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AIRCRAFT ACCIDENT REPORT

FEDERAL AVIATION ADMINISTRATION
DOUGLAS DC-3C, N7
LaGUARDIA AIRPORT, NEW YORK
JANUARY 4, 1971

Adopted: JUNE 3. 1971

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D. C. 20591
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16. Abstract A Federal Aviation Administration Douglas DC-3C, N7, crashed approximately 2,000 feet short of the approach threshold of Runway 4 at La Guardia Airport, New York, January 4, 1971, at 1832 e.s.t. The crew was attempting to fly an Instrument Landing System approach in instrument meteorological conditions, at night. The La Guardia weather reported 3 minutes after the accident was: "... 200 feet scattered, measured 300 broken, 600 feet overcast, visibility 1½ miles, light rain, fog, wind 060° at 11 knots, altimeter 29.83 inches, ... Runway 4 visibility 2 variable to 3 milrs."

The Board determines thst the probable cause of this accident was: The failure of the pilot to recognize the windshear condition and compensate for it; the lack of crew coordination in that the copilot did not monitor the approach due to a Self-induced communications problem and failed to warn the pilot that the aircraft was too low; and the diversion of the pilot's attention from his primary task of completing the approach and landing. These conditions resulted in a mismanaged ILS and landing approach and the continuation of the descent into ground obstructions.

The Board recommends tha: the FAA take action to remove or mark the obstructions in the approach area at La Guardia.

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SYNOPSIS

A Federal Aviation Administration Douglas DC-3C, N7, crashed approximately 2,000 feet short of the approach threshold of Runway 4 at La Guardia Airport, New York. The accident occurred at 1832 e.s.t., January 4, 1971, while the crew was attempting to fly an Instrument Landing System approach in instrument meteorological conditions, at night.

The two pilots—the only occupants of the aircraft—received serious injuries and the aircraft was destroyed.

The La Guardia weather observation provided to the pilots for the approach was: "200 feet broken, 400 feet broken, 600 feet overcast visibility 1-1/2 miles in light rain and fog; wind 060° at 13 knots; Runway 4 visual range 1-7/8 miles variable to 3 miles."

The Board determines that the probable cause of this accident was: The failure of the pilot to recognize the wind shear condition and compensate for it; the lack of crew coordination in that the copilot did not monitor the approach due to a self-induced communications problem and failed to warn the pilot that the aircraft was too low; and the diversion of the pilot's attention from his primary task of completing the approach and landing. These conditions resulted in a mismanaged ILS and landing approach and the continuation of the descent into ground obstructions.

The Board recommends that the FAA take action to remove or mark the obstructions in the approach area at La Guardia.

INVESTIGATION

N7 was returning from an administrative flight which had provided transportation for FAA personnel from La Guardia to Johnstown, Pennsylvania, with an intermediate stop at Pittsburgh, Pennsylvania. The aircraft left Pittsburgh with a nearly full fuel load and flew to Johnstown, a flight of approximately 32 minutes.

The crew received a weather briefing at Johnstown and, after a delay of just over 1 hour, the flight departed for La Guardia at 1711 e.s.t.[1] The estimated time en route from Johnstown to La Guardia was 1:45 hours.

Arriving in the New York area, the flight was radar vectored to the Instrument Landing System (ILS) final approach to Runway 4 at La Guardia via the Prospect Intersection.

The pilot stated that he was flying the aircraft during the approach. An airspeed of approximately 140 knots was maintained as the flight

[1] All times are eastern standard, based on the 24-hour clock.

proceeded to the Prospect Intersection to prevent the delay of traffic behind. He said that he used one-quarter flaps approaching the Prospect Intersection and one-half flaps from there on. He planned to maintain an airspeed of 120 knots until he reached visual flight conditions and then to reduce the airspeed to 95 knots "over the fence."

The pilot-in-command stated that the copilot called runway in sight about 600 or 700 feet mean sea level,[2] and the pilot could see the approach lights and runway lights at that time. The pilot said that there was something that caused the lights to look fuzzy but he didn't know whether it was glaze ice on the windshield or fog.

The pilot said that the localizer was "pretty well locked" during the approach and the glide slope was "in the ball park." He planned a rate of descent of 300 to 500 feet per minute but did not recall the actual rate he used. He said he used 15 to 18 inches of manifold pressure during the initial part of the approach from Prospect Intersection.

The visibility conditions existing after he broke out of the clouds caused the pilot to consider going around; however, he rejected the idea because he had the runway in sight and was aligned with the centerline of the runway. He thought he called for full flaps after breaking VFR and that he increased the manifold pressure to approximately 23 inches. He estimated that he divided his attention equally between the windshield and the instruments after he first saw the approach lights. He had no recollection of the crash or that one was imminent.

The copilot said that as they broke out of the clouds, the ILS instrument showed approximately a two-thirds scale "fly right" for the localizer and an approximate "1 dot fly down" indication for the glide slope. He called this information to the pilot's attention. The copilot did not recall specific airspeeds or the position of the landing flaps. He did recall that the landing gear and flaps were extended.

The copilot said that he tuned both navigational receivers to the ILS frequency, 109.9 MHz, and that he tuned the tower frequency, 118.7 MHz, and the approach control frequency 128.8 MHz on the communication receivers.

He also stated that about 400 feet when the aircraft was clear of clouds in a right turn, the runway lights and approach lights were in sight at about "1:00" (approximately 30° right of the nose of the aircraft). About this time, the copilot attempted to contact the tower for clearance to land. He was unable to establish communication with the tower and his attention was then directed into the cockpit in an effort to determine the cause of his difficulty.

The copilot's next recollection was that of receiving a landing clearance and then looking out to see the approach and runway lights ahead and feeling as though the aircraft was flying up to them. He felt that the aircraft was too low but if they didn't encounter an obstacle, they might have a chance to "make it." He did not recall adding power, pulling back on the wheel, or calling out to the pilot, but he did remember seeing a telephone pole as he looked up. Shortly thereafter, the right wing struck the pole, causing the aircraft to yaw and the right wing to go down. He had no recollection of the crash or how he got out of the aircraft, and the next thing he remembered was awakening in the hospital.

The FAA General Manual for Operation of FAA Aircraft, Chapter 5, Paragraph 151, Change 12, regarding altitude awareness, stated in part:

> d. Pilots shall complete the final checklist prior to or as soon as practicable after the final approach fix.
>
> e. During final approach, the pilot not flying should check and call out as appropriate:
>
> (1) The final fix inbound for altimeter and instrument cross-check and flag warnings. During a flight director or an autocoupled approach both pilots should confirm proper flight director/autocoupler mode, and glide

[2] All altitudes are mean sea level unless otherwise indicated.

slope lock-on as appropriate. Raw ILS data should be monitored during approach and significant excursions called out by the pilot not flying.

(2) Five hundred feet above field elevation. Cross-check of altimeters, instruments, and flag warnings. Thereafter, he should call out significant deviations from programmed airspeed, rate of descent and instrument indicators.

(3) One hundred feet above minimum descent altitude or decision height.

(4) Minimum descent altitude or decision height.

(5) Approach, strobe, or centerline lights 'in sight', or 'runway in sight' or 'no runway in sight'.

. . . . .

The copilot stated that he called "runway in sight" but did not make any altitude calls after that because they were "visual." There is no indication that any altitude calls were made between the outer marker and the accident site.

Ground witnesses stated that the aircraft was very low. Two of them said that it was headed across the extended centerline of Runway 4 from left to right and made a turn back to the left just before the crash. None of the witnesses reported any unusual sound or condition other than that the aircraft was very low. A number of them reported seeing one or two large white lights. The copilot said he did not believe the landing lights were on. He also stated that the windshield wipers were not on.

At an altitude of 55 feet, the aircraft first struck a street light, approximately 2,747 feet short of the threshold of Runway 4. The approximate position of the wreckage was latitude 40° 47' N., longitude 73° 52' W. The aircraft traveled approximately 700 feet, damaging approach lights and knocking down utility poles, until it came to rest, inverted, against a residence approximately 2,000 feet from the threshold of Runway 4 and about 100 feet right of the extended runway centerline. The ground elevation at this point is about 33 feet.

The two pilots, the only occupants of the aircraft, received serious injuries, and the aircraft was destroyed.

Damage to public and private property included approach lights, a street light, utility poles and lines, two automobiles, and minor damage to one house. There were no injuries to persons on the ground.

Both pilots were properly certificated and were qualified in the DC-3 in accordance with existing FAA regulations.

The pilot-in-command possessed an Airline Transport Pilot Certificate and was type rated in the DC-3. His first-class medical certificate was issued May 7, 1970, and required that he "possess correcting lenses for near vision." He was wearing half lens glasses correcting near vision only, during the approach. He also had an administrative waiver on his hearing ability.

The pilot-in-command had flown a total of approximately 9,711 hours, including about 112 hours in the DC-3. He was initially qualified in the DC-3 on April 9, 1965, and had flown the aircraft 27:44 hours since July 1, 1970, and 25:12 hours in the 90 days preceding the accident.

The copilot also possessed an Airline Transport Pilot Certificate and a DC-3 type rating. His first-class medical certificate was dated March 27, 1970, and contained a limitation that he "must possess corrective lens for near vision." He stated that he had his glasses in his possession on this flight but was not wearing them during the approach.

He had flown approximately 9,169 hours, which included approximately 470 hours in the DC-3. He had flown the DC-3 15:06 hours in the 90 days preceding the accident.

The pilot-in-command had logged 12 ILS approaches in the preceding 6 months and the copilot had logged six.

These pilots had flown together twice since November 1970.

The aircraft had been maintained in accordance with existing FAA regulations. The weight and center of gravity were within limits at the time of the accident. The aircraft was fueled with 100- to 130-octane aviation gasoline.

The weather in the La Guardia area was characterized by low clouds, and visibility was restricted by light rain and fog. The controlling weather observation was taken at 1753 and was: "Measured 200 feet broken, 400 feet broken, 600 feet overcast, visibility 1-1/2 miles, light rain, fog, temperature 38°F., dew point 34°F., wind 060° 13 knots, altimeter setting 30.00 inches, Runway 4 visibility 1-7/8 variable to 3 miles 200 feet broken variable to scattered."

Another observation, made 3 minutes after the accident, was in part: "... 200 feet scattered, measured 300 feet broken, 600 feet overcast, visibility 1-1/2 miles, light rain, fog, wind 060° 11 knots, altimeter setting 29.98 inches, Runway 22 visibility 2-1/4 miles, Runway 4 visibility 2 variable to 3 miles."

The nearest winds aloft observation was reported at 1815 at Kennedy International Airport. That report was in part:

Height (Feet m.s.l.)	Direction (Degrees True)	Velocity (Knots)
Surface	220	5
+43	215	14
1,000	215	26
2,000	220	46
3,000	220	56
4,000	225	60
6,000	235	61

The freezing level was near 9,800 feet m.s.l.

The pilots stated that they broke out of the clouds between 400 and 700 feet. They both recalled seeing the approach lights as well as the runway lights for the full length of the runway.

The ground witnesses reported rain and fog in the accident area.

The pilots received a weather briefing at Johnstown before their departure for La Guardia and also received the current weather at La Guardia before making the approach.

The accident occurred in darkness below an overcast.

The navigational aids available to the flight included a full ILS, outer marker, middle marker, TACAN, and nondirectional beacon. These facilities were in use prior to and after the accident, and were flight-checked on the morning of January 5, 1971. The flight check indicated that all of the aids were operating within the established limits.

Air-to-ground communications were without reported discrepancies until the flight was requested to change to the tower frequency of 118.7 MHz, 1 mile southwest of the Prospect Intersection. The crew acknowledged these instructions but the aircraft continued to transmit on 128.8 MHz, an approach control frequency. Approximately 4 minutes later, 12 seconds before impact, the aircraft transmitted on 118.7 MHz, asked if they were cleared to land, and acknowledged the clearance they received. This was the last transmission received from the aircraft.

The current approach plate for the ILS approach contained a caution note which stated: "CAUTION: Standard clearance not provided over obstruction in final approach area ... unlighted obstructions in approach zone (Runway 4) protruding 40 feet above lights at beginning of approach light lane and decreasing to 10 feet above lights at 1,000 feet from approach end of runway." The height of the approach lights was approximately 42 feet and ground elevation varied from 25 to 35 feet. Other obstructions in the approach area extended approximately 82 feet above sea level or 47 to 57 feet above the ground. None of the objects struck by the aircraft exceeded an elevation of approximately 65 feet or approximately 30 feet above the ground.

Information gathered during the investigation indicated that the following items were among those that intruded into the final approach surface:

Item	Reported elevation m.s.l.	Ground elevation m.s.l.	Item height	Maximum allowable	Intruded by
Street Light*	55 ft.	26 ft.	29 ft.	18 ft.	11 ft.
Telephone pole*	62 ft.	32 ft.	30 ft.	12 ft.	18 ft.
" "	65 ft.	35 ft.	30 ft.	9 ft.	21 ft.
" "	55 ft.	26 ft.	29 ft.	18 ft.	11 ft.

*Struck by aircraft N7

The published minimum altitude over the outer marker was 1,325 feet. The ILS had a 3° glide slope and the published minimum for the ILS approach was 400 feet and 3/4 mile with an airport elevation of 21 feet.

The aircraft came to rest against a house and was aligned on a magnetic heading of 175°. The landing gear was extended as were the flaps. The degree of flap extension could not be determined accurately; however, the flaps appeared to be down about 50 percent.

The right wing had separated from the aircraft and was found about 225 feet southwest of the main wreckage area.

Both powerplants were in the primary wreckage area and examination of them showed no evidence of failure or malfunction prior to impact.

The pilot stated that he did not experience any significant difficulty or failure of the aircraft, the powerplants, or any aircraft system. The following components were taken to the National Aviation Facilities Experimental Center at Atlantic City, New Jersey, for a functional check:

No. 1 Glide Slope Receiver
No. 2 Glide Slope Receiver
No. 1 Course Indicator (Omni-mag)
No. 2 Course Indicator (Omni-mag)
Course Deviation Indicator
No. 1 VOR/LOC Receiver
No. 2 VOR/LOC Receiver

The two glide slope receivers were operational: The glide slope and localizer functions of the No. 1 course indicator (Omni-mag) were operational; the glide slope function of the No. 2 course indicator (Omni-mag) was operational, but the localizer function did not operate. The glide slope and localizer functions of the course deviation indicator were operational.

Damage to the Nos. 1 and 2 VOR/LOC receivers precluded functional checking. The pilot's and copilot's altimeters were taken to the manufacturer for examination. The examination disclosed no preexisting descrepancies. The visible impact damage to the internal components of the altimeters was repaired, both altimeters were tested, and they operated smoothly. This examination indicated that both altimeters were capable of normal operation prior to impact. Both altimeters had been properly set at 29.98 inches of mercury.

The navigational and communication radios were examined and were found to be set at the following frequencies:

No. 1 Navigation Receiver	109.9 MHz	(ILS)
No. 2 Navigation Receiver	118.7 MHz	(Tower)
No. 1 Communication Transceiver	123.6 MHz	
No. 2 Communication Transceiver	118.7 MHz	(Tower)
No. 1 Automatic Direction Finder	322 kHz	(Outer Marker- 332 kHz)
No. 2 Automatic Direction Finder	335 kHz	

A fire occurred in the primary wreckage area. The fire was extinguished by New York Port Authority fire trucks and damage was confined to the aircraft. Fire damage was reported in the cabin area and at the leading edge of the center wing, inboard of the right engine nacelle.

Neither pilot recalls how he got out of the aircraft. Rescuers found the copilot clear of the cockpit standing near the nose of the aircraft. He was led from the area and taken to the hospital by police car. The pilot was seen crawling from the wreckage and falling into a stairwell just south of the nose section. He was taken from the stairwell and moved to the hospital by ambulance.

The cockpit structure was destroyed. The copilot's seat belt was found buckled and separated from both attach points. The pilot's seat belt was unbuckled and attached to the seat.

A number of flightcrews who conducted ILS approaches to Runway 4 before and after the accident were interviewed. They indicated that the weather in the approach area was as good or better than reported. One crew reported that the glide slope was not exactly as they expected it to be in that it appeared to be too low at the outer marker and had a slight hump after passing the marker. They also reported that they used a rate of descent nearly double their normal rate to stay on the glide slope from the outer marker down to about the minimum altitude. At that point, they had to increase engine power above normal to reduce their rate of descent enough to stay on the glide slope. From the middle marker to touchdown, power requirements and rates of descent were reported to be normal, and no other difficulties were encountered during the approach or landing.

An air carrier flight operating a B-727 made an autopilot coupled ILS approach and landed about 2 minutes before the accident. The crew of this aircraft reported that they encountered a tailwind which required a rate of descent of 1,200 feet per minute to stay on the glide slope. The effect of the tailwind began to decrease about 1,000 feet above the ground and by the time the aircraft was at 400 feet, the power setting had been increased to stabilize the rate of descent at 600 feet per minute. This crew saw the approach lights at 400 feet.

Another B-727 made a coupled autopilot ILS approach to Runway 4 and landed 2 minutes after the accident. The crew of this flight reported that from the outer marker inbound, the rate of descent was 600 to 700 feet per minute. The power settings, airspeeds, instrument indications, and rate of descent were normal throughout the approach. This crew noted no wind shear but was aware of a headwind.

ANALYSIS

The aircraft, powerplants, and associated systems were not factors in causing the accident. The flightcrew reported that they had no significant problems with the aircraft and their evaluation was borne out by the investigation.

The navigational aids used by the flight were operating normally and their operation did not contribute to accident causation.

The flight into La Guardia was normal and without reported difficulty until the aircraft approached the Prospect Intersection.

During the approach to Prospect, the captain was using a relatively high airspeed to prevent the delay of traffic behind. He started the descent later than he would have liked and he used a relatively low power setting to lose altitude more rapidly with a higher-than-normal sink rate. The aircraft passed Prospect Intersection slightly above 2,500 feet m.s.l., the minimum altitude for that point. It was on the localizer course at that time and power was reduced to 15 to 17 inches manifold pressure, and the pilot attempted to maintain an indicated airspeed of 120 knots. That airspeed would have required a rate of descent of 626 feet per minute under no wind conditions to follow the 3° glide slope.

According to the controller's recollection, the aircraft passed the outer marker at approximately 1830:19 and the accident occurred at

approximately 1832. The distance traveled during that period of time was 3.6 nautical miles and the altitude lost was approximately 1,300 feet, if the aircraft was at the prescribed altitude over the marker. The average groundspeed was approximately 128 knots and the average rate of descent was approximately 770 feet per minute.

There was a warm front between the Kennedy and La Guardia airports and the winds aloft were southwesterly and quite strong, while the surface wind was from the northeast and relatively gentle. The winds aloft were causing increased ground speeds during the initial part of the ILS approach as indicated by the statements of other pilots who had to use higher-than-normal rates of descent to stay on the glide slope; however, some pilots did not report high descent rates. The power settings and flap extension used by the pilot of N7 indicate that he was using a higher-than-normal rate of descent. However, the captain said he was not aware of any wind shear but probably should have been, based on the tailwind en route and the direction of landing. He also said shear was not mentioned in the radio weather reports and he did not realize its effect on the approach at the time.

In those cases where other pilots used high descent rates, they reported that at about 400 feet, the rate of descent required to hold the glide slope decreased, which indicated that their groundspeed decreased significantly.

It was at about this height, 400 feet above the ground, with the aircraft high and to the left of the glide slope, that the crew of N7 probably established visual contact and were able to see the approach and runway lights. After calling the runway in sight and the position of the aircraft relative to the glide slope, the copilot concentrated his attention in the cockpit to attempt to obtain a landing clearance.

The pilot has stated that he divided his attention equally between outside references and the flight instruments. He was concerned about the restriction to visibility and had considered making a missed approach. The Board believes that he might also have been devoting some of his attention to the copilot's attempts to contact the tower because the flight did not have a clearance to land.

The position of N7 upon attaining visual flight conditions required a right turn and an increased rate of descent to return to the localizer and the glide slope. These corrections were made visually; later a turn back to the left and a decrease in the rate of descent were initiated.

There was moisture on the windshield from the rain and fog because the pilot did not turn on the windshield wipers. This condition can cause refraction which makes outside objects appear lower than they really are.

The Board believes that the aircraft broke out of the clouds with a higher-than-normal rate of descent due to the unreported tailwind which existed down to about 400 feet above the ground. The rate of descent was increased and a turn to the right was initiated to return to the ILS glide slope and localizer centerline. These corrections were probably made using visual references rather than flight instruments. As the aircraft descended, the requirement for the higher descent rate was reduced when the wind shifted to a headwind, but since the pilot was not aware of the wind shear and was not devoting full attention to the flight instruments, he apparently did not notice the change in glide slope indication.

No evidence of a power application was found. It appears that by the time the pilots realized they needed power, it was too late to apply it before they struck the approach lights. The copilot recalled realizing that they were too low; "flying up" to the runway lights; and striking a telephone pole. According to his statement, the approach was "visual" after they broke out of the clouds and his major concern was to get a clearance to land. He later stated that if he had not had the communication problem, he might have monitored the latter part of the approach and prevented the accident. Thus, it is apparent that there was no cross-check by the crew in the cockpit. Furthermore, the pilot's attention was diverted from the

instruments by his efforts to fly by visual reference to the lights, and he was probably further distracted by the copilot's activities in the cockpit as the latter attempted to solve the communication problem. These diversions coupled with the possibility of an optical illusion, which could have caused the pilot to believe he was higher than he actually was, and the existing wind conditions, resulted in an excessive descent rate which was not detected until it was too late to prevent the accident.

The Board considered the possibility that the corrective lenses required for both pilots might have played a part in the cause of the accident. The captain's glasses were intended to correct a near vision deficiency only and he was wearing his glasses during the approach. There was nothing in his medical record that indicated a deficiency of distance vision, depth preception, or other vision problems. The copilot was also reported to possess corrective lenses for near vision. He was not required to wear them while exercising the privilege of his certificate. The Assistant Eastern Regional Flight Surgeon, FAA, stated that the condition of the copilot's eyes should not have compromised his ability to see the radio frequency displays in the cockpit.

The Board determines that the probable cause of this accident was: The failure of the pilot to recognize the wind shear condition and compensate for it; the lack of crew coordination, in that the copilot did not monitor the approach due to a self-induced communications problem and failed to warn the pilot that the aircraft was too low; and the diversion of the pilot's attention from his primary task of completing the approach and landing. These conditions resulted in a mismanaged ILS and landing approach and the continuation of the descent into ground obstructions.

RECOMMENDATIONS

There are numerous obstructions in the approach area to Runway 4 that intrude into the airspace. Although not a direct causal factor in this accident, their lack of conspicuity may have shortened the warning time available to the crew. Therefore, the Board recommends that:

> The FAA, in conjunction with the appropriate local and Federal agencies, initiate a program to remove these obstructions. Pending this removal, these obstructions should be marked and lighted so as to be clearly detectable day and night.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

Isabel A. Burgess, Member, was absent and did not participate in the adoption of this report.

INVESTIGATION AND HEARING

Investigation

The National Transportation Safety Board received official notification of the accident about 1915 e.s.t., January 4, 1971. An investigative team was dispatched from Washington, D.C., by rail at 2215 e.s.t. The team arrived at the accident scene at 0410 e.s.t., January 5, 1971. An organizational meeting was held at 1000 e.s.t. and working groups were established for Operations, Witnesses, Air Traffic Control, Human Factors, Weather, Structures, Powerplants, and Systems. Parties-of-interest participating in the investigation included the Federal Aviation Administration, Pratt & Whitney Division of United Aircraft Corporation, and Butler Aviation. The United States Coast Guard had an observer present during the investigation.

The on-site investigation was completed on January 8, 1971.

N7 was a public aircraft and the investigation was conducted under the authority of a letter-of-agreement between the Administrator, Federal Aviation Agency and the Civil Aeronautics Board. This authority was transferred to the National Transportation Safety Board upon implementation of the Department of Transportation Act of 1966.

No preliminary report has been issued and no public hearing was held as part of this investigation.