

AVIATION OCCURRENCE REPORT

SCRAPE WINGTIP ON LANDING

ALLCANADA EXPRESS LIMITED

BOEING 727-260 C-FACM

HAMILTON, ONTARIO

18 MARCH 1998

REPORT NUMBER A9800054

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 cargo laden Boeing 727-260 aircraft, serial number 22759, departed from Vancouver, British Columbia at 1924 Pacific standard time, 17 March 1998, on a flight to Montreal, Quebec, with stops at Calgary, Alberta, Winnipeg, Manitoba, and Hamilton Ontario. The aircraft was operated as Canex flight 501 (CNX 501) and had three crew on board. At 0410 eastern standard time (EST)¹, 18 March 1998, the aircraft landed firmly on runway one two left (12L) at Hamilton, following an instrument landing system (ILS) approach. The crew performed the after landing checks and taxied the aircraft to the ramp without further incident.

Damage to the outboard underside section of the aircraft left wing was discovered during a ramp walkaround inspection of the aircraft. The left wing had scraped the runway surface on touchdown damaging the leading and trailing edge flaps.

The accident occurred during night hours at an elevation of 760 feet above sea level in instrument meteorological flight conditions.

Ce rapport est également disponible en français.

¹ All times are EST (Coordinated Universal Time minus five hours) unless otherwise noted.

Other Factual Information

The flight across the country was uneventful and operated on schedule with the first officer at the controls for the flight from Winnipeg to Hamilton.

Surface weather observations for Hamilton airport were not taken while the aircraft was en route, however, the flight crew monitored the Toronto and London observations and planned for reduced visibility in fog for their approach at Hamilton. When in communication with the Hamilton Control Tower at 0404, they were advised that the runway visual range (RVR) for runway 12L was 5 500 feet with the runway lights set at strength five, and the tower visibility was three quarters of a statute mile in light snow grains and fog. The aircraft was radar vectored for a straight-in ILS approach, runway 12L, and intercepted the localizer thirteen miles back from the runway. The first officer disengaged the autopilot after intercepting the localizer and hand-flew the aircraft using the aircraft flight director system for guidance throughout the approach. The aircraft was configured for landing with the trailing edge flaps extended

30 degrees and the landing gear extended when it crossed over the ILS outer marker, 3.7 nautical miles from the end of the runway. Landing clearance was issued at 0408, at which time the RVR was reported at 5 000 feet with the runway lights at strength five, and tower visibility was three quarters of a statute mile. The wind was from 070 degrees magnetic at 10 to 15 knots.

Data from the aircraft flight data recorder (FDR) indicate that during the final descent, airspeed was maintained between 136 and 146 knots indicated airspeed (KIAS). The rate of descent averaged 700 feet per minute with slight engine power adjustments. The aircraft was crabbed left, generally three to four degrees, with minor heading variations noted during the descent. Approximately 12 seconds prior to touchdown, the aircraft engine power was reduced to flight idle through approximately 50 to 60 feet above ground level (agl). On short final, several minor track corrections were made, as indicated by heading and roll data . The aircraft subsequently rolled from right to left through wings level passing through the runway heading of 118 degrees magnetic, just prior to touchdown. The roll rate increased through wings level, as the aircraft continued to roll left. The aircraft touched down firmly with a vertical deceleration of approximately 1.5g at 126 KIAS. At touchdown, the aircraft was banked left 11.5 degrees, possibly slightly higher due to sample rate, and the heading was decreasing through

116 degrees magnetic. The wings were immediately levelled and the nose landing gear lowered onto the runway. Following nose landing gear touchdown, the heading was re-aligned with the runway track, and reversers were deployed.

The aircraft cockpit voice recorder (CVR) was not functioning during the occurrence flight. Information recorded on the tape was determined to be from eight weeks prior to the occurrence. CVR system serviceability can be checked by the flight crew from the cockpit by pressing a test button and monitoring a needle deflection on the system test meter. The flight crew reported that they had carried out this CVR test and the system indicated it was serviceable. There have been instances where spurious meter deflections have led to false indications of a serviceable CVR system. The CVR manufacturer had issued a service bulletin outlining a modification to prevent false system serviceability indications from the test meter. The occurrence CVR did not incorporate the modification.

The aircraft flight crew reported that at 250 agl, the captain, the pilot-not-flying, called "approach lights in sight" and the approach continued. At 200 feet agl, the captain had the approach and runway end lights in sight and called "decision", meaning the aircraft had descended to decision height (DH)². The first officer looked up and saw the approach and runway lights and called "runway in sight, landing". The aircraft was aligned with the runway centre line on the glide path and localizer at that time. At 150 feet agl, the captain observed the aircraft above the glide slope on the glide slope indicator and remarked to the first officer "you're getting high". The first officer acknowledged. At 100 feet agl the second officer began to call out the aircraft altitude from the radar altimeter. He called "100" and, at about that time, the first officer reported encountering some turbulence and the aircraft began to drift to the right of the runway centre line. The second officer called "50" and then "30" but, at 30 feet, noted that the aircraft stopped descending. At about this time the captain observed that the aircraft was right of centre line not descending, and he called "I have control", took control of the aircraft, and applied hard left rudder to bring the aircraft back to the centre of the runway. The aircraft landed firmly slightly right of runway centre line. The landing roll was normal with the use of reverse engine thrust.

Runway 12L is an asphalt surface, 8 000 feet long by 200 feet wide, and was bare and wet at the time of the occurrence. Approach lights for the runway were category 1, centre row, high intensity, with runway identification and threshold lights. The runway edge lights were high intensity and there was a 2-bar visual approach slope indicator system (VASIS). All runway lighting was set at maximum strength for the approach.

The visibility was deteriorating during the early morning hours at Hamilton. The first weather observation recorded by the Hamilton weather office at 0600 reported one quarter statute mile in light rain and fog. The visibility remained at one quarter mile throughout the morning with one observation reporting one eighth of a mile.

Wind conditions, reported by control tower personnel at the time of landing, indicate that a crosswind component of 07 to 11 knots existed. The company operations manual for Boeing 727 type aircraft states that maximum demonstrated crosswind for takeoff or landing, not limiting, is 29 knots.

The flight crew was certified and qualified for the flight in accordance with existing regulations.

The aircraft weight and centre of gravity were within prescribed limits. The calculated landing weight of the aircraft was 133 000 pounds or 60 382 kilograms.

The following TSB Engineering Branch Report was completed:

LP24/98 FDR/CVR Analysis.

² A specified height at which a missed approach must be initiated during a precision approach if the required visual reference to continue the approach to land has not been established.

Analysis

Data from the FDR and reports from the crew show a normal approach and normal handling of the aircraft until it descended to about 150 feet agl and was approaching over the end of the runway. At that point the first officer's attention was diverted to controlling the aircraft as it encountered some turbulence and possibly a wind shift close to the ground. He allowed the aircraft to drift to the right of the runway centre line, and it appears that he may have started to flare the aircraft early, stopping the descent at about 30 feet agl. The captain at this point, with the engine power at idle and the aircraft close to the ground, felt they were committed to a landing but was concerned that the aircraft had stopped descending and was right of centre line. Because fog was reducing his visibility along the runway, he was not able to determine how far the aircraft had travelled down the runway and, therefore, wanted to get the aircraft on the runway as quickly as possible. He took over control of the aircraft and applied hard left rudder input to bring the aircraft back to the runway centre line. The left rudder input caused the aircraft to roll left sufficiently for the left wing to contact the runway surface on touch down.

The pilot-flying transitioned to visual flight when the aircraft was at decision height, 200 feet agl, and approaching the high intensity runway approach lights. The captain estimated the forward visibility to be about 4 000 feet at that time. Once the aircraft passed beyond the approach lights, it is likely that forward visibility was more restricted, but it could not be determined to what extent. The first weather observations reported a visibility of one quarter mile and remained at that throughout the morning with one observation reporting one eighth of a mile. In conditions of reduced visibility, it is desirable to have the aircraft set for landing and only be required to flare to land before passing beyond the high intensity approach lights. In this instance, several control inputs were required to position the aircraft, and a transfer of control between the flight crew members took place after the aircraft passed beyond the approach lights, likely in reduced forward visibility.

Findings

1. The flight crew was certified and qualified for the flight in accordance with existing regulations.
2. The aircraft weight and centre of gravity were within limits.
3. There was no evidence of malfunction or component failure of the aircraft that would contribute to the cause of the accident.
4. The first officer was at the controls during the approach.
5. Visibility along the runway was reduced by fog.
6. The aircraft drifted above the glide slope and right of the runway centre line as it passed over the runway threshold.
7. The captain took control of the aircraft and applied hard left rudder at 30 feet agl.
8. The aircraft rolled left and landed firmly on the runway with 11.5 degrees of left bank.

9. The aircraft left wing contacted the runway surface on touch down.
10. The aircraft cockpit voice recorder was not functioning during the occurrence flight.

Causes and Contributing Factors

The aircraft rolled left and the left wing struck the runway surface on touch down after the pilot applied hard left rudder control in the landing flare to align the aircraft with the runway centre line. The captain's late take-over of control and the reduced visibility along the runway were likely contributing factors to the occurrence.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 08 January 1999.

Appendix A Approach Chart RWY 12L

