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REPORT OF THE CIVIL AERONAUTICS BOARD

Of the investigation of an accident
involving civil aircraft of the United
States NC 16015 which occurred near
St. Louis, Missouri, on December 11,
1940. American Airlines.

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CONDUCT OF INVESTIGATION

An accident involving aircraft NC 16015, while operating in scheduled air carrier service as Trip 9 of American Airlines, Inc., between Chicago, Illinois, and St. Louis, Missouri, occurred near the Lambert-St. Louis Airport, St. Louis, Missouri, on December 11, 1940, about 2:47 p.m. (CST). The accident resulted in major damage to the airplane and injuries to two passengers and two members of the crew. The two remaining passengers and the stewardess were not injured. The accident was reported to the Chicago office of the Civil Aeronautics Board about 3:45 p.m. by a representative of American Airlines.

Inspection and Preservation of Wreckage

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. An accident investigator of the Board arrived at St. Louis, Missouri, at 9:50 p.m., December 11, 1940, and after interviewing the Captain and First Officer on the flight involved, proceeded to the scene of the accident. In accordance with instructions of the Board the damaged airplane had been placed under guard and the airplane had not been disturbed except for the damage necessarily incurred in removing the Captain and First Officer from the pilot's compartment.

After a preliminary examination of the damaged parts, it was decided to remove the airplane to a hangar on the Lambert-St. Louis Municipal Airport where a more complete examination could be made. The examination was completed on December 13, 1940, and the airplane was released to American Airlines.

Public Hearing

In connection with the investigation of the accident a public hearing was held in St. Louis, Missouri, on December 18 and 19, 1940. G. Grant Mason, Jr., Member of the Board, acted as Presiding Examiner, assisted by Robert W. Chrisp, Attorney of the Board, as Associate Examiner. The following personnel of the Safety Bureau of the Board participated in the hearing: Jerome Lederer, Director; Frank E. Caldwell, Chief, Investigation Division; Paul Carreau, Air Safety Specialist in Meteorology; and Raymond P. Parshall, Air Safety Investigator.

At the hearing all of the evidence available to the Board was presented, forty-nine exhibits were introduced, and thirty-one witnesses testified, including witnesses from the vicinity of the accident and experts in various technical subjects involved in the investigation.

While the examiners and the representatives of the Safety Bureau were the only ones designated to ask questions directly of any witness, the Presiding Examiner, acting under instruction 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 proceeding might submit them to the Examiners. Seventy-eight questions were submitted and at the close of the hearing the Presiding Examiner announced that every question submitted had been asked unless the subject matter of the question had previously been covered by the testimony.

Upon the basis of all the evidence accumulated in the investigation and 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

American Airlines, a Delaware corporation, was operating at the time of the accident as an air carrier under a certificate of public convenience and necessity and an air carrier operating certificate issued pursuant to the Civil Aeronautics Act of 1938. These certificates authorized it to engage in air transportation with respect to persons, property and mail between various points, including Chicago, Illinois, and Fort Worth, Texas, via St. Louis, Missouri; Tulsa, Oklahoma; Oklahoma City, Oklahoma; and Dallas, Texas.

On the flight in question the crew consisted of Captain Herbert Susott, First Officer Earl Philipps, and Flight Stewardess Ruth Arnestad.

Captain Susott, age 34, had accumulated a total of 7,798 hours of flying time, of which 3,407 hours and 48 minutes were in Douglas DC-3 type airplanes, and about 460 hours by instruments. His last physical examination required by the Civil Air Regulations was taken on July 5, 1940, and showed him to be in a satisfactory physical condition. Captain Susott, in accordance with company policy, had been given refresher flight checks from time to time which included the operation of DC-3 airplanes and instrument procedures over the Chicago-Fort Worth route. The results of these tests, as shown by company records indicated that he was a well qualified and proficient pilot. The records also showed that Captain Susott had been employed by American Airlines and its predecessors since October 6, 1929, and had operated over the route involved since May 18, 1940. He has had no previous accident during the period of this employment.

First Officer Phillipps, age 26, had accumulated at the time of the accident 1,155 hours of flying time, of which 385 hours and 36 minutes were in Douglas DC-3 type airplanes, and about 90 hours by instruments. His last physical examination required by the Civil Air Regulations was taken on November 10, 1940, and

showed him to be in a satisfactory physical condition. He had been employed by American Airlines since February 15, 1940.

Both pilots held appropriate certificates of competency and ratings for the flight and equipment involved.

Miss Arnestad, of Chicago, Illinois, has been employed as flight stewardess by American Airlines since April, 1939.

Airplane and Equipment

Airplane NC 16015 operated on the flight was a Douglas Model DC-3 manufactured by the Douglas Aircraft Corporation of Santa Monica, California. It was powered with two Wright Cyclone engines, Model G-102, each rated at 1100 horse power for take-off, and was equipped with Hamilton Standard constant speed, hydromatic, full-feathering propellers, Hub Models E 3 E-50 and Blade Models 6153 A-18. This model aircraft and its equipment had been approved by the Civil Aeronautics Authority for air carrier operation over routes flown by American Airlines with 21 passengers and a crew of three and with standard gross weight of 24,400 pounds. At the time of departure of Trip 9 from Chicago, the gross weight of the airplane was approximately 23,227 pounds, including mail, cargo, 800 gallons of fuel, 160 quarts of oil, 4 passengers, and a crew of three.

Lambert-St. Louis Airport

On the opposite page appears a sketch of the Lambert-St. Louis Airport (Figure A) to which Trip 9 was dispatched, indicating the

number, length, and alignment of the present runways and the location of the extensive construction work which was in progress on the airport on December 11, 1940, the day of the accident. Some time prior to the accident, a portion of land in the northeast corner of the airport around the present Curtiss-Wright plant was leased by the City of St. Louis to the Curtiss-Wright Company for the construction of an airplane factory. In connection with the construction, several 60-foot poles were erected on December 6, 1940, approximating the location of the future outer boundaries of the factory building and indicating the actual height of the building upon completion.

The Curtiss-Wright Company is a contractor for military aircraft being built for the United States Government. Due to limited manufacturing facilities at its existing plant located on Lambert-St. Louis Airport, it was forced to expand rapidly to meet production requirements. The construction work which required the erection of the poles was part of the expansion program for national defense. Representatives of the air carriers operating into St. Louis, the Civil Aeronautics Administration*, the City of St. Louis, and other interested persons attended a conference on October 11, 1940, at which this construction work and the location of the poles were discussed.

Flood lights were to be placed on the poles to facilitate a 24-hour working period on the project and a red light had been placed on the top of each pole as an obstruction marker. These lights were lighted at the time of the accident.

* The "Civil Aeronautics Administration" is the term used to designate the Administrator of Civil Aeronautics and his staff, which includes the inspection, air traffic control, and airways personnel. The Civil Aeronautics Administration, an executive agency, is entirely separate and independent of the Civil Aeronautics Board, which is a quasi-judicial, quasi-legislative agency of Congress.

The nearest poles are about 300 feet from the north side of the number one runway, which is approximately 5,600 feet long and is used extensively by airplanes landing when instrument conditions prevail. The terrain east of the runway is favorable for such landings and neon approach lights extend for a distance of 1,500 feet east of the end of the runway. In addition, the west leg of the St. Louis radio range (the radio range station is located 2-1/4 miles east of the airport) roughly parallels the number one runway, lying about 275 feet north of the runway at the eastern boundary of the field, and is used by pilots as an auxiliary aid in locating the runway under instrument conditions.

Joseph N. Dorst, Chairman of the Municipal Airport Commission, St. Louis, Missouri, who testified concerning the location of the new Curtiss Wright factory, stated that a master airport plan had been prepared recently which provided, among other changes, for the re-location of the number one runway to the south. Mr. Dorst stated that in order to expedite this re-location, the Municipal Airport Commission had authorized the filling of a low area in the southeast portion of the airport with dirt excavated in connection with the construction of the Curtiss Wright factory. The location and extent of this area is indicated on Figure A. In order to do this work, it was necessary for trucks to operate back and forth across the number one runway at a point approximately 1,500 feet from the northeast end of the runway. In this operation, dirt was spilled on the runway forming mud during wet weather which not only prevents the use of that part of the runway but creates a hazard at that point on the runway for air carrier aircraft landing and taking off. Ralph W. Page, Manager of the Airport, testified that this dirt was

removed from the runway from time to time but agreed that it constituted a hazard on the airport. He further stated that he and the Municipal Airport Commission were arranging for the replacement of the present boundary lights so as to include only that part of the airport suitable for landing purposes, thus eliminating approximately 1,500 feet of the No. 1 runway but leaving about 4,000 feet, the original length of the runway, available for operation.

Mr. Page said that a written warning order with a sketch of the airport and the area to be affected by the construction and improvements had been issued by his office on November 23, 1940, notifying the Civil Aeronautics Administration and all persons operating aircraft on the airport of the hazards created by the construction program. The regional office for the Fifth Region of the Civil Aeronautics Administration issued a Notice to Airmen on November 30, 1940, which set forth the anticipated condition of the airport with the instruction printed thereon that the notice should be kept posted conspicuously until December 17, 1940, when presumably it would be replaced by another Notice to Airmen. In addition, the Civil Aeronautics Administration's communications station at St. Louis issued, on December 10, to all stations on teletype circuit No. 7, which includes the Chicago station, a notice describing the current condition of the airport. This notice was posted on the airport bulletin board at Chicago and was seen there by Captain Susott.

Thus, on December 11, 1940, the day of the accident, the normal condition of the airport had been affected by the construction of

60-foot poles just north of the east end of the No. 1 runway, by the accumulation of mud on the No. 1 runway about 1,500 feet from its east end and by the filling of a low area in the southeast portion of the airport.

The Flight

Trip 9 was scheduled to leave the Chicago Municipal Airport at 12:40 P. M. (CST) on December 11, 1940, and, in accordance with regular company procedure, was cleared by the company flight superintendent at Chicago for an instrument flight to St. Louis. The clearance was based on current sequence weather reports, United States Weather Bureau weather forecasts, and a trip forecast made by the company meteorologist. The pilot's flight plan stated that he would climb to an altitude of 6,000 feet and the flight was cleared to cruise at that altitude by Airway Traffic Control at Chicago. The estimated time of arrival at Lambert-St. Louis Municipal Airport was 2:12 P. M. and Memphis, Tennessee, was designated as the alternate airport.

Available weather reports showed that a general overcast condition prevailed over the entire route between Chicago and St. Louis with an area of precipitation from Joliet, Illinois, (about 30 miles southwest of Chicago) south. The ceiling at Chicago was estimated to be 1,800 feet and visibility three-fourths of a mile with moderate smoke. Intermediate weather at Peoria and Springfield, Illinois, indicated average ceilings of 600 to 700 feet and visibility about one and one-fourth miles. The ceiling at St. Louis was estimated to be 600 feet with scattered clouds at 400 feet, light rain, and

light fog, and visibility one and one-half miles. The weather at Memphis, the alternate airport for St. Louis, was unlimited, with high broken clouds, scattered clouds at 4,000 feet, and visibility more than 10 miles.

The trip departed from the ramp at the Chicago Municipal Airport at 12:47 P. M., having been delayed seven minutes on account of mail. According to the testimony of Captain Susott, after take-off the flight proceeded normally, making a radio position report over Joliet at 4,000 feet, on instruments, at 1:07 P. M. and crossing the Bloomington, Illinois, radio range intersection (about 110 miles southwest of Chicago) at 6,000 feet between layers of clouds at 1:57 P. M. At 2:02 P. M. a radio check was made over Springfield, Illinois (about 75 miles northeast of St. Louis) at 6,000 feet. Weather conditions at St. Louis were reported to the pilot at 2:03 P. M. by the company radio operator there, and acknowledged by the pilot. This report indicated that the ceiling was 400 feet, variable with scattered clouds at 200 feet, visibility one mile, light rain, light fog, temperature 35, dew point 35, and wind northeast five miles per hour.

1/ Weather minimums are prescribed, in accordance with the Civil Air Regulations, in competency letters issued to air carriers by the Civil Aeronautics Administration. The weather minimums for American Airlines at Lambert-St. Louis Airport were, at the time of the accident, 400 feet altitude and one mile visibility.

Captain Susott, First Officer Phillips, and Flight Stewardess Arnestad, testified at the hearing. The description of the flight which follows is based largely upon the testimony of the two pilots. The flight started to descend shortly after passing over Springfield, Illinois, and at 2:24 P. M. arrived over the Otterville, Illinois, radio range intersection (22 miles north of the Lambert-St. Louis Airport) at 2,000 feet, on instruments. At this time Airway Traffic Control gave the Captain a traffic clearance to land at the Lambert-St. Louis Airport and, proceeding down the north leg of the St. Louis radio range at 1,600 feet, crossed the St. Louis range station at 2:31 P. M., still on instruments. (See Figure B, a sketch of his flight path by Captain Susott)

Captain Susott testified that he then started a standard instrument approach by making a turn to his left to go out on the east leg of the radio range at 1,600 feet. The landing gear was then extended, and, after continuing out the east leg for three minutes, a procedure turn of 180 degrees was made, and, while heading back toward the range station, the airplane descended to an altitude of 1,100 feet above mean sea level.^{2/} After crossing the radio range station at this altitude, descent

^{2/} The elevation of the Lambert-St. Louis Airport is 540 feet above sea level.

was immediately started toward the field. The airplane came out of the overcast east of the field at an altitude of about 400 feet in the vicinity of the Wabash Railroad tracks which run north of the field, and proceeded toward the airport flying at an altitude of 350 feet. Upon reaching the eastern boundary of the airport,^{3/} the Captain observed that he was somewhat south of the No. 1 runway. He then flew in a west-northwesterly direction underneath the ceiling and crossed the north side of the field at the end of runway No. 3. In his testimony Captain Susott stated, "At this time and also previously, my plan was to land on runway No. 4 as I had been given a choice to land on runway No. 4 or No. 1 and because previous weather reports indicated I would have a northeasterly wind, or there had been a northeasterly wind, I had reason to believe we at that time still had easterly wind, although probably on the ground itself it might be practically calm."

After passing the northern boundary of the airport he proceeded westward and observed that the scattered clouds which had previously been reported were lying so close to the western boundary of the airport that in order to line up for a landing on No. 4 runway his visibility would have been reduced below the minimum of one mile. Therefore, he elected to come in on the No. 1 runway. He then made a gradual left turn and continued around the south side of the field, keeping the field in sight on his left and flying in an easterly direction.

^{3/} See sketch of airport opposite page 5.

PREPARED BY DE KIRCHMANN
AS TOLD BY CAPT. SUSOT

CONTACT 10-12-40

100' 110'

60'

1097

76°

AIRPORT

EE-337

195'

S-STAR
A-FUN

PREPARED BY [unclear]

Fig. B

He said, "I had to make a plan how my landing would be made. On previous flights I had been told by the tower that we should land at least 1,000 feet up on runway No. 1 because of the equipment, loose dirt spilled on the runway, and traffic equipment across this runway; also because of this information I had on previous flights I felt that I would land, or plan my landing rather, to strike runway No. 1 in the vicinity of the north and south taxi strip, which is, I would say, somewhere between 1,500 feet and 2,000 feet from the east end of the runway. Also, now that I have passed this south side of the field, I am flying away from the field and at an altitude of about 350 feet, because that was my minimum I felt I could fly safely around the circle. I had to use some means of not going out too far east, I only had one mile visibility, so my plan was, and which was followed, to use the south leg [of the St. Louis range] as a turning point to start my turn coming back towards the field. This turn was begun when we reached the twilight zone on the south leg, and continuing . . . a very short distance . . . to the west side of the range station. I know it was a very short distance because in the sweep of the turn I saw the range station and I had also at this point received the radio signal that the range station was there. After passing the range station it was next in order to line up or rather continue back to the field in a westerly direction. The range station being 2-1/4 miles from the field, my visibility reported as one mile, could not leave me see the field from the range station, therefore I still

had and was using the beam to guide me from the range station to the field. In other words, it is an auxiliary aid. . . and it assured me of returning in a westerly direction to the field. . . . I felt that coming down this beam I would be fairly well in line with this runway and also the point at which I had planned to land on . . . I picked up the approach lights some distance ahead and off to my left. Having picked up the approach lights, I slowed down the ship . . . and I was going to prepare the ship for landing and following the approach lights we lost some altitude, the exact amount I am unable to say, as I was watching the approach lights off to my left.

"I naturally wanted to see if my line of landing was coming pretty well in order. Looking over the front of the ship's nose and through the front windshield which had a light rain on the windshield I looked through and saw these poles. There were some partly ahead of me, of course, with red lights on top of them, but they were absolutely in my line of flight. I was still above the height of the poles. I changed the line of flight.

"Making this turn I did not feel that it was very advisable to use flaps and turn; this turn was made to my left to avoid striking, or to avoid continuing in a straight line and coming -- maybe missing the poles, but it looked too close. This turn was made rather sharply, naturally being somewhat surprised to find the poles in my line of flight, then I decided after making this turn and crossing the runway that there was still plenty of room in the airport to land the airplane successfully, so I again turned the ship to the right trying to parallel runway No. 1.

" . . . I found that I was over a portion which looked to me to be that portion of the airport which I had heard of and had read about as being the 'fill' portion of the airport . . . and naturally I had to use power . . . to drag [i.e., fly] across this fill portion of the airport. However, at that time, I had made up my mind that if I was not on the ground by the time I crossed this north runway No. 6 and No. 3, I would go around! . . . we crossed this fill portion and the motors were snapped back immediately and the ship was allowed to rest on the ground. I noticed I hadn't crossed this runway so I let the ship rest on the ground and continued to roll. We crossed this runway and about somewhere in this vicinity I started to apply the brakes . . . It came as rather a surprise to me that I was getting very little results from my brakes . . . After I felt that at this point where I wasn't getting the proper braking that there was a possibility that I might have to ground [loop] the ship, so I immediately released the [tail] wheel and by that time I attempted to ground loop. This attempt to ground loop was made by using the right rudder and the right brake. My speed at this time was not sufficient to have enough force on my rudder to turn the ship or the brake I was using -- right brake -- did not answer my call; later finding out skidding. After trying this ground loop there was only one question, to go straight ahead, or attempt to take off again, which was out of the question because of the obstructions shortly ahead of me. Crossing the boundary of the field and seeing . . . this ditch [Cold Water

Creek/ it looked to me like we would either roll in it or to the edge of it, however, in my opinion it was so close I felt the switches had better be cut, and I immediately signaled Phillips to cut the switches, and he cut the single ignition switch and I cut the master switch. At no time after the ship was on the ground were the motors used and I think I have just taken me right up to the edge of the ditch now. From there on we just go in."

Captain Susott estimated that the airplane was travelling between 80 and 90 miles per hour at the time it contacted the ground in the landing and between 10 and 15 miles per hour when it rolled into the ditch.

First Officer Phillips and Flight Stewardess Arnestad corroborated the testimony of Captain Susott.

The chief control tower operator on duty at the airport, Mr. Straub, also testified as to the flight and landing of the airplane. He said, "At 2:42 p.m., the first instrument approach of Flight 9 was observed coming in over the east-southeast corner of the field and was headed in a generally northwesterly direction. It passed over the field, I would say roughly at about 300 feet, flying as it appeared to me, he was flying level, making no attempt at descent and disappeared northwest . . . He was then observed to approach at 2:47 or just prior to 2:47 p.m. again over the east-northeast corner of the field which is east of the Curtiss-Wright building; I would say it appeared to be just about over the Coldwater Creek at that corner of the field and it seemed to me he was travelling in a southwesterly direction and I noticed the

ship making a gliding right turn, in other words, he was coming in from his right turn and he continued in that turn until he was well within the boundaries of the field and from my position in the tower it looked as though the ship might have made ground contact somewhere very close or just east of the spot which is approximately in the center of the field and from that point in the ship continued and so far as I could determine, more or less in a straight line until it crashed into the ditch in the southwest corner of the field. . . ."

Mr. Straub further stated that although a light rain was falling at the time of the landing, the visibility was fully a mile. His estimate was based on the observation of objects located a mile distant from the control tower.

The airplane came to rest in Coldwater Creek which extends along the south boundary of the Lambert-St. Louis Airport. The nose section was telescoped when it struck the south bank of the creek but the airplane remained in an upright position.

An examination of the wheel tracks made by the airplane during the landing showed that the plane contacted the ground travelling on a heading a little south of west. From the point of first contact with the ground to the point where the accident occurred is approximately 1,875 feet. An examination of the wheel tracks showed deeper impressions at different points which indicated that the brakes were being applied off and on as the airplane progressed across the field. Captain Susott testified that the brakes were functioning normally

when used on the Municipal Airport at Chicago. Moreover, the variance of the depth of the wheel tracks on the Lambert-St. Louis Airport indicates that the brakes were operating properly during the landing but very little traction could be obtained at the time due to the wet condition of the field upon which the landing was effected.

Conduct of the Flight

During the investigation, consideration was given to the way in which all concerned with the flight performed their duties and the manner in which all of the equipment involved in the flight operated. Captain Susott and First Officer Phillips agreed that the engines, propellers, airplane controls, and radio equipment were functioning normally during the entire flight. While there is some evidence that there was a dog leg or bend in the west leg of the St. Louis radio range at the Lambert-St. Louis Airport on December 11, 1940, it does not appear that this condition contributed in any manner to the accident. The weather forecasts and observations upon which Captain Susott depended were made without substantial error and the dispatching by American Airlines' personnel was in accordance with proper procedure.

With the ceiling and visibility at the minimums prescribed by the Civil Aeronautics Administration for the operations of American Airlines at the Lambert-St. Louis Airport and with special caution indicated by those conditions, we find that the landing of NC 16015 by Captain Susott involved errors of technique, knowledge, and judgment.

Captain Susott testified that he was north of a proper alignment with the No. 1 runway upon his final approach and it was evident that this misalignment was responsible for his discovering that the poles would be in his line of flight. A more exact flight path might reasonably have been expected under the circumstances since Captain Susott not only was aware of the location of the west leg of the range station, which he had used as an aid in his orientation, but he also had the benefit of the neon approach lights which were seen by him to his left. These lights extend some 1,500 feet from the airport boundary and thereby provide ample distance for a correct alignment with the No. 1 runway, regardless of how far along that runway the actual landing is planned.

It is possible that if the poles had not been there and the flight path of the airplane had been continued without interruption, Captain Susott could have landed on the No. 1 runway at approximately where he had intended since he would have had an additional 1,500 feet in which to align himself for the final landing. However, Captain Susott was "surprised" to discover the poles in his flight path notwithstanding the fact that he testified that he had seen the poles on a previous flight. This indicates an error in knowledge on the part of Captain Susott in forgetting that the poles were on the airport.

Under all the circumstances which existed at the moment when he discovered that the poles were in the path of his approach for a landing, we find that there was an error in judgment on the part of Captain Susott in undertaking the series of maneuvers he performed in order to make a landing. In addition to minimum ceiling and visibility, conditions at the airport were made worse by the presence of low-lying scud. A light rain was falling,

thus still further reducing the visibility from the cockpit and making the airport surfaces slippery. He could have anticipated that his brakes would for this reason be ineffective on the turf and that he would not have positive control of the airplane after he had actually landed. Furthermore, such wind as had been reported was somewhat unfavorable for a landing on No. 1 runway and even more unfavorable for the direction in which the final landing actually was made. In view of these factors we consider that Captain Susott did not exercise sound judgment in continuing to a landing after finding it necessary to change his flight path to avoid the poles. Captain Susott should have applied power, pulled up and proceeded to his alternate, abandoning all attempts to land at St. Louis.

Ceiling and visibility minimums have been established in order that all concerned may have available reasonable standards below which no operations are permitted. When weather conditions reach the minimum standards permitting operations, that in itself should be no indication to pilots or other operating personnel that landings should be made. On the contrary, when weather conditions have reached the minimums, there is a corresponding increase in responsibility upon a pilot to make sure that all other conditions are favorable for continued operations or a landing, and pilot technique, knowledge, and judgment then are thrown into bold relief as being of primary importance.

CONCLUSION

Upon all of the evidence available to the Board at this time, we find that the facts relating to the accident involving NC 16015 which occurred near St. Louis, Missouri, on December 11, 1940, are as follows:

1. The accident, which occurred at approximately 2:47 p.m., December 11, 1940, to American Airlines' Trip 9 of that date, resulted in major damage to aircraft NC 16015 and injuries to two passengers and two members of the crew.

2. At the time of the accident, American Airlines held a currently effective and appropriate certificate of public convenience and necessity and an air carrier operating certificate.

3. Captain Susott and First Officer Phillips were physically qualified and held proper certificates of competency to operate as air carrier pilots over the route between Chicago, Illinois, and St. Louis, Missouri.

4. Aircraft NC 16015 was currently certificated as airworthy at the time of the accident.

5. Trip 9 was cleared by the company flight dispatcher in accordance with proper procedure from Chicago, Illinois, to St. Louis, Missouri.

6. At the time of departure from Chicago the gross weight of the airplane did not exceed the approved gross weight and its load was properly distributed with reference to the location of the center of gravity.

7. At the time of departure from Chicago to St. Louis, the airplane carried sufficient fuel to permit flight at normal cruising power to St. Louis and thereafter for about six hours, thus making available to Captain Susott a choice between a number of alternate airports.

8. Trip 9 proceeded without incident from Chicago until it arrived over the St. Louis radio range station at 2:31 p.m. at an altitude of 1,600 feet.

9. Captain Susott then executed a standard instrument let-down-through procedure and broke out of the overcast east of the Lambert-St. Louis Airport at an altitude of 400 feet above the level of the airport.

10. The condition of the airport had been affected by the construction of 60-foot poles just north of the east end of the No. 1 runway, by the accumulation of mud on the No. 1 runway about 1,500 feet from its east end, and by the filling of a low area in the southeast portion of the airport; these conditions were known to Captain Susott.

12. The ceiling at the airport was 400 feet, with lower scattered clouds at 200 feet; the visibility was one mile and light rain was falling.

13. After breaking out of the overcast, Captain Susott planned to land toward the east on the No. 4 runway but was unable to do so because of the poor visibility resulting from the presence of low-lying scattered clouds west of the airport.

14. Captain Susott then attempted to land toward the west on the No. 1 runway but missed his approach and found himself headed directly toward the poles, previously referred to, which are located on the north side of the runway.

15. Captain Susott turned sharply to the left to avoid the poles and then to the right in an effort to line up on No. 1 runway. This maneuver placed him south of the runway, in spite of which he elected to continue to a landing on the turf beyond the fill in the southeast corner of the airport.

15. The wheels of the aircraft first touched the ground approximately 1,875 feet from Coldwater Creek, which runs near the boundary of the airport on the south and west.

16. Due to the limited area available and the slippery condition of the turf, Captain Susott was unable to bring the aircraft to a stop before it rolled into the creek.

17. Aircraft NC 16015 and all of its equipment functioned normally during the entire flight.

18. The weather forecasts and observations upon which Captain Susott depended were made without substantial error.

19. The airway aids to navigation available for use by Captain Susott were functioning satisfactorily.

Probable Cause

Upon the basis of the foregoing findings of fact and upon all of the evidence available to us at this time, we find that the probable cause of the accident to NC 16015 (American Airlines' Trip 9) on December 11, 1940, was the clearly incautious attempt by the pilot to land the airplane under circumstances unfavorable to a safe landing.

Recommendation

The Board has recommended to the Administrator that the weather letters of competency issued by him to air carriers be amended to provide that when a solid cloud cover prevails at an altitude of 800 feet or less and the horizontal visibility is officially reported to be less than five miles, the height of the ceiling shall be from the base of the lowest cloud form

officially reported. The Board suggested that this recommendation be made effective and enforced until such time as additional studies indicated that other action of a more fundamental and permanent character should be taken. The Board has been advised by the Administrator that this recommendation has been carried into effect.

BY THE CIVIL AERONAUTICS BOARD:

/s/ Harllee Branch
Harllee Branch, Chairman

/s/ Oswald Ryan
Oswald Ryan, Member

/s/ G. Grant Mason, Jr.
G. Grant Mason, Jr., Member

/s/ George P. Baker
George P. Baker, Member

(Mr. Edward P. Warner, Vice Chairman, did not take part in the adoption of this report and recommendation.)