



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada



AIR TRANSPORTATION SAFETY INVESTIGATION REPORT A23P0130

LOSS OF CONTROL AND COLLISION WITH TERRAIN

SkyQuest Aviation Ltd.
Piper Aircraft Corp. PA-34-200 (Seneca), C-GTYH
Chilliwack Airport (CYCW), British Columbia
06 October 2023

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. **This report is not created for use in the context of legal, disciplinary or other proceedings.** See the Terms of use at the end of the report. Masculine pronouns and position titles may be used to signify all genders to comply with the *Canadian Transportation Accident Investigation and Safety Board Act* (S.C. 1989, c. 3).

History of the flight

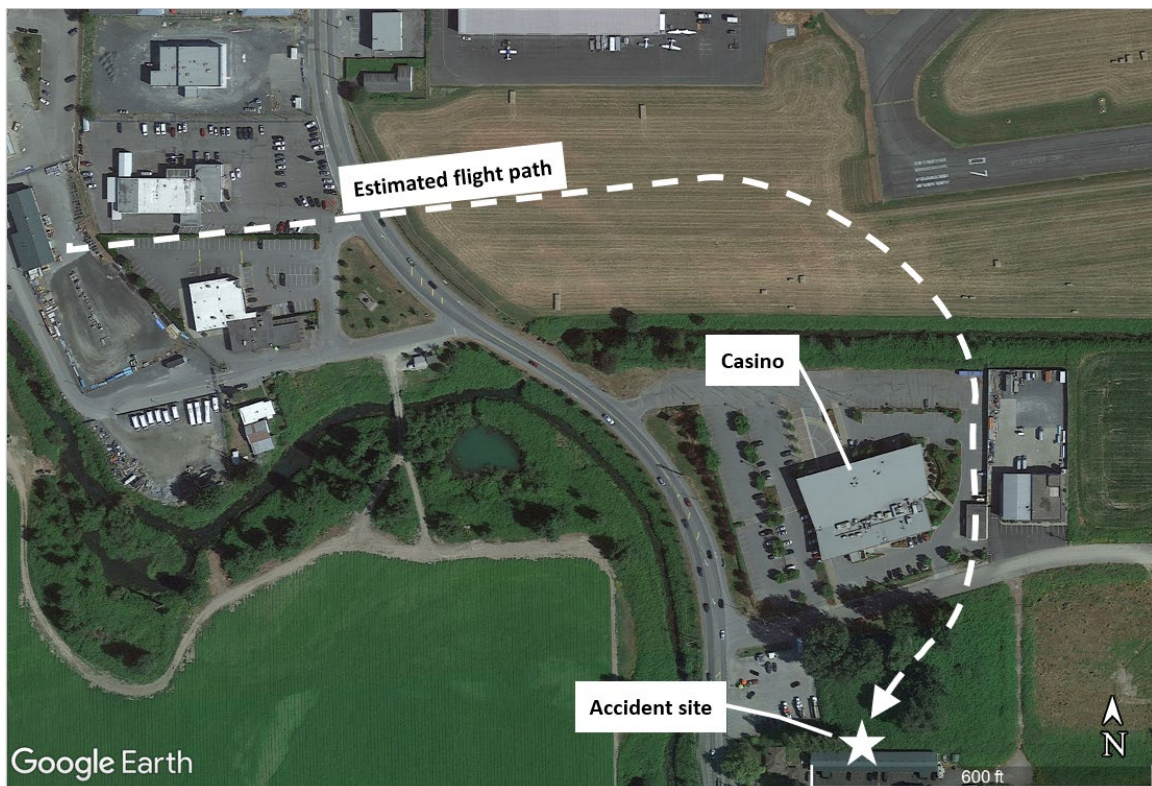
On 06 October 2023, the SkyQuest Aviation Ltd. Piper Aircraft Corp. PA-34-200 (Seneca) aircraft (registration C-GTYH, serial number 34-7250160) departed Langley Regional Airport (CYNJ), British Columbia (BC), with an instructor and 2 students on board for their 2nd training session toward a multi-engine rating. One student was seated in the front-left seat, and the other student was seated in the 2nd row of seats. Approximately 1 hour later, once the training session was complete, the aircraft returned to CYNJ. Upon shutdown, the students switched seating positions. The aircraft then departed CYNJ to conduct additional training, including single-engine exercises. The air training exercises were conducted north of the Chilliwack Airport (CYCW), BC. The aircraft subsequently proceeded to CYCW. The investigation was unable to determine what the instructor's intentions were once they arrived at the airport; however, the aircraft was observed completing 1 circuit and then lining up for an approach to Runway 07.

The aircraft levelled off below 100 feet above ground level (AGL) while aligned with the runway; then, before reaching the runway threshold, it banked and turned right. The bank angle continued to increase past 90° while the aircraft's heading changed toward a southerly direction, and the pitch decreased toward a nose-down attitude. At 1359,¹ the aircraft impacted the ground near a casino in a close-to-inverted and nose-low attitude.

There was no flight-path data available from the aircraft's avionics, and there was no radar information recorded of the aircraft's activity at CYCW. However, a dashcam video camera from a vehicle passing the airport recorded the last moments of the flight.

The impact resulted in damage to trees and vegetation. An unknown quantity of fuel was released. There was no post-impact fire. The aircraft's emergency locator transmitter activated in response to impact forces. All 3 occupants were fatally injured.

Figure 1. The aircraft's estimated flight path based on dashcam video (Source: Google Earth, with TSB annotations)



Aircraft information

The Piper Aircraft Corp. PA-34-200 (Seneca) is a twin-engine, light aircraft designed for general aviation purposes, including flight training, personal use, and commercial applications. It features a low-wing configuration with 1 engine on each wing and is equipped with tricycle landing gear.

¹ All times are Pacific Daylight Time (Coordinated Universal Time minus 7 hours).

A review of the aircraft maintenance records was conducted. There were no outstanding defects at the time of the occurrence and no indications of overdue or outstanding work to be completed. The aircraft was equipped with aftermarket turbochargers;² however, the waste gates were set in the full-open position and provided no added performance.

The TSB performed a calculation using the reported initial fuel load and a typical fuel consumption rate for the 1st flight, which was approximately 1.2 hours long, along with the time the aircraft was taxiing and manoeuvring on the ground. The calculation determined that at the time of the occurrence, the aircraft had approximately 62 U.S. gallons of fuel on board and weighed 3817 pounds, which was within the weight and balance envelope.

Post-accident examination

The aircraft was examined at the accident site. The wing flaps were in the UP position and the landing gear was extended. Because of the nature of the impact, damage to the aircraft, and work by first responders, the investigation was unable to assess the position of the engine controls or ancillary controls at the time of the occurrence. Damage to the left engine and propeller were consistent with power being produced at the time of impact. Damage to the right propeller was consistent with the engine producing low or no power; the propeller was in an unfeathered position at impact. At the accident site, first responders noted a strong odour of fuel and saw leaking fuel, suggesting there was fuel in the aircraft at the time of impact. First responders moved both fuel selectors to the OFF position while attending the scene.

All aircraft components were accounted for at the accident site, and flight control continuity was verified.

After the wreckage was recovered, a more detailed examination of the airframe, flight controls, and engines was completed. Particular attention was given to the right engine and propeller. The engine was disassembled and inspected, and all major components were visually inspected. The fuel delivery system and ignition system were tested by a third party using diagnostic equipment; no anomalies were noted.

The light bulb for the stall warning system and the light bulbs for the turbocharger system were sent to the TSB Engineering Laboratory in Ottawa, Ontario, for analysis. It was determined that the stall and left-hand overboost lights were likely off at the time of the impact, but the right-hand overboost bulb exhibited some deformation that indicates that the bulb could have been illuminated at the time of impact. The investigation could not reconcile this observation given that the turbochargers' waste gates were fully open and not providing additive boost to the intake manifold.

Notwithstanding the extent of the damage, the investigation did not discover any issues with the flight controls that would have led to the loss of control or anything mechanical that would have prevented either engine from producing power.

² Supplemental Type Certificate SA2937WE.

Weather information

The aerodrome routine meteorological report issued at 1400 for Abbotsford Airport (CYXX), BC, the closest airport to the accident site with weather reporting, located 18 nautical miles to the northwest, indicated the following:

- Winds from 340° true (T), variable from 320° T to 050° T, at 4 knots
- Visibility of 30 statute miles
- Few clouds at 23 000 feet AGL
- Temperature 24 °C and dew point 12 °C
- Altimeter setting 30.15 inches of mercury
- Density altitude 1100 feet above sea level

Weather was not considered a factor in the accident.

Minimum control speed roll

The dashcam video and post-accident wreckage examination are consistent with the aircraft entering a minimum control speed (V_{MC})³ roll before the collision with terrain. A V_{MC} roll occurs when there is an asymmetrical power situation and the aircraft's speed falls below V_{MC} . In this scenario, the aircraft will begin to yaw and roll toward the low-thrust-producing engine because there is insufficient yaw control available to counter the thrust produced by the operating engine.

To avoid a V_{MC} roll, pilots are trained to keep the aircraft's speed above V_{MC} ⁴ when in an asymmetric thrust situation. If control becomes difficult, a reduction in power on the higher-thrust-producing engine is required to regain yaw and roll control.

The pilot's operating manual (POM) for the PA-34-200 states the following with respect to V_{MC} :

Vmc is the calibrated airspeed below which a twin-engine aircraft cannot be controlled in flight with one engine operating at take-off power at sea level density altitude and the other engine windmilling. Vmc for the Seneca has been determined to be 80 MPH. Under no circumstances should an attempt be made to fly below this Vmc with only one engine operating. As a safety precaution, when operating under single-engine flight conditions either in training or in emergency situations, maintain an indicated airspeed above 90 MPH.⁵

The POM goes on to state that any demonstrations that approach an uncontrolled flight condition should be made at a minimum of 3500 feet above the ground.⁶

The POM, provides the following procedure for maintaining or regaining control of the airplane in the case of an engine failure in a climb:

³ Minimum control speed is "the minimum flight speed at which it is possible to retain control of the aeroplane and maintain straight flight, through the use of maximum rudder deflection and not more than 5 degrees of bank, following sudden failure of the critical engine." (Transport Canada, TP 11575E, *Instructor Guide: Multi-Engine Class Rating*, Second Edition [October 2010], Definitions).

⁴ Piper Aircraft Corporation, *The Seneca Pilot's Operating Manual*, Revision 761 506 (PR871130) (30 November 1987), Section 6: Operating Instructions, p. 6-12.

⁵ Ibid.

⁶ Ibid.

If engine failure occurs when airspeed is below 80 mph (CAS) [calibrated airspeed] reduce the power on the good engine as required to maintain directional control. Reduce nose attitude to accelerate toward the single engine best rate of climb speed of 105 mph. Then feather the inoperative engine [...]⁷

SkyQuest Aviation Ltd.

SkyQuest Aviation Ltd. is a flight training unit located at CYNJ. It provides flight training for private pilot licences, commercial pilot licences, night ratings, instrument ratings, and multi-engine ratings. The occurrence aircraft was the only twin-engine aircraft in the unit's fleet.

Instructor and student experience

Records indicate that the instructor held the appropriate licence and ratings for the flight in accordance with existing regulations. The instructor held a valid commercial pilot licence, multi-engine rating, Group 1 instrument rating, and a Class 3 instructor rating. The accident occurred on the 1st day the instructor was providing multi-engine training. The instructor had accumulated 1047.1 total flight time hours, 52 hours of which were multi-engine time.

The student under training at the time of the accident held a private pilot licence and had accumulated 198.5 total flight time hours, 1.5 hours of which were multi-engine time.

Multi-engine training

To qualify for a multi-engine rating in Canada, a candidate must meet the requirements established by Transport Canada in *Canadian Aviation Regulations* (CARs) Standard 421.⁸ These requirements include holding a valid pilot licence and demonstrating proficiency in operating multi-engine aircraft. The training process developed by the occurrence flight training unit is largely based on Transport Canada's TP 11575E, *Instructor Guide: Multi-Engine Class Rating*, which does not provide a specific mandated training syllabus for the multi-engine rating, rather it provides only guidance for flight training units and instructors.⁹

The training guidance focuses on developing the necessary skills to safely manage multi-engine operations, such as handling asymmetric thrust, engine-out procedures, and emergency scenarios. The guidance includes the recommendations to avoid simulating an engine failure on approach below 500 feet AGL, avoid operating at airspeeds below the airplane's best rate-of-climb airspeed with a single engine, and only practice this exercise on actual approaches after the student is competent in handling the emergency at altitude.¹⁰

⁷ Ibid., Section 3-C: Emergency Procedures, subsection 6: Engine Failure During Climb, p. 3-13.

⁸ Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, Standard 421: Flight Crew Permits, Licences and Ratings, subsection 421.38(3).

⁹ Transport Canada, TP 11575E, *Instructor Guide: Multi-Engine Class Rating*, Second Edition (October 2010), Exercise 10 – Engine Failure During Takeoff or Overshoot.

¹⁰ Ibid.

The CARs do not mandate a minimum number of training hours; instead, candidates must achieve the required competencies through flight instruction and preparation for the associated flight test.¹¹

SkyQuest Aviation Ltd. has a syllabus for the multi-engine rating and divides the flight training into 9 objectives.¹² Objectives may be achieved with a single flight but may require multiple flights to achieve the desired proficiency. The occurrence flight was the 2nd training flight for the student under training at the time of the accident and, based on information gathered by the investigation, the student was largely following flight objective 2: steep turns and manoeuvring at reduced airspeed. However, according to the sign-out sheet, single-engine work was also being covered. In the syllabus, the first time single-engine exercises are practised is in objective 5.

The investigation could not determine the specific exercise or intent of what was occurring during the missed approach at CYCW.

TSB laboratory reports

The TSB completed the following laboratory reports in support of this investigation:

- LP140/2023 – NVM [non-volatile memory] Data Recovery – GPS [global positioning system], EFI [electronic flight instruments] and PEDs [personal electronic devices]
- LP178/2023 – Light Bulbs Analysis

Safety messages

Instructors are reminded that during multi-engine training, any asymmetric thrust exercises should be performed at a safe altitude and airspeed given the significant altitude losses that can occur in the event of a V_{MC} roll.

Pilots of multi-engine aircraft are reminded that should a loss of yaw control occur during an asymmetric thrust situation, it is imperative that power be reduced on the operating engine and recovery of airspeed be attained by reducing the pitch attitude. At lower altitudes this may result in a forced landing, which offers greater survivability than a V_{MC} roll.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 04 June 2025. It was officially released on 25 June 2025.

Visit the Transportation Safety Board of Canada's website (www.tsb.gc.ca) for information about the TSB and its products and services. You will also find the Watchlist, which identifies the key safety issues that need to be addressed to make Canada's transportation system even safer. In each case, the TSB has found that actions taken to date are inadequate, and that industry and regulators need to take additional concrete measures to eliminate the risks.

¹¹ Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, Standard 421: Flight Crew Permits, Licences and Ratings, subsection 421.38(3).

¹² SkyQuest Aviation Ltd., *Training Standards: Multi Engine Rating*, Version 1.0 (no date), Training Sequence.

ABOUT THIS INVESTIGATION REPORT

This report is the result of an investigation into a class 4 occurrence. For more information, see the Policy on Occurrence Classification at www.tsb.gc.ca

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