at New Bedford these limits were: Ceiling 200 feet, visibility one-half mile. Specifically, if Flight 285 had not established visual contact at an altitude of 200 feet above the runway elevation the pilot was obliged to discontinue the approach. Following the glide path, this altitude would be reached 189 feet above the trees initially struck.

The New Bedford ILS consists of two sets of identical equipment. One set of components is used while the other set serves as standby. Either set may serve in either status. The purpose of the duplication is to provide continuous service while periodic maintenance is performed, to provide immediate service in event of component failure, and to provide greater service life of the system through rotation of the components.

The landing system incorporates an automatic "fail safe" feature. The feature functions by automatically and immediately switching the operating component to its standby in event of malfunction or failure. It will also turn the

entire ILS off if, at the same time, both the operating and its standby component should malfunction or fail. Further, any unsafe deviation from proper alignment of the localizer or glide path will result in a system alarm and will automatically switch the system to standby.

The ILS incorporates a monitor panel which will signal by visual and audio alarm any of the aforementioned conditions. Also, malfunction or failure of the monitor will actuate the alarm. The panel for the New Bedford ILS is installed in the CAA Providence Tower where it is monitored continuously by controllers on shift-duty 24 hours a day.

Providence Tower personnel stated or testified that on the day of the accident there was no indication of malfunction or failure of the ILS. The monitor panel signaled no fault and on-site inspection of the operating components following the accident showed there had been no switch-over of the units and the operating units were functioning normally. It was learned that numerous practice ILS approaches had been made, without complaint, during the day of the accident. Another Northeast flight, 274, used the system about one-half hour before the accident. The captain testified the approach was in instrument weather conditions to 300-350 feet above the ground. He stated that he found the system entirely normal.

During the investigation all aircraft equipment from N 34417 necessary for the conduct of the ILS approach was carefully examined. Preliminary examination of this airborne equipment indicated it was operable. It was therefore removed from N 34417 and without altering its recovered condition the equipment was bench checked. This work, under Board supervision, confirmed that the equipment was operable. It was also determined that the ILS and ADF receivers were properly tuned to the New Bedford facilities.

On September 24 the ILS, ADF, and marker beacon receivers, and the captain's cross pointer indicator, all from N 34417, were installed in another DC-3 for flight testing on the New Bedford installation. Numerous approaches were made, during which all the components functioned normally.

During one of the test approaches the New Bedford glide path and localizer transmitters were turned off. This was done to determine what, if any, effect the Worcester ILS would have on the airborne equipment during a simulated ILS approach at New Bedford. The Worcester ILS is on the same frequency as New Bedford and located some 50 miles away at a higher terrain elevation. During this test some energy was received by the localizer receiver during the procedure turn. None was received by the glide path receiver and the glide path "off flag" was continuously in position showing it. Shortly after the outer marker was overhauled inbound both cross pointers centered and the partially showing localizer "off flag" dropped completely into position showing no signal was being received.

An expert witness from the CAA stated the results of the test were quite normal. He stated that some signal would be expected from Worcester with the New Bedford installation inoperative. He added that with New Bedford operative its signal strength would greatly override the Worcester signal and preclude interference between the two systems. He said such consideration, among many others, is the subject of careful review before the commissioning of any ILS.

The flight test also included a minimum altitude approach on the ILS but without adherence to the glide path altitudes. This test showed there was terrain clearance with a full scale "fly up" indication on the glide path indicator. Specifically, this was true over the accident scene.

Because of damage to the captain's altimeter no useful information could be determined from its examination. The copilot's altimeter was found set to a barometric pressure of 30.02, which was the last setting given the flight. This instrument had received external and internal damage and although still operable it exhibited an initial error of -205 feet as compared to a master altimeter during test. This error was apparently the result of ground impact damage and was of such magnitude that it would most certainly have been detected by the crew when setting their altimeters before and during the flight. Furthermore, a flight conducted with reference to an altimeter having such an error would result in the aircraft's being above the indicated altitude by the amount of the error.

The tower altimeter was also examined. It was found to have an initial error of plus 85 feet and an average error of plus 70 feet as compared to the master instrument. However, an aircraft with its altimeter adjusted to a setting obtained from this instrument would, actually, be higher than the altitude indicated.

The static source selector was recovered in the alternate source position. This unit had been torn from its supporting structure and the selected position prior to the crash could not be determined, although the manner in which the unit was torn out would move the selector to the alternate position. When in the alternate source position, altitude indications are somewhat higher than normal; however, the magnitude of the increase is known to flight crews and is considered by them when the alternate source is in use.

The New Bedford altimeter is set according to the ANC manual procedure. This is to obtain the Providence setting every six hours and place that setting in the window of the New Bedford altimeter noting the resultant height reading. This resultant height reading is thereafter maintained until the next periodic check and aircraft are given the barometric setting corresponding to the current height reading.

Important information concerning Flight 285 was learned from several ground witnesses, passengers, and the stewardess. Two witnesses, driving to Worcester on Highway 6, had stopped for a traffic light at the intersection of Slocum Road and the highway. The intersection is about two miles southeast of the localizer course measured from a point about one-half way between the outer and middle markers. These witnesses testified that they saw the aircraft flying in and out of the fog at low altitude. It was seen southwest of the intersection flying on a heading which, if continued, would intersect the localizer course at an angle between 60 and 90 degrees at a point about 2-3/4 miles from the runway.

Another ground witness, at home, a position about 2-3/4 miles from the runway along the localizer course, stated that at 2045 he heard the flight; and that it was so low it rattled his screen door. He added that he was well

acquainted with engine sound, living where he did, and knew that this aircraft sounded much lower than usual. The witness tried to see the aircraft but could not, adding he took this action in alarm because of the apparent lowness of the aircraft. He described the weather as being very foggy.

One passenger, seated on the right side in the aircraft, stated that he saw a row of lights before the crash. Highway 6 is lighted in segments on both sides.

Another passenger, seated on the left side of the aircraft at the window seat of the second row, stated she looked out very intently after the "fasten seat belt" sign came on. She stated that she saw tree tops sticking up out of the fog which obscured all but the upper branches. She said the aircraft passed over them very closely. Her observations caused her to remark to the passenger seated beside her, "It looks as though we're in the Berkshires and only 10 feet above them." She added that there was a period of time of at least one minute between her observations and the crash.

The stewardess of Flight 285, through deposition following the public hearing, testified that the flight was entirely normal until the accident, although it was "rushed" at Martha's Vineyard in order to leave before deteriorating weather conditions delayed departure. She said the flight was smooth to New Bedford and she had checked the passengers after the "No Smoking - Fasten Seat Belt" sign came on. She stated that she thereafter took the last seat on the right and peered out the window. She said she saw tree tops alarmingly close for about 15 seconds before the first impact. She added that the aircraft seemed to be flying level at this time. The stewardess said she did not know which pilot was flying the aircraft but that Captains Pitts and Sweetland were seated in the left and right seats, respectively. The chief pilot stated that, when two captains made the pilot complement, either could take the left seat and the pilot in the left seat would usually fly the aircraft.

Nearly all the survivors said the engines sounded normal, and that the cabin lights were on.

Whether or not the landing lights were on could not be determined though one light was examined under laboratory conditions. The other landing light was destroyed.

Weather observations at the airport are taken by Northeast personnel, trained and certificated by the U. S. Weather Bureau. The observer described the latest observation, made about 2035. He said the actual reading of the ceiling was 230 feet but which is properly recorded to the nearest 100 feet. He said that visibility markers were visible slightly more than a mile. The tower controller said he could see the outermost approach lights and these are 3,000 feet from his position. Other persons substantiated this.

Rescue personnel said the accident scene was shrouded by fog at ground level but that it seemed thinner above the ground. The airport manager said that while at the scene the approach lights were "haloed" but in thinner fog than that just over the water and moist swamp. Persons at the highway where the car witnesses were located said it was foggy and that driving was "in and out" of heavier and lighter areas.

The captain of Flight 274, which landed at 2012 and was the last flight to land before the accident, said that when he "broke out" weather conditions were substantially above minimums. He said conditions made the transition from instruments to visual positive but he felt the weather was deteriorating and this prompted him later to pass the information to Flight 285, "It'll be tight." The captain stated he noted no significant wind factor during his approach.

Analysis

Analysis of the synoptic weather situation shows that a warm front was advancing toward the New Bedford area along an east-west line. At 2000 the front had advanced northeastward to a position from Watertown, New York, to Bridgeport, Connecticut, to Block Island and thence eastward along the 39th parallel. Weather conditions in advance of the front and in the New Bedford area were typical of those in advance of a warm front, consisting of low stratus clouds, fog, rain, and drizzle. Low ceilings and visibilities existed in the New Bedford area; however, the lowest existed along the coast and immediately in advance of the front. The synoptic situation and weather observations made at other stations in the New Bedford area show that consistently low ceilings and visibilities existed over the entire area. These conditions clearly dictated that an ILS approach be made to the New Bedford Airport where latest conditions were reported as: Ceiling 200 feet; visibility 1 mile in fog. While these conditions were very similar surrounding the airport, it is possible that somewhat poorer conditions may have existed locally in the final approach path to runway 5 because of the swamp below it.

By an exhaustive and meticulous examination of the basic airframe of N 34417, its powerplants, its systems, and the electronic airborne equipment, it was shown that none of these caused or contributed to the cause of the accident. Lack of damage to the equipment, components, and systems of most vital concern permitted the Board to make its determination on conclusive material and test evidence.

In a similar manner the condition of the New Bedford ILS ground components was determined. Numerous ILS approaches were made on September 15, one of which was conducted about one-half hour before the accident in weather conditions very similar to those existing at the time of the accident. Operational checks of the system were made following the accident and others were made using the airborne equipment from N 34417. All showed normal operation. Further, the ILS monitoring system did not alarm at any time on the day of the accident. For these reasons the Board believes that if the ILS had been used according to the proper procedures satisfactory ground and airborne operation would have been available.

It will be recalled that ground witnesses saw the flight over a position about two miles southeast of the localizer course measured from a position some 2-3/4 miles from the runway. When observed it was flying toward the localizer course on a heading which, if continued, would intersect the course about 2-3/4 miles from the runway at an angle of between 60 and 90 degrees. The Board finds that it would not have been possible for the aircraft to have been over this position or on this approximate heading if the flight had been following the ILS approach procedure. From this evidence it would appear that the procedure turn was being made between the outer and middle markers rather than beyond the outer marker as prescribed by the approach procedure.

It is further believed that the row of lights sighted by one passenger were street lights lining segments along both sides of Highway 6 below where the flight was seen.

Thereafter, along the projected line of flight the aircraft was heard at an alarmingly low altitude, and another passenger and the stewardess saw trees below the flight altitude. The passenger's observation lasted about one minute, the stewardess' about 15 seconds, and both thought the aircraft was being flown just above the trees. To the Board it is most evident that these observations could not have been made in the existing weather conditions if the aircraft had been flown at the altitudes prescribed by the approach procedures and in conformance with the ILS glide path. Thus, from this evidence, it is the Board's view that Captain Pitts not only did not follow the ILS approach path but also descended to an extremely low and unsafe altitude without adherence to the ILS glide path. It is reasoned that the captain was attempting to fly visually below the overcast to the runway, assisted by ADF and localizer indications for direction. The Board finds no valid reasons or justification for the conduct of the approach in this manner.

There is no clear evidence to explain the final descent into the trees. While the flap position found is not considered the amount normally used for landing, it was an amount indicating intention to land. Such intention would indicate that at least the glow of the approach lights had been sighted. From low altitude, in foggy visibility, Captain Pitts may have fixed his vision to the lights ahead and, without good reference to vertical position or margin for error, the aircraft descended unnoticed toward the trees. Without question, however, the descent was recognized in time to apply near maximum power but too late to avoid striking the trees.

Findings

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

1. The carrier, aircraft, and flight crew were currently and properly certificated.
2. At departure from Martha's Vineyard the aircraft was loaded less than the maximum allowable and the load was properly distributed.
3. Flight to the New Bedford area was made in and on top of instrument weather conditions in accordance with an instrument flight rules flight plan.
4. Flight 285 reached the New Bedford area and was cleared for an ILS approach.
5. Weather conditions at the airport and the surrounding area clearly dictated an ILS approach.
6. Airborne and ground equipment necessary to the ILS approach was functioning normally.
7. Flight 285 descended prematurely in the approach area without conformity to the ILS procedure.

8. Flight 285 descended to a low and unsafe altitude in an attempt to approach the airport visually, assisted by directional instruments.

9. The flight did not conform to the ILS glide path.

10. From low altitude a descent occurred which was not recognized by the pilots in time for corrective action to be effective.

11. The trees struck were located 165 feet to the right of the localizer centerline, nearly 189 feet below the glide path centerline, and about 4,000 feet short of the runway threshold.

12. There was no evidence of malfunction of the aircraft, its systems, or powerplants.

Probable Cause

The Board determines that the probable cause of this accident was that the pilot attempted to make a visual approach by descending prematurely in the approach area without adherence to the prescribed ILS approach procedure which was dictated by existing weather conditions.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ G. JOSEPH MINETTI

/s/ LOUIS J. HECTOR

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

Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at 2150, shortly after its occurrence, September 15, 1957. 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 public hearing was ordered by the Board and held in the New Bedford Hotel, New Bedford, Massachusetts, on October 29, 30, and 31, 1957.

Air Carrier

Northeast Airlines, Inc., is a Massachusetts corporation with its principal offices located in Boston. The company is engaged in the transportation by air of persons, property, and mail. The company operates under a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration.

Flight Personnel

Captain Vincent L. Pitts, age 35, was employed by the company on January 1, 1946. He was promoted to captain on March 19, 1953. Captain Pitts, at the time of the accident, held a currently effective airman certificate with airline transport rating; he was also rated on DC-3 and Convair aircraft. His most recent line check was accomplished April 23, 1957, and his latest semiannual instrument proficiency check was completed satisfactorily on April 28, 1957. Captain Pitts had accumulated 7,079 airline flying hours, of which 4,348 were in the DC-3. Company records reflected that he had flown frequently into the New Bedford Airport and over the route involved. Captain Pitts had taken his last physical examination on June 26, 1957; this he passed satisfactorily, without waivers.

Captain Roger W. Sweetland, Jr., age 33, was employed by the company on June 23, 1952, and became a captain on November 28, 1956. Captain Sweetland held a currently effective airman certificate with airline transport rating and rating on the DC-3 aircraft. His most recent line check was on August 22, 1957, and his last instrument proficiency was on August 21, 1957; both were accomplished satisfactorily. Captain Sweetland had accumulated 2,097 airline flying hours, of which 1,522 were in the DC-3. Captain Sweetland had additional military flying hours in transport equipment and had flown the Berlin Airlift. His most recent physical examination was passed, without waivers, on August 6, 1957.

A review of company records showed both pilots had received regular pilot training and checks by the company, both of which included ILS approaches and Link Trainer time. This training was in accordance with Civil Air Regulations requirements and was similar to an average airline curriculum. A company witness stated both pilots were considered highly competent.

Stewardess Nancy J. Lehan was employed by the Company on March 8, 1954, as a reservationist. On January 26, 1957, she became a stewardess following company training for this position which commenced in October 1956. Her training was standard for the position and included, among other subjects, first aid and

emergency procedures, including U. S. Coast Guard ditching instruction on June 18, 1957. She satisfactorily completed a flight physical on January 24, 1957.

The Aircraft

N 34417, a DC-3, was manufactured July 22, 1942, and was acquired by the company January 29, 1952, from Trans World Airlines. At the time of the accident the aircraft had been flown a total of 35,685 hours, of which 13,989 hours were by the company. The aircraft was powered by Pratt and Whitney R-1830-92 engines with model 23E50-505 Hamilton Standard propellers and 6353A-18 blades. A review of the company's maintenance records on N 34417 showed it was satisfactorily maintained by the company.