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JP

REPORT OF THE CIVIL AERONAUTICS BOARD

Of the investigation of an accident
involving civil aircraft of the United
States NC 19970 which occurred near
Savannah, Georgia, on October 10, 1941

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CONDUCT OF INVESTIGATION

An accident involving aircraft NC 19970 occurred at the Savannah Municipal Airport, Savannah, Georgia, on October 10, 1941, about 2 10 a m 1/ while the aircraft was operating in scheduled air carrier service between New York, New York, and Miami, Florida, as Trip 5 of Eastern Air Lines, Inc 2/ The accident resulted in substantial damage to the airplane. At the time of the accident the airplane was carrying five passengers and a crew of three. None of the passengers or members of the crew sustained any injuries.

The Washington office of the Civil Aeronautics Board 3/ was officially notified of the accident about 3 03 a m the same day and was informed at that time that the right landing gear of the aircraft had collapsed on landing. Immediately after receiving this notification the Board initiated an investigation of the accident in accordance with the provisions of Section 702(a)(2) of the Civil Aeronautics Act of 1938, as amended. Investigators were sent to the scene of the accident, the first of whom arrived there about 9 30 a m the same day.

Inspection and Preservation of the Wreckage

The damaged airplane was not disturbed prior to the arrival of the first of the Board's investigators, who immediately took custody of the airplane and placed it under guard. After an examination of the damaged airplane at the scene of the accident the right wheel and tire were forwarded to the National Bureau of Standards, Washington, D C, for inspection and analysis. Upon conclusion of the investigation, the aircraft was released to Eastern.

Public Hearing

In connection with the investigation of the accident, a public hearing was held at Miami, Florida, on October 24, 1941. Robert W. Chrisp, an attorney for the Board, acted as Presiding Examiner. The following personnel of the Safety Bureau of the Board participated in the hearing: R. D. Hoyt, Assistant Director; Frank E. Caldwell, Chief, Investigation Division; Thomas J. Fowler, Air Safety Investigator; and Harold G. Crowley, Accident Reports Consultant.

All of the evidence available to the Board at the time was presented at the hearing. Twelve witnesses testified and fourteen exhibits were introduced. While the Examiner and the representatives of the Safety Bureau were the only ones designated to ask questions of the witnesses, the Examiner, acting under instructions of the Board, announced at the opening of the hearing that any person who had any evidence, questions, or suggestions to present for consideration in the proceedings might submit them in writing to the Examiner. Two written questions were so submitted and asked during the hearing.

After the close of the hearing, a deposition was taken from Earle R. Foote, United States Army Air Corps, who witnessed the accident. The deposition was made a part of the record of the investigation.

1/ All times mentioned herein are Eastern Standard unless otherwise indicated.

2/ Hereinafter referred to as "Eastern".

3/ Hereinafter referred to as the "Board".

Upon the basis of all the evidence accumulated in the investigation and at the hearing, the Board now makes its report in accordance with the provisions of the Civil Aeronautics Act of 1938, as amended

II

SUMMARY AND ANALYSIS OF EVIDENCE

Air Carrier

Eastern Air Lines, a Delaware corporation, was operating at the time of the accident as an air carrier under certificates of public convenience and necessity and air carrier operating certificates issued pursuant to the Civil Aeronautics Act of 1938, authorizing it to engage in air carrier transportation with respect to persons, property, and mail on various routes, including that between the co-terminal points, Newark, New Jersey, and New York, New York, and the terminal point Miami Florida, designated as Route 6, via numerous intermediate points, including Washington, D C , Raleigh, North Carolina Charleston, South Carolina, Savannah, Georgia, and Jacksonville, Florida

Flight Personnel

On the flight in question, the crew consisted of Captain Fred R Cann, First Officer John R Loveless, and Flight Steward John Fredun

Captain Cann, aged 46, who had a total of approximately 11,600 hours of flight time, was the holder of an airline transport pilot certificate and had been in the employ of Eastern about 13 years Prior to the accident he had logged approximately 3500 hours in DC-2 and DC-3 airplanes His last physical examination before the accident, required by the Civil Air Regulations, was taken on April 10, 1941, and showed that he was in satisfactory condition A physical examination taken on October 13, 1941, after the accident, also showed that he was in satisfactory condition Company records indicated that he was a well qualified and proficient pilot On his last flight check prior to the accident, given on September 30, 1941, he received a satisfactory grade on all items checked

First Officer John R Loveless, aged 24, had a total flying time of approximately 2100 hours He was originally employed by Eastern on June 12, 1940 prior to that time he had been on active duty with the United States Army Air Corps since June 16, 1938 At the time of the accident he held a commercial pilot certificate with an instrument rating and had logged a total of approximately 1114 hours as copilot in DC-2 and DC-3 airplanes His last physical examination, required by the Civil Air Regulations, and taken about June 17, 1941, showed him to be in satisfactory condition It appears from the evidence that both Captain Cann and First Officer Loveless were physically qualified and held proper certificates of competency for the flight and equipment involved

Airplane and Equipment

Aircraft NC 19970 was a Douglas, Model DC-3, manufactured by the Douglas Aircraft Company, Inc , of Santa Monica, California, in October, 1940, and purchased by Eastern on October 30, 1940 It was powered with two Wright Cyclone G202A engines, and at the time of the accident had flown a total of 3,171 hours, with replacements of engines and parts from time to time The engines were equipped with Hamilton Standard, constant speed, hydromatic,

full-feathering propellers This model aircraft and its equipment had been approved by the Civil Aeronautics Administration for air carrier operation over routes flown by Eastern with 21 passengers and a crew of three The airplane had been certificated for operation with a standard weight of 24,400 pounds and a provisional weight of 25,200 pounds, without de-icer equipment At the time of the departure of Trip 5 from Washington, D C , the weight of the airplane was 25,156 pounds 4/

The airplane and its equipment had received the overhauls, periodic inspections, and checks which are provided for in company practice and approved by the Civil Aeronautics Administration

History of the Flight

Eastern's Trip 5 of October 9, 1941, originating at LaGuardia Field, New York, New York, and operating as a scheduled air carrier flight from New York to Miami Florida, with scheduled intermediate stops at Washington, D C , Charleston, South Carolina, Jacksonville, Florida, and West Palm Beach, Florida, was due to depart LaGuardia Field at 9 00 p m and took off at approximately 9 05 p m

Prior to departure from LaGuardia Field, the captain, with the dispatcher and meteorologist, made a study of the weather conditions prevailing over the route He then prepared a flight plan for the first leg of the flight to Washington, D C , which called for cruising at 4000 feet contact The flight arrived at Washington at approximately 10 30 p m The flight over that portion of the route was described as routine

Another flight plan was prepared at Washington National Airport, Washington, D C , for the next leg of the flight to Charleston, South Carolina This flight plan called for cruising at 6000 feet Authorization for instrument flight was approved by Airway Traffic Control 5/ at Washington with Raleigh, North Carolina, and Savannah, Georgia, as alternates At the time of departure from Washington, 10 50 p m , the airplane carried a fuel supply of 800 gallons of gasoline and 44 gallons of oil, which was sufficient to permit flight at normal cruising power to Charleston and thereafter for about five hours and twenty minutes,

4/ The "standard weight" of an airplane is the maximum allowable weight for landing, while the "provisional weight" of an airplane is the maximum allowable weight for take-off When an airplane takes off with a weight in excess of the designated standard weight, the weight of the airplane must be reduced by gasoline consumption, prior to arrival at its next scheduled stop, to the extent necessary to bring it within the standard weight for landing If sufficient gasoline had not been consumed between time of take-off and any emergency landing, gasoline can be dumped by the use of tested and approved dump valves in order to reduce the total weight to the approved weight for landing At the time of the accident the weight of the airplane had been reduced since its departure from Washington, D C , to well below its authorized standard weight

5/ The Airway Traffic Control staff, a part of the Civil Aeronautics Administration, regulates the flow of traffic over a civil airway during instrument weather conditions in order to eliminate the possibility of collision between aircraft Before flying on a civil airway under instrument weather conditions, approval must be secured from Airway Traffic Control for the flight, including the altitude at which it is to be flown

thus making available to Captain Cann a choice between Raleigh and Savannah, the alternate airports

At 12 33 a m the flight reported that it was at 6000 feet altitude over Raleigh, North Carolina, and estimated that it would pass over Florence, South Carolina, holding the same altitude, at 1 04 a m About this time the flight received the 12 30 a m weather sequence, reporting the Charleston Airport closed with 1/4 mile visibility

At 12 43 a m the flight received a radio message from Eastern's dispatcher at New York as follows.

"You are cleared over Charleston to Jacksonville, landing at Savannah to discharge Charleston passengers and cargo if Savannah weather remains above the required minimum 6/ Your alternates are Raleigh and Miami Municipal "

The flight acknowledged receipt of this message

There was still ample fuel aboard the aircraft to accommodate this change in the flight plan even though Miami Municipal Airport was designated as a new alternate The latest weather sequence reports showed that both Raleigh and Miami were clear and the forecasts for this region also indicated that the weather would so continue

Upon nearing Charleston the flight heard the latter part of the 1 30 a m weather sequence reports broadcast from the Charleston range station, which included a special report to the effect that Charleston then had 1/2 mile visibility Following this report, the captain elected to go lower to "take a look" at the airport, and did so However, upon descending to an altitude of approximately 2000 feet over the range station, he decided that there was too much fog and continued toward Savannah His reported estimated time of arrival there was 2 03 a m

At 1 30 a m the communications operator of the Civil Aeronautics Administration at Savannah, who also acts as a Weather Bureau observer, transmitted via teletype the regular 1 30 a m sequence weather report for Savannah, which incorporated a special observation giving the sky as clear, visibility 1-1/8 miles, dense ground fog, temperature 68, dew point 65, wind west 2, altimeter 29 97 In transmitting this report an error was made in the visibility reading, which should have been 1/8 mile This error was immediately detected and the operator notified Eastern's office in the same building by interphone of his error in transmitting the visibility In order that there might be no misunderstanding as to the correction, the operator, a few minutes later, went downstairs to Eastern's office and personally advised the transportation agent While he was in Eastern's office, the transportation agent asked him what the weather was at that time The latter stepped outside the building and upon observing a marker light 1/2 mile to the west, informed the transportation agent verbally that the visibility to the west was 1/2 mile Following this, Eastern's Savannah ground station reported at 1 38 a m to the Eastern station at Jacksonville that

6/ The minimums authorized by the Civil Aeronautics Administration in Eastern's Weather Letter of Competency for Charleston, S C and Savannah, Georgia, for both day and night landings are, visibility of at least 1 mile with a ceiling of 500 feet, or visibility of 3/4 mile with a ceiling of 700 feet or visibility of 1/2 mile with a ceiling of 1000 feet or higher

the visibility was 1/2 mile, variable 7/ Since Jacksonville had previously broadcast to Trip 5 the Savannah visibility as 1-1/8 miles, it immediately contacted the flight at 1 41 a m and advised it of the 1/2 mile visibility then existing This was acknowledged by the flight

When the Civil Aeronautics communications operator at Charleston received the 1 30 a m Savannah sequence on the teletype, he detected the error made in the visibility report of 1-1/8 miles and broadcast a correction of 1/8 mile for Savannah at 1 42 a m He stated that his reason for so doing, without obtaining a verification, was that it was then time for him to broadcast his regular sequence report, and that such a delay might result in the withholding of vital meteorological information During this time Captain Cann was listening to the company broadcast and did not hear this correction However, upon returning to the Charleston range he stated he heard the latter part of the weather sequence broadcast at 1 42 a m

The following radio conversation, ending at 1 57 a m , then took place between Trip 5 and the Savannah ground station

Trip 5 "Give us the surface and Kollsman "

Savannah "The Savannah Kollsman is 29 91 The surface is calm, (wind) indicated west The visibility is one-half a mile, variable "

Trip 5 "Do you think it's O K to take a look?"

Savannah "That's O K The northeast end of the field is the best and would suggest landing to the southwest if O K There are some Army strips parked on the left of the northeast-southwest runway about 100 feet on the left as (you) land (toward the) southwest (They are) well off the runway "

Trip 5 "O K Five "

Savannah "O K Savannah "

A few minutes later Savannah called Trip 5 and said, "The visibility is not as good as when I last called you " Trip 5 replied, "That's O k " This conversation ended at 2 03 a m

At the time of the above conversation, the aircraft was in the vicinity of the airport and, according to the captain, he could line up the northeast-southwest runway and was able to see the marker lights at each end Captain Cann then requested that the airport flood lights be turned on and his request was complied with He stated that there was only a very thin layer of fog close to the runway extending only slightly above the runway, but that smoke, extremely dense, but not very high, was lying across the northeast end of the runway The First Officer testified that fog was visible and that there was "a halo around the lights" to indicate there was fog there He also stated there was a dense billow of smoke just to the northeast of the northeast-southwest runway

7/ Although the 1/2 mile visibility observation was considered official it was not recorded on the "Airway Weather Reports" form for the Savannah station The recording for 1 30 a m indicated "visibility 1/8 mile, dense ground fog"

The aircraft passed over the airport at an altitude of about 1000 feet, headed south-westerly and approximately parallel with the northeast-southwest runway. The seat belt sign was turned on and the landing gear was extended and locked. The mixture controls were set in the proper position for landing. After passing the field the captain started a left turn and began to decrease altitude. When the aircraft had descended to approximately 700 feet it was brought back to level flight and shortly afterward the remainder of a 360-degree turn was completed. Upon the conclusion of this turn the aircraft was still at an altitude of about 700 feet, approximately northeast of the northeast-southwest runway and lined up with it.

The captain did not order the flaps put down, even partially, and the approach was continued. He did not turn on the aircraft's landing lights. He stated that this part of the approach was made at an air speed between 85 and 90 m p h. Captain Cann further stated that during the final approach, he entered the fog or smoke about the height of the beacon 8/ First Officer Loveless estimated the top of the fog to be one hundred to one hundred and fifty feet in height. First contact with the ground was made on the left side of the runway about 760 feet beyond its northeast end. The aircraft first struck on its right wheel and in a tail-high attitude, the left wheel making its first contact about 42 feet beyond. The right tire blew out almost immediately upon contact, the right wheel broke, and other parts of the right landing gear were damaged. The tips of the right propeller blades struck the ground. The aircraft bounced, touched the runway again about 700 feet beyond, swerved sharply to the right, and then came to rest. During the swerve the left tire also failed. The accident occurred at 2 10 a m. When asked to state his observation with respect to the lights after the airplane first made contact with the ground, First Officer Loveless testified that the field flood lights were on and the ground was discernible to a certain degree, but after the airplane bounced from the runway he could not see anything more, except that probably if he had looked, he could have seen lights at the west side of the field.

Mr Davis, Eastern's transportation agent at Savannah, was standing outside the Administration Building at the time the aircraft was approaching for a landing. He stated that he first saw it at an altitude of 25 or 50 feet as it was coming over the northeast end of the runway in what seemed to him to be a normal approach. He continued observing the aircraft until just prior to its contact with the ground, at which time he turned and lost sight of it. However, Davis states that although he heard the noise of the impact, fog prevented him from again seeing the airplane, which finally came to rest about 2000 feet approximately to the west of him.

Earle R. Foote, a soldier attached to the United States Army Air Base at Savannah, witnessed the accident. At the time he was on duty at the airport guarding the Army aircraft which Captain Cann had been advised were parked to the left of the runway. Mr Foote was standing near these aircraft, which were not equipped with obstruction lights, and he was approximately 375 feet from the point at which aircraft NC 19970 first contacted the ground.

He testified that about the time of the accident fog of variable density was drifting

8/ The beacon light is 50 feet high and is located approximately 400 feet east of the east side of the Administration Building.

across the airport and that occasionally he was unable to see the light on a barge about 1/4 mile distant. He heard the aircraft approach the field and first saw it directly overhead, flying toward the southwest at an altitude of about 1000 feet. He then lost sight of it because of fog. He heard it as it turned away from the airport during its 360-degree turn and then did not hear it for about four minutes. He next heard the aircraft as it approached the northeast end of the northeast-southwest runway. He testified that when the airplane came within his vision it was over the runway, flying "not so fast" but "high", and that almost immediately it dropped suddenly to the ground from an altitude of about 30 feet and then bounced into the air and disappeared from his view. He also testified that the aircraft was visibly nose-down at the time of first contact but he was unable to estimate the angle at which the aircraft contacted the ground or how high it bounced.

Mr. Foote did not recall seeing any smoke, as described by Captain Curn and First Officer Loveless, lying over or drifting across the northeast end of the runway. He further stated that although he had from time to time, before the accident, been able to discern boundary lights on the southwest end of the field about 3000 feet distant, but because of fog, he could not see those lights at the time of the accident.

At 2 16 a m the following weather report was issued at Savannah: "Special observation, ceiling unlimited, sky clear, visibility zero, dense ground fog, temperature 68, dew point 65, wind calm, altimeter setting 29.97."

Investigation disclosed that all radio range facilities over the entire route between Washington, D. C., and Jacksonville, Florida, were functioning normally throughout the flight.

Condition of the Wreckage

Inspection of the wreckage revealed that following the failure of the right tire the right wheel had been severely damaged. Its drum was demolished. The right drag strut had broken, allowing the landing gear to fold back. Other parts of this landing gear mechanism indicated that it had been subjected to a severe side thrust. All three blades of the right-hand propeller were bent from contact with the runway. The control mechanism of this propeller was also broken. The right wing tip was scuffed from dragging on the runway and the right aileron was damaged. The left tire had failed and was flat.

The aircraft first contacted the runway on its right wheel. Ten and one-half feet beyond that point the right tire blew out, the wheel broke, and the landing gear partially collapsed. This gear again struck the ground at a point about 16-1/2 feet farther on.

The first contact by the left wheel occurred at a point about 42 feet beyond the point of initial contact. Approximately 36 feet beyond the point of initial contact a mark on the runway made by the tail wheel was evident. This tail wheel mark was to the left of the point at which it would have been if the tail wheel had tracked directly between the two main wheels in the normal manner. It was approximately 6 feet from the projected marks of the left wheel and approximately 12 feet from the marks of the right wheel. The marks on the ground, combined with the captain's statement that he was "angling away" from the parked Army aircraft, indicate that the airplane was turning to the right at the time of first contact. The right propeller first contacted the ground at a point about 27 feet beyond the point of initial contact and marks on the runway extending for a distance of about 42 feet

showed that the right wing tip had dragged along the ground

At a point about 69-1/2 feet beyond the point of initial contact it was apparent from measurements that the aircraft had left the ground for a distance of about 700 feet. Its next contact with the ground occurred on the opposite, or northwest, side of the runway, indicating that the airplane had continued its general direction of flight after making first contact with the ground. After making its second contact with the ground the airplane continued to turn to the right and a short distance later, this turn developed into an acute right groundloop.

The right wheel was a Bendix, Type B-3, and was of the same physical dimensions as the Bendix, Type B-1, which it had replaced. The left wheel was the B-1 type. The Type B-3 wheel had been in use for 1188 hours prior to the accident, and had given no trouble. The major difference in the two types is that the B-3 is of aluminum alloy and the B-1 of magnesium alloy. The B-3 type of wheel is used extensively by various airlines.

The tire on the right wheel was a Goodrich of standard size, 1700 x 16, Type R-8. At the time of the accident it had had a total time of 570 hours. The records of Eastern do not indicate that it had ever been damaged, nor that it had ever been retreaded. As the average life of such tires in ordinary use is somewhat in excess of 1000 hours, it is apparent that the subject tire should not have been in a badly worn condition.

The sequence of breakage following first contact (the tire first and then the wheel) is indicated by the finding of a piece of the tire casing at a considerable distance, approximately abeam of the point at which that tire first touched the ground. If the wheel had broken first, the pressure in the tire would undoubtedly have been relieved by the inner tube blowing inward radially from the casing. In this event it is very improbable that small pieces of the casing would have been blown laterally as was the small piece that was found.

The National Bureau of Standards on November 22, 1941, submitted a report to the Board on the examination of the tire and wheel from NC 19970. In summarizing their report, the Bureau stated that there was no evidence of defective material in the tire or tube or landing wheel. It was their opinion that the tire struck the ground with sufficient force to crush the tire. This allowed the tire to deflate suddenly. Further damage to the tire and tube and the damage to the wheel occurred after and as a result of the failure of the tire.

The subject runway was slightly crowned and was being widened on its northwest side. The height of the crown was negligible and could not have contributed substantially to the right wheel striking first. The construction work had no bearing on the accident.

Conduct of the Flight

There appears to be no question but that the flight was properly dispatched from New York, New York, to Washington, D C, and from Washington, D C, to Charleston, South Carolina. When it became apparent to Eastern's dispatcher at LaGuardia Field that the visibility at the Charleston airport had decreased below 1/2 mile he immediately cleared the flight to Jacksonville via Savannah, and in so doing provided Captain Cann with two alternate airports should the visibility at Savannah and Jacksonville fall below the minimums.

authorized. The fuel on board the aircraft at the time it left Washington was sufficient for the flight to proceed to any of its alternates, and remain well within the requirements of the Civil Air Regulations.

The United States Weather Bureau and Eastern's forecasts proved to be accurate within reasonable limits. They predicted that high ceilings would prevail over the area to be traversed by the flight and that ground fog would be encountered along the eastern seaboard. An aftercast of the weather condition existing at the time of the accident showed light ground fog forming at the Savannah Airport at 9 58 p m, gradually becoming dense ground fog and reducing the visibility to zero by 2 16 a m approximately six minutes after the accident. The wind remained calm with the exception of the 1 30 a m report, which was west 2 m p h, thus indicating that no large changes in air mass condition were occurring at the station during the night or early morning.

Captain Cann and First Officer Loveless agreed that the engines, propellers, airplane controls and radio equipment were functioning normally during the entire flight. Eastern's maintenance records indicated that the aircraft and all of its equipment had been maintained in an airworthy condition. Moreover, a pre-flight inspection of the aircraft performed prior to its departure from Washington showed that it was in a satisfactory condition. The report of the National Bureau of Standards indicates that neither the right tire nor the right wheel were defective. The monitoring reports of all the radio ranges along the course showed them to be operating accurately during the period involved.

Captain Cann's action in descending to the 2000-foot level over the Charleston range station to "take a look" at the airport cannot be criticized in the light of the circumstances existing at the time. Upon approaching Charleston he heard part of the 1 30 a m sequence weather broadcast by the Charleston range station, which indicated that Charleston then had 1/2 mile visibility. The captain testified that due to the thickness of the fog he could not see the lights of the airport and therefore concluded that it would be unsafe to attempt a landing.

Although an error was made by the Civil Aeronautics communications operator at Savannah in transmitting via teletype the visibility as 1-1/8 miles rather than 1/8 mile in his regular 1 30 a m report, it is obvious that this mistake had no bearing on the accident. Corrective measures were taken by both him and the communications operator at Charleston immediately after it occurred. Moreover, Mr. Worthington, the Civil Aeronautics communications operator at Savannah, after notifying Eastern's Savannah station of the mistake, proceeded downstairs to Eastern's office and personally advised Mr. Davis, the transportation agent. The fact that he was requested to, and did make, another visibility observation at this time cannot be considered irregular under the circumstances. An observer of the United States Weather Bureau is authorized to take and record an observation upon request, and Mr. Worthington was entirely within his authorization in doing as he did. The only criticism that can be made was his omission in not making the observation a part of the official record.

After leaving Charleston and before arriving in the vicinity of Savannah, Captain Cann was fully advised as to the weather conditions existing at Savannah. Although Eastern's Jacksonville station had previously given him the erroneous visibility observation at Savannah of 1-1/8 miles, that station subsequently advised the flight at 1 41 a m that the visibility was 1/2 mile, variable. First Officer Loveless when questioned concerning the

1-1/8 mile visibility, stated that shortly after receiving the weather report he recognized the discrepancy. Since First Officer Loveless had recognized this error, and since Captain Cann had received the erroneous weather report, it is difficult to understand why they failed to request a verification of the report by Eastern's ground station at Jacksonville. It is a matter of common knowledge to airline pilots that the United States Weather Bureau reports visibility in 1/4-mile fractions when the visibility is about 1/4 mile and, when less than 1/4 mile it is reported as 1/8 mile or zero. Therefore, it is reasonable to assume that Captain Cann and First Officer Loveless knew or should have known that an error had been made. Since it appears that neither of them heard the correction by the communications operator at Charleston, and since neither of them requested a verification of the erroneous report, it is apparent that they accepted, without question, the 1/2 mile variable, visibility report.

As the flight approached Savannah, the Captain requested and was given the surface wind of 2 m p h, Kollsman 29 91, visibility 1/2 mile, variable, by the Eastern ground station. During this time Captain Cann and First Officer Loveless stated that they could see the beacon light and other lights on the ground, although the beacon "looked sort of fuzzy". It is probable that the captain could see the marker lights outlining the ends of the runway as he passed directly over the airport at an altitude of 1000 feet. Earle R. Foote, the soldier on duty guarding the Army airplanes, testified that he saw the airplane come over at about that altitude traveling in a southwesterly direction. He stated, however, that he lost sight of the airplane as the fog obscured his view. Captain Cann stated that smoke, which was lying across the northeast end of the northeast-southwest runway, was the only obstruction to a normal landing condition. Both flight officers stated that they could see the lights of the airport during the 360-degree turn and final approach to the airport. It is significant to note that it was at this time that Davis called the flight and said that the "visibility is not as good as when I last called you".

Neither Davis nor Foote saw the airplane again until it appeared just over the end of the northeast runway. Davis said it was about 25 to 50 feet high, and making a normal approach. He watched the airplane until just before it contacted the ground in what appeared to be a normal landing, however, he said his attention was attracted to something inside the building and he did not see the airplane land. He testified that he heard the airplane contact the ground but the Army airplanes and the fog prevented him from seeing the accident. The airplane came to rest approximately 2000 feet to the west of the Administration Building where Davis was standing.

Foote, who was standing out near the runway in question, was in a much better position to see the airplane and observe its approach. He said it was flying "not so fast, but high", and that almost immediately it dropped suddenly to the ground from an altitude of about 30 feet, then bounced into the air and disappeared from view. He said it sounded "like the coupling of box cars and the scraping of metal". Foote's testimony indicates that the disappearance of the airplane from his view was not the result of the upward bounce of the airplane but was due to the fact that it was traveling almost directly away from him. In other words, although fog subsequently obscured his view, this obscurity was because of the increasing distance between him and the aircraft rather than because of a greater density of fog at the height to which the aircraft bounced. Neither did Mr. Foote recall seeing any smoke, as described by Captain Cann and First Officer Loveless, lying or drifting across the runway. Although he had, from time to time, before the accident, been able to discern boundary lights on the southwest end of the field about 3000 feet distant, he could not see

those lights at the time of the accident

From the condition of the tires, landing gear, right propeller blades and right wing tip of the airplane, it is apparent that the contact with the ground was severe. Moreover, the evidence indicates that the airplane was in a tail-high attitude turning to the right, and that the right wing was low at the time of first contact.

Captain Cann stated that just prior to contacting the ground he could see the runway and realized that he was landing on the southeast edge which would place him closer to the parked Army aircraft, and, in order to avoid them, was angling toward the center or opposite side of the runway when the aircraft made contact with the runway near its southeast edge. He stated that during the latter part of the approach, while he was keeping the runway lined up, looking at the air-speed indicator, and watching the smoke which covered the near end of the runway, he possibly "looked out" too long. He said he saw the ground coming up and pulled the control column back and applied a slight amount of power just prior to first contact.

The fact that Captain Cann landed on the southeast edge of the runway indicates clearly that he did not have sufficient visibility to line himself up properly with that runway. He had been told by Eastern's ground personnel that the Army airplanes were parked parallel to the southeast edge of the runway and it seems unlikely that he would have intentionally landed on the side of the runway nearest them. In addition, the fact that he was "angling to the right" just prior to landing indicates that he had not been properly aligned with that runway before that time. Furthermore, the action of Captain Cann in making his final approach for a landing, and then in actually attempting the landing, without the use of flaps, was an unusual procedure. It would indicate that he was not sure of being able to effect the landing, and wished to be able to pull out readily. Indeed, when he was asked why flaps were not used, Captain Cann gave the following answer: "Well, in landing in a fog condition, the fact is I wasn't certain that I was going to land."

In view of these factors we consider that Captain Cann did not exercise sound judgment in continuing to a landing after being advised that visibility was worse than the minimum conditions of 1/2 mile, as previously reported.

III

CONCLUSIONS

Findings

Upon all of the evidence available to the Board at this time we find that the facts relating to the accident involving aircraft of United States registry NC 19970, which occurred at Savannah, Georgia, on October 10, 1941, are as follows:

1. The accident which occurred at approximately 2:10 a.m. (EST) on October 10, 1941, to Eastern Air Lines' Trip 5 of October 9 resulted in major damage to aircraft NC 19970 but in no injuries to any of the occupants.

2. At the time of the accident Eastern Air Lines held a currently effective certificate of public convenience and necessity and an air carrier operating certificate authorizing

it to conduct the flight

3 Captain Cann and First Officer Loveless were physically qualified and held proper certificates of competency to operate as air carrier pilots over a route between New York, New York, and Miami, Florida, via intermediate points

4 Aircraft NC 19970 was currently certificated as airworthy at the time of the accident

5 Trip 5 was cleared in accordance with proper procedure from New York, New York, to Washington, D C , and from Washington, D C , to Charleston, South Carolina

6 Trip 5 proceeded normally from New York, New York, to Washington, D C

7 At the time of departure from Washington, D C , and at the time of the accident the gross weight of the airplane did not exceed the permissible gross weight and the aircraft was loaded properly with reference to the location of the center of gravity

8 At the time of departure from Washington, D C , for Charleston, South Carolina, the aircraft carried sufficient fuel to permit flight at normal cruising power to Charleston and thereafter for about five hours and twenty minutes, thus making available to Captain Cann a choice between Raleigh, North Carolina and Savannah, Georgia, the alternate airports

9 While in flight between Washington and Charleston, Trip 5 was cleared over Charleston to Jacksonville with a stop at Savannah, weather permitting, with appropriate alternates. This change in destination was accomplished in accordance with company procedure and the Civil Air Regulations

10 There was still ample fuel aboard the aircraft to accommodate this change in the flight plan even though Miami Municipal was designated as a new alternate

11 Although an erroneous weather report was transmitted via teletype at 1 30 a m by the Assistant Communications Operator at Savannah, corrective measures were taken by both him and the Civil Aeronautics Communications operator at Charleston immediately after it occurred

12 At the time of the accident the weather conditions at Savannah were below the approved minimums

13 The subject runway was being widened at the time of the accident. This construction work did not contribute to the accident

14 Captain Cann was flying the aircraft at the time of the accident

15 The landing was made without the use of flaps because Captain Cann had not been certain of being able to complete the landing

16 Although a weather report sent from the Savannah ground station to Trip 5 at 1 57 a m showed visibility of 1/2 mile, variable, and a report sent at 2 02 a m described the visibility as "not as good" as previously reported, Captain Cann elected to attempt a landing at Savannah

PROBABLE CAUSE

On the basis of the foregoing findings and the entire record available to us at this time, we find that the probable cause of the accident involving NC 19970 (Eastern Airlines' Trip 5 of October 9, 1941) on October 10, 1941, was the action of the captain in attempting a landing under conditions of insufficient visibility

BY THE CIVIL AERONAUTICS BOARD

/s/ George P. Baker
George P. Baker

/s/ Oswald Ryan
Oswald Ryan

/s/ Harlee Branch
Harlee Branch

/s/ Edward Warner
Edward Warner