FINAL REPORT
LANDING ACCIDENT
CESSNA 182Q 6Y-JND
26 APRIL 2002
NEGRIL AERODROME, JAMAICA

Submitted 06 May 2002

FINAL REPORT: TIMAIR CESSNA 182Q MSN 18266565 6Y-JND LANDING ACCIDENT AT NEGRIL 26 APRIL 2002

Synopsis

On April 26, 2002 at 1135 a.m. local time a Cessna 182 registered as 6Y-JND and operated by Timair Limited, flew from the Donald Sangster International Airport at Montego Bay, Jamaica to the Negril Aerodrome, carrying two passengers and the pilot. On the arrival of 6Y-JND at Negril, the pilot of a preceding aircraft informed the pilot of 6Y-JND that the approach to runway 05 had a tailwind and that runway 23 was the most usable.

Although the weather was suitable for the flight from the aspects of ceiling and visibility, 6Y-JND encountered strong, gusty winds and the pilot made three approaches, first to runway 05 second to runway 23 and finally to runway 05 again. On the first two approaches the pilot discontinued the approaches without trying to land due to what he perceived to be high speeds across the ground, indicative of a tailwind and on the last approach he stated that he also encountered a tailwind.

Nevertheless, on his last approach to Runway 05, the pilot managed to land the aircraft halfway down the runway, bounced twice and elected to add power and take off again. During the attempt to take off the aircraft drifted to the left side of the runway and the left wing came into contact with bushes and low trees, dragging the aircraft further left and starting it into a roll to the left. The aircraft overran the runway surface, crossed some soft ground where the nose wheel and propeller dug into the ground and started the aircraft into a somersault. It came to rest inverted with the entire engine compartment and nose wheel assembly separated from the fuselage.

The two passengers received minor injuries and were able to extricate themselves from the fuselage, while the pilot received minor injuries and had some initial assistance from crash fire rescue personnel to exit the wreck.. All occupants were taken to a nearby hotel where they were treated by a nurse and doctor and sent to a hospital in Savannah-la-Mar for X-rays. There were no serious injuries and no fatalities. The aircraft was destroyed.

Weather

The weather on April 26 was partly cloudy with good visibility, easterly winds and suitable for unlimited visual flight rules operations. The early morning the winds at Negril were light however, by 11 a.m. the winds had increased to gusty easterly winds that were frequently shifting direction. The actual wind speed is not known as there is no anemometer at Negril aerodrome. As the aerodrome does not support instrument flight rules traffic there are no weather reports taken at Negril and there is no terminal forecast issued for Negril.

Aerodrome

Negril aerodrome has been in existence for many years. It started as a contractor's private runway during some initial construction at Negril. The aerodrome is situated on land that is owned by the Urban Development Corporation and is operated by the Airports Authority of Jamaica, Western Region. The single runway is oriented northeast-southwest 05-23 and is 2170 feet long. It is used for daytime, visual flight rules, flight operations by private aircraft and by all Jamaican air operators except Air Jamaica Limited.

Negril aerodrome fails to meet many safety standards. The lack of compliance with safety standards was the subject of a technical report published by the JCAA in January 2000. That report was provided to the appropriate authorities, however, little if anything has been done to improve the aerodrome since that report was completed. At the time of the accident some things appeared to be worse than at the time of the report. Trees and bushes encroached more closely on the runway strip and graded areas, the windsock was inadequate, there are unmarked man made obstacles near the runway and the runway strip and runway end areas are substandard. A six inch diameter sewer pipe is exposed at the threshold of Runway 05. Approach, take off and transitional obstacle limitation surfaces standards are all penetrated by obstacles of natural growth or man made obstacles. The narrow runway is not oriented into the prevailing wind and is not properly marked.

Flight Crew

The pilot was properly licensed and had received all mandatory approved training and checks and was legally current on the Cessna 182 aircraft. There was no fatigue factor evident nor was one identified: the pilot stated he had gone to bed about 10 p.m. the night before and awakened at 6:45 a.m. on the morning of the 26th April. He had received proper rest and had not exceeded duty time nor missed any rest period in the previous 28 days. He held a valid medical certificate and there was no contributing medical factor identified in relation to this incident.

The pilot in command joined the airline in March 2002, had 403 hours as a pilot and had been a Timair captain on the Cessna 182 for two days. He had been cleared to fly with passengers for the first time on the morning of April 25th. He received his commercial pilot training in Canada, held a Canadian commercial pilot license and had converted it to a Jamaican license in February 2002. His Jamaican commercial pilot flight test was conducted in January 2002 on a Cessna 172 aircraft by a designated examiner, his last Cessna 182 competency check was conducted by the Timair Chief Pilot in April 2002 and he had been route qualified to Negril by the Timair Chief Pilot in April 2002. (*Note: the designated examiner is a senior flight instructor who was authorized to conduct*

commercial pilot flight tests on behalf of the JCAA.).

Passengers

The aircraft carried two passengers, one female in the right front seat beside the pilot and one male in the rear seat. The front seat occupants wore shoulder harness and lap belts and the rear seat passenger wore a lap belt. Their baggage was stored behind the rear seat in the baggage compartment.

The Aircraft

6Y-JND, a Cessna 182Q model, was built by the Cessna Aircraft Corporation in 1978. It was registered to Timair Limited on March 8, 1993. The certificate of maintenance review was issued on December 10 2001 and was valid to December 10 2002. The certificate of airworthiness was issued on November 26 2001 and was valid at the time of the incident.

Aircraft Maintenance History

The aircraft had a total of 9228 hours and was due for a 50-hour service check at 9234 flight hours. The previous 100-hour maintenance check was completed on March 28 2002. There were no aircraft technical logbook entries indicating any fault with the aircraft.

Company Training Programs

Company training programs meet CAA and international standards and have been checked and approved by CAA inspectors. Training of the pilot involved in this accident included: company procedures; aircraft technical ground school; dual instruction and flight as an observer during revenue trips, flights carrying cargo only and a competency check and route familiarization prior to assignment to passenger carrying duties.

History of the Flight

The pilot had flown one trip to Negril from Sangster International Airport at 8:14 a.m. on April 26th, and returned to Sangster at 8:40 a.m. that day. He had encountered no unusual winds or weather en-route or at Negril on this trip.

The aircraft carried 40 gallons of fuel, the pilot, one male and one female passenger and 120 pounds of baggage. The female was in the right front seat and the male was in the rear seat. The pilot had completed the weight and balance showing both passengers in the rear seat. Despite the seating change the aircraft was within its flight envelope and legal to fly. 6Y-JND left Sangster at 11:35 a.m. for the second trip to Negril. No one at Timair was

aware of the strong wind conditions that had developed at Negril when 6Y-JND was dispatched for its second trip of the day. The pilot of 6Y-JND and one other pilot described the enroute weather as turbulent with rough air along the coastline. The turbulence over the sea indicated that there may have been some windshear, which is vertical difference in wind velocity and/or direction. 6Y-JND was alerted to the wind conditions at the aerodrome as the pilot approached Negril when the pilot of a Cessna 208 ahead of him advised him that there was a "big push" on runway 05 approach meaning that there was a strong tailwind on final approach. Aircraft do not normally land with a tailwind as it increases the speed over the ground and therefore increases the stopping distance required. The Cessna 208 landed on Runway 23 and indicated to 6Y-JND that Runway 23 was suitable for landing. The following reconstruction of events is taken from the statement of the pilot of 6Y-JND and the accident investigator's interview notes from the pilot interview and visual inspection of the accident scene. 6Y-JND made one approach to Runway 05 and discontinued it at 700 feet above ground and flew a circuit pattern to get established on final approach for Runway 23. The pilot believed that his ground speed was too high and that he had a tail wind on the approach to runway 23 so he broke off that approach and set up on long final for another approach to Runway 05. The aircraft was configured for the approach with 20 flap and flown at 70 knots indicated airspeed. At 11:55 a.m. while on short final to Runway 05, the pilot encountered a sudden wind shift and realized that the ground speed had increased. By this time he was over the runway flaring and he elected to continue with the landing rather than apply power and abandon the approach. He floated about halfway down the runway, touching down at the midpoint. Touchdown was followed by two porpoise bounces (a bounce situation that can be caused by a tailwind, in which the aircraft touches down on the nose wheel first, then main wheels). He did not recall applying any brakes and realized his ground speed was too fast so he could not stop on the remaining runway. He added power and raised the flaps to what he stated was 10 flap (the aircraft was found with flaps fully retracted and the flap lever in the full up position). As he added power the aircraft nose came up and the aircraft began to drift to the left. The right main wheel was still on the runway and rubber tracks on the runway show that its brake was locked for about eight meters as the aircraft's left wing approached some tall bushes at the edge of the runway. There was no mark on the grass at the verge of the runway to indicate whether the left wheel was braked. The brake mark stopped seven meters from the end of the runway. As the aircraft continued forward into the bushes the right wing lifted and it began to make a sudden bank to the left. The left wing struck the bushes and the aircraft was dragged further to the left rolling to the left more quickly, exiting the runway on a line along the left-hand runway edge orientation. As it left the runway it passed down a slight decline into soft ground and more bushes and as the nose wheel dug into the ground the aircraft pitched forward and to the right over the propeller and engine. The nose wheel was torn off and the propeller, engine and engine compartment contents separated completely from the aircraft leaving an almost clean firewall and the main part of the aircraft slid on the back of the fuselage finally coming to rest on its back in thick bushes, oriented with the tail facing east, forty-four meters from the end of the runway. The nose wheel was found seven meters closer to the runway end than the engine and propeller which were located forty-two meters from the runway end and adjacent to the left hand wingtip. The flaps were retracted, both main doors and door windows were

open and the fuel selector, ignition and electrical switches were off. The primer control was open at full extension. The flap lever was in the flap-up position. Throttle, carburetor heat and mixture controls were all closed. Both wings suffered damage with the right wing leading edge showing buckling and crumpling damage from the leading edge impact on bushes and ground and the right wingtip was torn off. The left wing had some lateral buckling at the mid-section and there was evidence of a fuel leak from the left tank. The fuselage showed a small buckle just aft of the right cabin rear quarter panel window and the left hand rear cabin quarter panel window had a small hole in it. The propeller showed evidence of a hard strike with power on that had damaged one blade tip and rotated the propeller blade on its seat. The other blade was bent backwards and had no tip damage indicating that the bend occurred as the aircraft pitched over onto its back. During the interview the pilot stated that he had shut off the fuel and ignition and as the passengers exited the aircraft he retrieved their baggage and handed it out to them. A crash fire rescue member then helped him from the wreckage. There was no fire. The passengers and pilot suffered minor injuries.

Sangster Tower personnel informed the JCAA of the crash. at 12:20 p.m. Investigators arrived at Negril at 5:00 p.m. and inspected the accident scene, took measurements and photographs and obtained documents. The pilot and other witnesses were interviewed the next day in Montego Bay. It was not possible to interview the passengers.

Analysis

Although it is not possible to tell exactly what the wind speed and direction was at the time of the accident it is clear that 6Y-JND experienced a strong tailwind during the landing attempt. The wind was reported by pilots to be quite strong and variable in direction with gusts causing turbulence. Negril is renowned for its crosswinds as any southeast flow comes over the hills to the east of the aerodrome and may pick up speed and create mechanical turbulence as the air flows down the hill and across the swamp toward the aerodrome. If there was a twenty knot tailwind on the approach an indicated airspeed of 70 knots would result in a 90-knot ground speed at the flare. As the wind decreased close to the ground and behind the trees at the side of the runway the aircraft's ground speed would then result in a higher airspeed causing the aircraft to float for a long time. The stalling speed of a Cessna 182Q weighing 2950 pounds with most forward center of gravity, with 20 degrees of flap and with no bank is 47 knots indicated airspeed. 6Y-JND weighed only eighty pounds less than maximum weight and had its center of gravity aft of the most forward position so its stalling speed would be less than 47 knots. Touchdown speed is usually only slightly above stalling speed. The pilot reported touching down halfway down the runway, say at about 50 knots indicated airspeed. It was probably at a somewhat higher speed as the aircraft porpoised twice (meaning it skipped due to the nose wheel touching before the

main wheels, then the mains then became airborne and then touched again nose first, a condition that results in a phenomenon called "wheel barrowing" when too much weight is on the nose wheel). This may be caused by too high a speed as the aircraft touches down.

The ground speed was the airspeed plus any tail wind speed, say about 45 to 50 knots plus the wind speed. The Cessna 182Q Landing Distance Chart shows that at normal touchdown speed with flaps 40 and zero wind at sea level at 30 degrees temperature the minimum ground roll is 620 feet. Note 2 on that chart states that for tailwinds up to 10 knots the distance must be increased by 10% for each 2 knots. The required distance would also be increased if less than full flap is used. With less than 1100 feet remaining from the touchdown point, possibly a fifteen to twenty knot gusty tailwind and an aircraft that had bounced twice on the long landing and that still seemed to be at a high ground speed, it is understandable that the pilot opted to overshoot. However, the decision was left too late as the airspeed had been decaying and was probably now less than 50 knots as he selected what he thought was half flap. He stated in his interview that he reset the flap from 20 flap to 10 flap, however the flap control and the flaps were found in the full up position. This raised the probability that the pilot had raised the flaps completely and concurrently lost a 20% advantage in ground run and climb performance. There was now insufficient runway to complete a take off on the paved surface. As he added power he stated the nose began to lift. Raising the nose at that point would have unloaded the aircraft weight from the wheels and increased lift on the wings as the angle of attack increased and would have allowed the aircraft to drift to the left in the quartering tailwind. That type of tailwind with low airspeed makes it very difficult to control an aircraft in the resultant drift. In this case, drift was not controllable with aileron and rudder and, even though the pilot apparently tried to brake with the right brake to get back to the runway, the left wheel left the runway surface and the left wing tip began to impact the small trees at the edge of the runway and the right wing lifted in the crosswind. The pilot could no longer control the aircraft and it rolled off the end of the runway into the soft ground and dense bushes and flipped over onto its back.

Conclusions

The accident resulted from three main cause factors:

1. Pilot inexperience in that he chose to disregard another more experienced pilot's advice and also to try a third attempt to land contrary to his company's unwritten policy and to continue with the last landing attempt even though he noted that his ground speed was too high.

2. A strong quartering tail wind that may have been beyond the landing or take off crosswind limits of the Cessna 182Q.

3. Sub-standard aerodrome conditions that included a poorly located wind indicator, narrow runway, lack of proper graded area, objects of natural growth penetrating the

obstacle clearance areas and runway strip, and an overrun area characterized by the lack of a stabilized strip at the end of the runway.

Recommendations

1. Negril aerodrome should be fitted with a remote reading anemometer that may be read by one of the operators' ground staff and reported to pilots over the UNICOM frequency.

2. Negril aerodrome should be fitted with a windsock at each end of the runway in addition to the anemometer that requires electrical power. This is due to power outages and the variability of the local winds at each runway end.

3. The safety recommendations contained in the January 2000 JCAA technical report on Negril aerodrome should be subject to action without further delay.

4. Failure to take action in 3 above should result in closure of the Negril aerodrome to all traffic.

5. An air operator should not have unwritten operational policies. If it is applicable to operational safety, the information should be included in the company operations manual and/or made into a company standard operating procedure.