AVIATION OCCURRENCE REPORT

CONTROLLED FLIGHT INTO TERRAIN

CESSNA 402 N67850
WABUSH, NEWFOUNDLAND 23 NM NW
22 OCTOBER 1995

REPORT NUMBER A95Q0210

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Summary

The Cessna 402, with five persons on board, took off from Auburn, Indiana, USA, around 0630 local time (1130 Coordinated Universal Time (UTC)) for Schefferville, Quebec, with stops en route. Their final leg was from Montreal International (Dorval) to Schefferville, with Wabush, Newfoundland, as the alternate, and they took off at 1523 EDT (1923 UTC). The flights were conducted in accordance with instrument flight rules (IFR). While in cruising flight and west of Wabush, the pilot requested the weather conditions for Schefferville and Wabush. Because of poor conditions in Schefferville, the pilot decided to fly to his alternate, Wabush. During the ILS approach for runway 01, the aircraft was too high to complete the approach, and the pilot requested and received clearance to execute another one.

During the missed approach, the pilot proceeded an unknown distance outbound and turned back toward the airport. During the inbound leg, the aircraft contacted trees on the side of a mountain, at an indicated altitude of 2,460 feet asl, and decelerated over a distance of about 900 feet. The aircraft came to rest 23 nautical miles north of the airport, on the extended centre line of runway 01, on a heading of 186 degrees magnetic. The aircraft crashed probably at just after 1907 ADT (2207 UTC) during the hours of darkness.

The occupants were picked up safe and sound early the next morning by Search and Rescue personnel of the Canadian Forces.

Ce rapport est également disponible en français.

Other Factual Information

The pilot was certified and qualified for the flight in accordance with existing regulations. For the flight, the pilot used Jeppesen flight publications, which were consistent with Canadian publications. The pilot was not familiar with this airport.

Records indicate that the aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. The aircraft was not equipped with a ground proximity warning system (GPWS), nor is that equipment required. There was no evidence found of any pre-impact mechanical deficiency or aircraft system malfunction.

The pilot had checked the weather conditions for the route before take-off. On departure, he was aware of the possibility that he would go to the alternate airport if the weather at the destination airport did not improve.

About 2130 UTC, when the aircraft was at an altitude of 11,000 feet above sea level about 74 nautical miles (nm) west of Wabush, the pilot was informed by the Wabush FSS specialist that the condition of the Schefferville runway was ice-covered and that the VHF omni-directional range (VOR) was not functional. Also, runway cleaning operations were not to begin until the next morning. The runway at Wabush was wet, and the weather conditions were as follows: broken cloud at 600 feet, overcast at 1,200 feet, visibility 2.5 miles in light rain, and winds from 150 degrees magnetic at 10 knots with gusts to 15 knots. Based on this information, the pilot decided to divert to the Wabush Airport.

At 2156 UTC, the pilot received from Wabush the relevant weather information for a runway 01 approach, for which he had been cleared by Moncton Control Centre. The weather information was similar to that received earlier. Five minutes later, the pilot requested another approach because he had missed the first one. The clearance was issued by the FSS specialist at about 2203 UTC, but it was not received by the pilot because of poor radio reception. At about 2207 UTC, the clearance for another approach to the Wabush airport, not above 6,000 feet, was received and acknowledged by the pilot, and he requested confirmation of the minimum altitudes for a missed approach. He was informed that the minimum altitude for the south-east quadrant was 3,600 feet, and for the rest of the area, 4,000 feet. Acknowledgement of this information was the last recorded radio transmission from the aircraft.

According to the published instrument approach procedure, a pilot executing a missed approach for ILS runway 01 at Wabush is required to climb to 2,300 feet asl on the runway heading, make a right climbing turn to 022 degrees magnetic and climb to 4,000 feet asl, then make a right turn to the WK non-directional beacon (NDB) maintaining 4,000 feet asl. See Appendix A.

The aircraft came to rest 23 nm north of the airport, almost on the extended centre line of runway 01. The axis of the wreckage was on a track of 186 degrees magnetic, which is the direction toward the

airport. At the site, the left altimeter was set to 29.85 inches of mercury and the indicated altitude was 2,460 feet. The last altimeter setting provided to the pilot was 29.84 inches of mercury. Impact marks indicate that the aircraft struck the trees on the side of the mountain while in cruising flight. Deceleration occurred over a distance of about 900 feet before the aircraft came to rest on the mountainside.

The frequencies of the aircraft's navigation equipment were checked at the site. VOR 1 was set to a frequency of 112.30 MHz, the Wabush VOR, with the standby frequency set to 110.3 MHz, the localizer transmitter (ILS). The horizontal situation indicator takes its information from receiver 1. Its course display window showed 190 degrees and the heading marker indicated 180 degrees. VOR 2 was tuned to the frequency 108.00 MHz (unknown). Automatic direction-finder (ADF) 1 was tuned to 203 kHz (unknown) and ADF 2 was tuned to 218 kHz, which is the Wabush NDB frequency. The pilot indicated that he selected these parameters to return to the airport.

When the aircraft came to rest, the passengers evacuated because gasoline vapours were escaping. When the odour dissipated, they went back into the aircraft, where they spent the night. Around 0140 UTC, Search and Rescue personnel arrived in the area to begin the search. They stayed near the site all night, and early in the morning they inserted a team by parachute. The pilot of the accident aircraft had a sore back and the passenger in the front seat had a fractured wrist. The other occupants had only minor injuries. All were evacuated to the airport at the same time.

The occupants of the aircraft reported that, during the approach, the aircraft was momentarily between two cloud layers. As the lower layer was thin, some passengers could see the ground a few minutes before the impact. The pilot saw trees at the last minute and had tried to avoid them.

The pilot had taken off early in the morning and was operating the aircraft alone. In aviation, mental fatigue is typically associated with tasks demanding intense concentration, rapid or complex information processing, and other high level cognitive skills. Examples of flight operations likely to engender this type of fatigue might include single-pilot, night, instrument approaches at unfamiliar airports.

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[1] Stokes, Alan & Kite, *Flight Stress: Stress, Fatigue, and Performance in Aviation* (Brookfield, Vermont: Ashgate Publishing Company, 1994) Chapter 8, p.236.

This occurrence was classified as a controlled flight into terrain (CFIT) accident. CFIT occurrences are those in which an aircraft is inadvertently flown into terrain, water, or an obstruction with no prior awareness on the part of the crew of the impending disaster. Investigations into CFIT occurrences have revealed a number of factors which normally include a combination of the following: management of time and tasks; procedure errors; and, loss of situational awareness.

Analysis

The pilot initiated the missed approach at his alternate airport because he was too high and close to the airport to intercept the ILS glide path. In the descent, the pilot had not taken into consideration the strong tailwind component which modified the descent slope of the aircraft.

During the missed approach, the pilot requested confirmation of the quadrantal altitudes, which tends to show that part of his planning for the approach was inadequate. This is supported by the fact that the aircraft crashed 23 nm north of the airport although, in accordance with the approach plate, during the missed approach the aircraft should have stayed within about 20 nm of the airport to stay within the 25 nm minimum safe altitude area.

For the conduct of this approach, it would be normal to have navigation receiver 1 displaying the ILS frequency of 110.3 MHz rather than the VOR frequency of 112.3 MHz, with 005 in the course display window rather than 190. Also, it would be normal to have both ADFs tuned to the Wabush NDB (218 kHz). Finally, the missed approach requires the use of only the ILS and ADF, and that the pilot maintain the minimum altitudes and fly a track to the WK NDB The pilot reported that he was using the VOR to return to the airport. The parameters displayed on the navigation instruments show that, at some point during the missed approach, the pilot lost the mental picture of what he had to do.

The aircraft struck trees at an altitude of 2,460 feet asl, but the aircraft, based on its heading and position, should have been at least 4,000 feet asl, the minimum safe altitude within 25 nm of the WK NDB and the missed approach altitude. Although the pilot requested confirmation of the minimum quadrantal altitudes, and the approach chart indicated the same information and more, the aircraft descended below the published minimum altitudes.

As the occurrence happened at the end of a long day's work in a complex environment, the pilot executed a night approach when his performance and vigilance were not necessarily optimal. All of these factors possibly contributed to mental fatigue which affected the pilot's performance during the missed approach.

Findings

1. The pilot was not familiar with the Wabush Airport and its approaches.

2. During the descent for the first approach, the tailwind modified the descent slope and the aircraft was too high and too fast to intercept the localizer course.

3. During the missed approach, the pilot lost the mental picture of what he had to do.

4. The pilot requested from the FSS specialist the minimum safe altitudes, an indication that the pilot was not adequately prepared for the approach.

5. The pilot did not maintain the published minimum safe altitude.

6. The pilot did not follow the missed approach procedure.

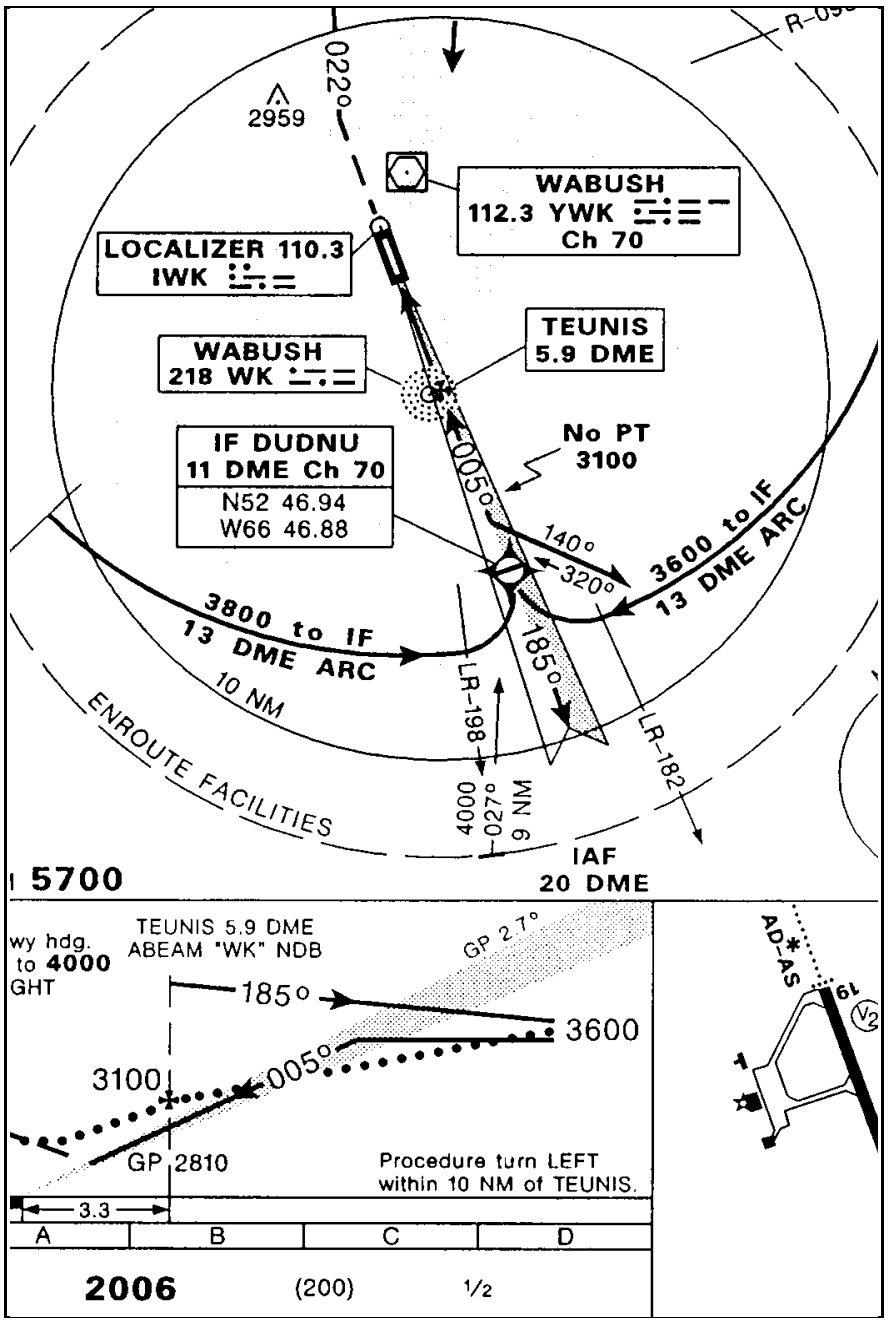
7. The pilot had been on duty for a long period, which possibly affected his performance.

8. The aircraft came to rest on the side of a mountain, 23 nm north of the airport at an altitude of 2,460 feet.

Causes and Contributing Factors

The pilot did not follow the missed approach procedure as published, particularly with regard to minimum altitudes, and the aircraft crashed on the side of a mountain.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, Benoît Bouchard, and members Maurice Harquail and W.A. Tadros, authorized the release of this report on 25 October 1996.



APPROACH CHART FOR THE WABUSH AIRPORT

Note: This chart is from the Canada Air Pilot; however, all of the pertinent information is the same as on the Jeppesen chart used by the pilot.