File No. 1-0108

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: May 7, 1958 Released: May 14, 1958

NEW YORK AIRWAYS, INC., BELL HELICOPTER MODEL 47H, N 2492B,
FARMINGDALE, L. I., NEW YORK, OCTOBER 19, 1957

The Accident

A Bell Helicopter, model 47H, N 2492B, owned and operated by New York Airways, Inc., struck a flagpole and crashed at Farmingdale, Long Island, New York, on October 19, 1957, about 1232.1/ One of the two passengers was killed, the other passenger and the pilot were seriously injured; the helicopter was demolished. A small fire broke out but was quickly extinguished.

History of the Flight

The aircraft had been chartered to the Oil Heat Institute of Long Island. Aerial photographs were first to be taken of the Farmingdale area where the Oil Heat Institute had arranged a public gathering with a band, speakers, and a street parade of a number of their fuel oil trucks. Then the helicopter was to land near the assemblage at a prearranged time and deplane "Mrs. Long Island," a contest winner, whose arrival was to feature the occasion.

Captain Rushton, a NYA pilot, took off solo from the company's base at La Guardia Airport about 1055 and flew to the Roosevelt Shopping Center, eight miles distant. Landing at the Center was on a limed grass plot, in accordance with a prior briefing, and was under the control of a New York Airways employee on the ground.

A photographer and a public relations representative of the Oil Heat Institute were taken aboard. A flight of approximately 15 minutes was then made during which photographs were taken at and near Farmingdale, 12-1/2 miles distant. The helicopter then returned to the Center and landed uneventfully on the same site under ground control of the same company agent.

This agent then briefed the pilot on the landing to be made at Farmingdale. A site on the mall of the Long Island Agricultural and Technical Institute had been selected and approved previously by another NYA pilot. This site, and a nearby flagpole, were discussed by the agent and Captain Rushton who had a sketch of the area. The signal to land was to be an opened bed sheet spread on the ground by a company agent.

1/ All times herein are eastern standard based on the 24-hour clock.

Departure from the Roosevelt Shopping Center was upon notification by telephone from a representative of the Oil Heat Institute at Farmingdale. This call was received at approximately 1215, at which time a normal departure was made. Captain Rushton occupied the left seat, "Mrs. Long Island," the center seat, and the public relations man, the right seat, all three wearing conventional seat belts. An altitude of 500-700 feet was maintained to Farmingdale; "Mrs. Long Island's" home at Levittown, New York, was passed en route. The campus of the Long Island Agricultural and Technical Institute was circled to the left at an altitude of about 500 feet. During this time the pilot saw the folded bed sheet on the ground, presumed that it was the landing signal, and started his approach.

The descent approach into the mall was steep, over wires, and into the wind. (See attachment A.) The ground agent on the mall had not received instructions to display the landing signal, so he waved off the flight, the nearby bed sheet remaining folded compactly on the ground. Captain Rushton, observing the signal not to land, brought the helicopter to a height of about 10 feet and flew down the mall. After passing over the ground agent, the helicopter continued ahead climbing slightly and also turning slightly to its right. (Again refer to attachment A.) The main blades struck the flagpole on the left side of the aircraft (blades retreating).

The helicopter pitched down sharply and struck the ground 55 feet beyond the flagpole, on the bow of the left float. Almost immediately the bow of the right float struck, the forward portion of the fuselage telescoped severely, and the helicopter toppled to the left. Persons nearby quickly dragged out the occupants and put out a small fire.

Investigation

The flagpole which was struck is about 80 feet high. It was painted a drab bluish-green which would not contrast markedly with the general background. A flag about five feet by three feet at its top stood out with the wind toward the approaching helicopter. One blade of the rotor hit 21 feet and 8 inches above the ground and the other hit 3 inches higher, the first 3-1/2 feet from its tip and the other 4 feet from its tip. The pole was 8 inches in diameter where struck and was only slightly scarred; both blades were destroyed.

Although damage to the helicopter was extensive it was possible to check the continuity and functioning of all controls. Nothing was found to suggest that there had been any impairment of any control, and control difficulty was not suspected.

The helicopter was originally fitted with dual controls. Those for cyclic and collective pitch had been removed from the right side. The right rudder pedals remained and the passenger, seated on the right, had been admonished to keep his feet free of them. He did so, as far as can be ascertained.

The transparent cabin enclosure was partially broken upon impact with the ground. Rescue workers were reported to have kicked out some of the remaining plexiglass to facilitate extricating the occupants. The control pedestal, in the middle of the cockpit, was forced free of its mounting. There was marked deformation of the front part of the fuselage. The actual groundspeed at time of ground impact was low, possibly in the order of 20 knots.

The helicopter had been adequately maintained and was currently in an airworthy condition. All Airworthiness Directives and mandatory engineering bulletins had been complied with and a review of the logbook for the preceding nine months showed no significant discrepancies. A preflight inspection and runup were performed by a New York Airways mechanic, with the assistance of Captain Rushton, and the form for this work (M-4) was signed off as satisfactory by the mechanic about 10 minutes before departure from La Guardia Airport. At the time of the accident there were only 2 hours and 17 minutes operating time remaining prior to a company-required top engine overhaul and magnetic inspection of the engine mount assembly. This two hours would have been more than ample for return to the company's base at La Guardia Airport.

Fuel and oil screens were removed from the engine and inspected for foreign matter. None was found. The trap in the fuel system was also clean and the fuel being used was of the proper octane (91).

The engine was removed and sent to its manufacturer, Aircooled Motors, Inc., Syracuse, New York, for functional testing under the supervision of a Board engine specialist. No adjustments of any kind were made to the engine before testing. A four-bladed test (club) propeller was used to absorb the power. A number of engine runs made may be summed as follows:

Both magnetos had shifted by impact to positions which advanced the spark beyond the specified setting. With the magnetos remaining in their advanced settings the engine performed within four percent of its rated horsepower, all temperatures and pressures remaining normal. Upon retiming the magnetos to normal, the power output of the engine was equal to or better than when new, as shown by a comparison of the test results with the initial testing after manufacture. Throughout all tests the engine accelerated properly at various powers. Performance of the engine under test was entirely normal in all respects.

Captain Rushton was employed by New York Airways in December 1956. At that time he had a total of 4,800 hours of piloting, of which some 500 hours had been in helicopters. Between December 1956 and the date of the accident he had flown S-55 helicopters 478 hours; S-58's, 96 hours; and 47-H helicopters, the type involved in this accident, for 17 hours. His total time in 47-H's was about 100 hours. He was regularly employed as a line pilot flying scheduled runs in S-55 and S-58 aircraft, and flew the 47-H aircraft only on occasional charters. Two of these charters had been during the preceding week. Both the S-55 and the S-58 are flown from the right side; the 47-H is flown from the left side.

Captain Rushton was assigned by the company to fly this charter operation, in accordance with the terms of an employment contract between NYA and the Air Line Pilots Association. The selection of pilots is made as follows: The flight is offered for bid by company pilots and assigned according to seniority of the bidding pilots. If no bid is made pilot assignment is in the reverse order of seniority. Such was the case here, although company officials emphasized that low seniority does not in any way reflect lesser ability.

It is company policy to have proposed landing sites for charter operations first inspected from the ground, and approved, by a company pilot. For day operation, as in this case, the inspecting pilot is not necessarily the one who will fly the charter. For night operation the site is visited and passed upon by the pilot who is to fly. The site of the accident had been duly inspected

and approved by a company pilot. He had passed on his information and approval, with the flagpole shown on a sketch, to the company's chief pilot. The latter passed it on through company channels so that it was in Captain Rushton's possession at the time of the accident. As previously mentioned, the landing site was also discussed by Captain Rushton and the company agent at the Roosevelt Shopping Center immediately before the final takeoff.

Inspection and approval, by a company pilot, of the proposed landing site and adjacent obstacles indicated that the site was fully acceptable in all respects and was, in fact, regarded by the operator as suitable as CAA-approved heliports used by the company in its scheduled operations in the New York area.

Reference to the attachment, which is to scale, will show that there was actually room for the helicopter to have passed between the flagpole and the nearest tree, located in the circle, 78 feet east of the flagpole.

Captain Rushton testified that following his descent into the mall, over the wires and into the wind as shown on attachment A, he started to air taxi toward the company agent. The descent was steep using about 18 inches of manifold pressure at an airspeed of 30-40 knots. Almost at once he saw the wave-off signal. He applied the maximum engine speed of 3,100 r. p. m. and 28 inches of manifold pressure in preparation to climb and circle the area while waiting for the signal to land. At this time, the captain testified, he became aware of a 200 r. p. m. drop. About this time people on the ground noticed a slight lateral oscillation in the tail section. Captain Rushton reduced collective pitch and nosed down to maintain speed. The r. p. m. came back to a normal 3,100 and he then again increased the collective pitch to resume climbing. The captain's testimony continues that the r. p. m. again dropped about 200, whereupon he became concerned with finding a landing spot ahead. He did not start an autorotation type of descent because of danger to people who were, so the captain stated, moving into his path ahead. Instead he decided to try to reach a point to the right of and beyond the flagpole which was clear of people. At this time the rotor blades struck the pole. No backfiring or engine roughness was noted at any time by the pilot, the surviving passenger, the ground agent, or by people on the ground.

Captain Rushton stated that the tachometer needles (for engine and for rotor) never split. He also testified that he was not using carburetor heat as the carburetor air temperature needle was, and had been, in the green arc at 40-42 degrees c. He further stated that he was using full rich mixture.

The captain testified that he first saw the flagpole when he turned in over the wires at the southeast end of the mall. He could not say that he had it continually in sight as he approached it as he looked at instruments from time to time. He never did notice the flag at its top, which was some 50 feet above him, and which was standing out toward him.

At the time of the accident the gross weight of the helicopter was about 138 pounds less than the maximum allowable of 2,350 pounds, and its center of gravity was located within prescribed limits. The chief pilot for New York Airways testified that under the conditions of this accident, with the helicopter loaded as it was, and with the wind as it was, a loss of 200 r. p. m. as claimed, would be disconcerting but not in itself dangerous, and would not commit the helicopter to a landing. He pointed out that it would be accompanied by a loss of altitude, the amount of altitude loss depending on the abruptness of the r. p. m. drop.

The nearest weather reporting station to the crash site is Mitchell Air Force Base, about 12 miles away. Its official observation at 1225, seven minutes before the accident, was: ceiling 1,600 feet, light broken clouds, ceiling measured 2,200 feet, broken clouds, 7,000 feet overcast; visibility 20 miles; temperature 55 degrees F.; dewpoint 45 degrees F.; relative humidity 70 percent; wind northwest 12 knots; altimeter setting 29.85 inches Hg. Opinion of persons at the place and time of the accident was that the wind was from the northwest, possibly of 15 knots and slightly gusty. The company's operating limit for wind is 40 knots.

Analysis

In the investigation of the accident nothing could be found to account for the claimed power loss. As pointed out under investigation, the engine ran normally under test, delivering full power, and without adjustments of any kind. The Board must therefore conclude that there was no mechanical defect in the engine. Inasmuch as the atmospheric conditions were not favorable to the formation of carburetor ice and the fact that the captain testified that his air temperature gauge remained in the green (safe) arc, we may also conclude that there was no power loss because of carburetor ice.

What seems quite possible is that Captain Rushton, after accepting the wave-off, and applying more collective pitch to climb, did not coordinate his throttle motion with the motion of the collective pitch control. This would result in a decrease in r. p. m. which, however, should have been immediately recognized and remedied by using more throttle, as the proper synchronization of these two controls should be second nature to experienced helicopter pilots.

Even if there had been a power loss caused by a 200 r. p. m. drop, for which no explanation was found, and which the Board finds difficult to accept, it is questionable if it would have been sufficiently disconcerting to cause Captain Rushton to forget the flagpole ahead.

It has been mentioned that the tail of the aircraft was seen to oscillate (move laterally) at about the time of the attempted climb out. This also could have been caused by incompletely coordinated control, as helicopters with tail rotors require rather precise rudder control with any change of power if direction is to be maintained exactly. It seems most unlikely to have been caused by gustiness.

Captain Rushton was, as heretofore mentioned, more experienced, at least currently, on larger and heavier helicopters than he was on the Bell, although he had flown the Bell twice during the previous week. This fact may also be contributory to the aforementioned hypothesis of uncoordinated control at the time of the first power application to climb out.

In attempting to arrive at the probable cause of this accident it seems desirable to keep certain circumstances in mind. When Captain Rushton approached the company agent intending to land he was in full awareness of what was to be done. The wave-off, directly toward the flagpole, put in motion a new chain of events. Rushton had seen the flagpole from a considerable distance back, so he testified, but it is probable that its presence did not remain in his mind as an obstruction in the event of a wave-off which he did not expect. Presumably he continued ahead toward the pole until too late to avoid it and may well have misjudged his position relative to the pole.

Findings

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

1. The helicopter, its pilot, and the company were properly certificated.

2. The weight and center of gravity of the helicopter were within prescribed limits.

3. The intended landing site was suitable.

4. The weather was good and not contributory to the accident.

5. The ground control provided by the operator was adequate.

6. The pilot was briefed on the intended landing site and nearby obstructions, including the flagpole which was struck.

7. The pilot approached prematurely, mistaking the folded bed sheet for the landing signal, and then accepted a wave-off.

8. The engine did not malfunction.

9. The pilot was initially aware of the flagpole but, following the wave-off, either did not see it or misjudged his distance from it.

Probable Cause

The Board determines that the probable cause of this accident was the pilot's failure to attend to the flight path of the helicopter and avoid the known obstacle ahead after an unexpected wave-off.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ G. JOSEPH MINETTI

/s/ LOUIS J. HECTOR

SUPPLEMENTAL DATA

Investigation and Taking of Depositions

The Civil Aeronautics Board was notified of the accident immediately after occurrence. An investigation was started at once in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. In connection with the investigation, depositions were taken at New York, New York, on November 19 and 20, 1957.

Operator

New York Airways, Inc., is a Delaware corporation with general offices at La Guardia Airport, New York. It operates primarily as an air carrier under a currently effective certificate of convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration. These certificates authorize the company to transport by air persons and property over a number of routes in the New York area. The company is also authorized, under the latter certificate, to conduct charter flights with helicopters as in this instance.

Pilot

Captain Richard Duane Rushton, age 34, was properly certificated and rated for the flight. He had been checked out in the Bell 47-H in May 1957, and again in September 1957. His physical examination was current and his rest period prior to the flight was adequate. He had been employed by New York Airways since December 10, 1956. At that time he had a total of 4,800 piloting hours, of which some 500 had been in helicopters. While employed by NYA he had flown S-55 helicopters 478 hours; S-58's, 96 hours; and Bell model 47-H helicopters for 17 hours. He was regularly occupied on scheduled runs with S-55's and S-58's.

The Aircraft

The helicopter was a Bell model 47-H, serial No. 1364, N 2492B. It was powered with a Franklin model 6V4-2000-C32 engine, serial No. 26932, of 200 h.p., manufactured by Aircooled Motors, Inc. The aircraft was manufactured in February 1956 and, at the time of the accident, had a total of 457 hours, of which 53 hours had been since its last major inspection. It had received its last prior line maintenance two hours prior to the accident. The engine had been operated, at the time of the accident, for a total of 302 hours and was due for an overhaul at 305 hours. Rotor blades were serial Nos. P-7515 and P-7516; both had a total time of 254 hours. All maintenance on the helicopter, blades, and engine was current.

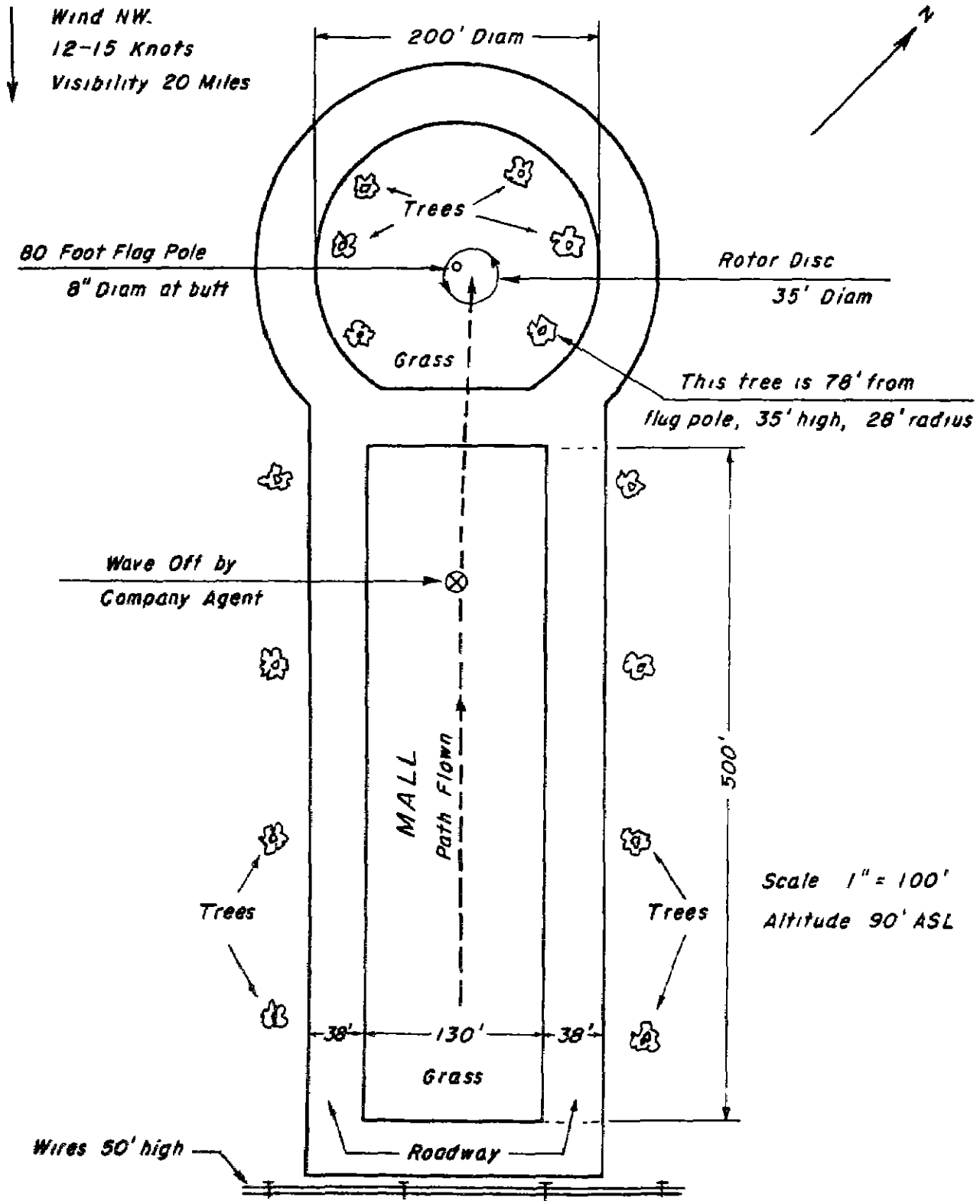
ATTACHMENT "A"

NEW YORK AIRWAYS BELL HELICOPTER N-2492B

CAMPUS OF LONG ISLAND AGRICULTURAL AND TECHNICAL INSTITUTE

FARMINGDALE, L I , N Y

OCTOBER 19, 1957



COMM-DC-10597