



Transportation
Safety Board
of Canada

Bureau de la sécurité
des transports
du Canada

Air Transportation Safety Investigation Report A20P0060

COLLISION WITH POWER LINE, MISSING AIRCRAFT

International Flight Centre Inc.
Cessna 172M, CF-CCV
Abbotsford Airport, British Columbia, 9.7 NM NNW
06 June 2020

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.

History of the flight

On 06 June 2020, the International Flight Centre Inc. Cessna 172M aircraft (registration CF-CCV, serial number 17261135) was conducting a visual flight rules (VFR) training flight from Vancouver/Boundary Bay Airport (CZBB), British Columbia (BC), with 1 student and 1 instructor on board.

At 1257,¹ the aircraft departed CZBB and turned east-northeast while climbing to an altitude of 2400 feet above sea level (ASL).

At 1304, the instructor contacted the tower controller at Pitt Meadows Airport (CYPK), BC, for permission to enter the control zone for circuits. The CYPK tower controller responded that additional aircraft could not be accommodated in the circuit and the pilot should try Langley Regional Airport (CYNJ), BC, as an alternate. At 1305, the instructor contacted the CYNJ tower controller to request transit through the CYNJ control zone, and was cleared as requested. There were no further communications received from the aircraft.

At 1309, the aircraft began a descent from 2200 feet ASL, flying over the Fraser River near Fort Langley Water Aerodrome (CAS4), BC, levelling briefly at 1500 feet ASL and 300 feet ASL before it levelled at 200 feet ASL over the river when radar contact was lost at 1312:29. The aircraft's last recorded position was approximately 9.7 nautical miles (NM) north-northwest of Abbotsford Airport (CYXX), BC, travelling eastbound at 200 feet ASL, with a groundspeed of 80 knots. At

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

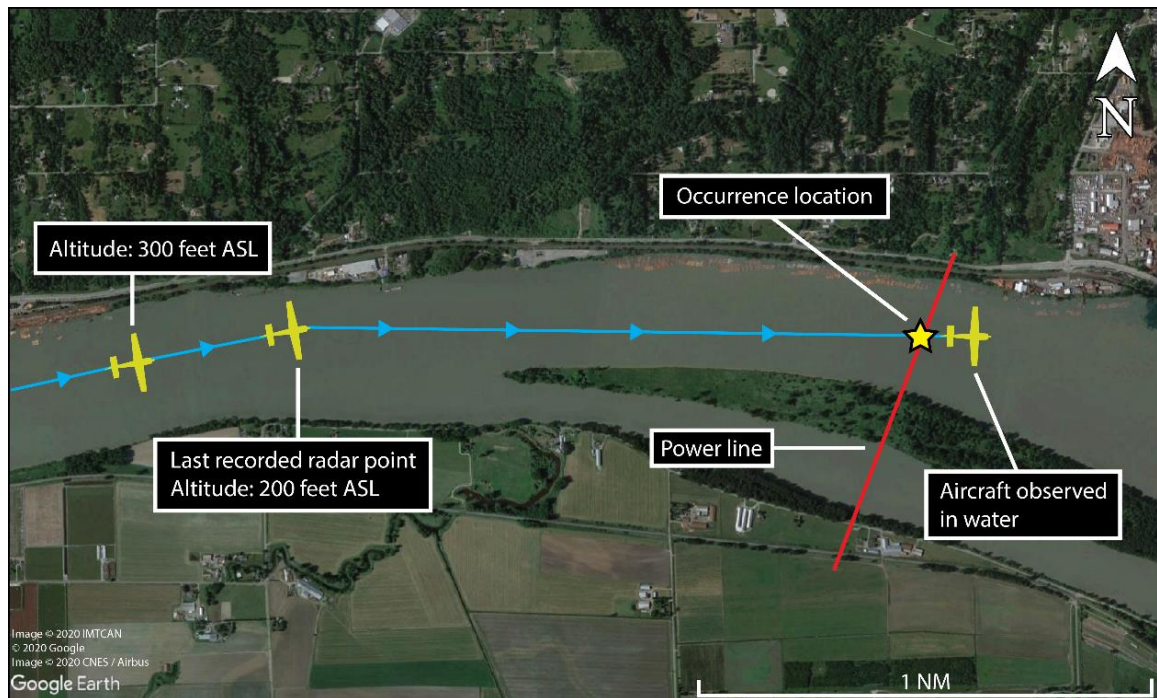
approximately 1313, the aircraft flew into a power transmission line that was strung across the Fraser River, approximately 125 feet above the water (Figure 1).

Observers in the area reported seeing a low-flying aircraft, and then seeing a splash in the river. They then saw the aircraft partially submerged. The first 911 call was received at 1319.

When local RCMP (Royal Canadian Mounted Police) and emergency responders arrived on scene, the aircraft could no longer be seen. Over the next several months, the RCMP used boats, helicopters, divers, and underwater imaging equipment in an attempt to locate the aircraft. However, the water level in the river was high at the time of the occurrence, which hampered the first few months of the search.

At the time of report writing, the occurrence aircraft and the occupants have not been found.

Figure 1. Occurrence aircraft's flight path and site of collision with power line (Source: Google Earth, with TSB annotations)



Weather information

According to the aerodrome routine meteorological report issued at 1300 for CYXX, the closest aerodrome to the site of the occurrence, the weather was favourable for VFR flight, with a reported temperature and dew point of 15 °C and 7 °C respectively. In addition, images recorded by Drive BC² road cameras near the occurrence site did not indicate the presence of any precipitation, low cloud, or reductions in visibility around the time of the occurrence. Weather was not considered a factor in this occurrence.

² British Columbia Ministry of Transportation and Infrastructure, Drive BC, "Webcam List", at <https://www.drivebc.ca/#webcams> (last accessed on 14 December 2020).

Pilot information

Instructor

The instructor was licensed and rated to provide flight instruction. He held a Class 4 instructor rating, and was therefore required to be under the supervision of a Class 1 or 2 instructor.³ In this case, the instructor was being supervised by the flight training unit's (FTU's) chief flight instructor, a Class 2 instructor. The occurrence instructor had accumulated a total of approximately 808 flight hours, including 494 hours as an instructor.

Student

The investigation determined that the student had accumulated approximately 80 flight hours at a FTU in the United States. The training at that FTU had concluded in May 2019. The student's flight instruction in Canada began in February 2020, and he had accumulated approximately 10 additional flight hours at the time of the occurrence.

Aircraft information

The occurrence aircraft was manufactured in 1972 and had accumulated approximately 3407 hours of total airtime. Records indicate that the aircraft was certified, equipped, and maintained in accordance with existing regulations. The aircraft had no known deficiencies before the occurrence flight.

The aircraft was not equipped with a flight data or cockpit voice recorder, nor was it required to be by regulation.

The aircraft was equipped with an ACK Technologies emergency locator transmitter, model E-04, capable of transmitting on 121.5 MHz and 406 MHz. No signal was detected.

Power transmission lines and markings

At the occurrence site, there are two 69 kilovolt (kV) power transmission circuits, consisting of 3 phase conductors each, for a total of 6 conductors (power transmission lines),⁴ spanning the Fraser river. These lines are owned by BC Hydro⁵ and are approximately 10 feet apart vertically and 22 feet apart horizontally. Three suspension towers support the power transmission lines that span across the river (Table 1).

³ Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, section 401.62.

⁴ The power transmission lines in this area are aluminum alloy conductors with steel reinforcement. There are 26 aluminum wires twisted around 7 galvanized steel wires creating a rated tensile strength of 95.6 kilonewtons (KN).

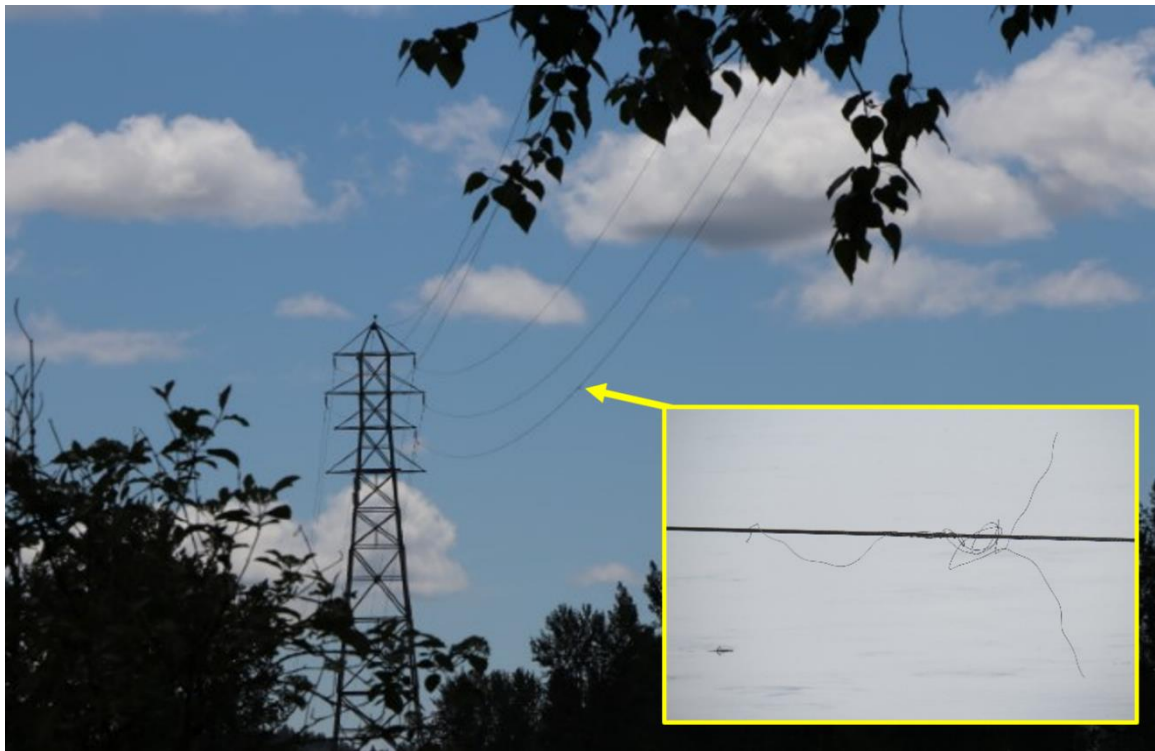
⁵ BC Hydro is a Crown corporation of the Government of British Columbia.

Table 1. Heights of the suspension towers that support the power transmission lines

Name of tower	Height above sea level	Height above ground level
North suspension tower	84 m (276 feet)	57 m (187 feet)
Middle suspension tower	63 m (207 feet)	57 m (187 feet)
South suspension tower	50 m (164 feet)	44 m (144 feet)

The aircraft collided with the span between the North and the Middle suspension towers, which is 2077 feet long and was approximately 125 feet above the river at the time of the occurrence.⁶ The lowest line was damaged and was disabled by circuit protection (Figure 2).

Figure 2. South-facing view of Middle suspension tower with inset image of damaged transmission line (Main image source: TSB. Inset image source: BC Hydro)



Section 601.23 of the *Canadian Aviation Regulations* (CARs) states that

[...] any building, structure or object, including any addition to it, constitutes an obstacle to air navigation if [...] in the case of any catenary wires crossing over a river, any portion of the wires or supporting structures is higher than 90 m [about 300 feet] AGL.^{7,8}

⁶ Conductor span sag varies depending on the ambient temperature and electrical load. For this conductor, the span could be as low as 90 feet above the river. (Source: BC Hydro)

⁷ Transport Canada, SOR/96-433, *Canadian Aviation Regulations* (last amended 27 June 2018), paragraph 601.23(1)(e).

⁸ Standard 621 of the *Canadian Aviation Regulations* defines a catenary as “the curved span of overhead wires hung freely between two supporting structures, normally with regard to exceptionally long elevated spans over

Therefore, given their height above the water, the power transmission lines did not constitute an obstacle to air navigation according to that regulation; however at an undetermined date prior to 2008, Transport Canada (TC) deemed the crossing to be an obstacle to navigation as the power lines were in close proximity to the VFR route through the Glen Valley practice area. As a result of this determination, lights were installed on the suspension towers, and the power transmission lines were depicted on the VFR navigational chart for the area (Figure 3).

Figure 3. Visual flight rules navigational chart for the area. The power lines crossing the Fraser River are circled. (Source: NAV CANADA, with TSB annotations)



In October 2015, BC Hydro submitted a request to TC to upgrade the suspension tower lights. TC approved the request shortly after the submission.

Medium-intensity (CL-866) white lights for daytime use were installed on the North and Middle suspension tower in 2019; however, at the time of the occurrence, the lights had not been activated.

As a result of the inactive suspension tower lighting, a recurring NOTAM was issued in 2015, indicating that the cable crossing was unmarked. This NOTAM was still valid at the time of occurrence. The investigation was unable to determine if the flight instructor or student were aware of the NOTAM, or if they were aware that the power transmission lines were indicated on the navigational chart.

Obstacle collision avoidance system

In 2008, BC Hydro implemented an obstacle collision avoidance system (OCAS) on spans of power transmission lines along known aviation routes as a trial at 4 sites in the province, including the occurrence site. The system used active radar, radio communication, and strobe lights to warn aircraft if they were on a collision course with the monitored span. Because the system used radar, its operation was independent of any equipment on board the aircraft.

canyons, rivers and deep valleys. (Source: Transport Canada, SOR/96-433, *Canadian Aviation Regulations*, Standard 621: Obstruction Marking and Lighting.)

In 2014, the private company that was supplying BC Hydro with support for the OCAS equipment ceased operation. Because OCAS relied on the real-time monitoring that the company provided, when this ended, BC Hydro was forced to stop using the system and all 4 OCAS in the province were deactivated. At the time, there were no other certified alternatives.

Low flight

The CARs stipulate that no person shall operate an aircraft “at a distance less than 500 feet from any person, vessel, vehicle or structure.”⁹ This distance of 500 feet applies both vertically and horizontally. The CARs do allow for flight training aircraft to operate below 500 feet, but only when operated outside of a built-up area, when operated without creating a hazard to persons or property on the surface, and when operated for the purpose of flight training by or under the supervision of a qualified flight instructor.¹⁰ The *Transport Canada Aeronautical Information Manual*¹¹ provides good airmanship advice on low flying.

Intentionally flying at a low altitude increases the risk of an accident. At heights below 90 m (about 300 feet) AGL, obstacles can be difficult to see as they might not be physically marked, or indicated on navigational charts. Flying at low altitude also reduces the margin of safety in the event of engine failure, a loss of control, or any other unexpected circumstances, and increases the risk of an impact with the ground or an obstacle.

The TSB has recently investigated several occurrences¹² which involved intentional low flight.

International Flight Centre Inc. training program

Flight training at International Flight Centre Inc. was being conducted with reference to the lesson plans contained in TC’s *Flight Instructor Guide – Aeroplane* (TP 975). The instructor was conducting flight training, for the student, in accordance with the regulations for initial issuance of a licence.¹³

The flight training program outline provided to the student did not contain a policy on acceptable minimum altitudes for low-level flying activity, nor was it required under the CARs. The Chief Flight Instructor had, however, verbally directed his instructors to not go below 500 feet during flight instruction. A review of the student pilot’s training record provided no indication that low-level manoeuvres had been previously practised (e.g., precautionary landings, low level diversions), or that such manoeuvres were planned for the occurrence flight. The investigation was unable to determine what, if any, purpose there was to operate the aircraft at less than 500 feet above the Fraser River.

⁹ Transport Canada, SOR/96-433, *Canadian Aviation Regulations* (last amended 27 June 2018), paragraph 602.14(2)(b).

¹⁰ *Ibid.*, subparagraph 602.15(2)(iv).

¹¹ Transport Canada, TP 14371, *Transport Canada Aeronautical Manual* (TC AIM), Issue 2020-2 (08 October 2020), AIR - Airmanship, section 2.4 Low Flying.

¹² TSB air transportation safety investigation reports A16A0084, A17Q0050, A18W0098, A18O0107, A19Q0096, and A20Q0023.

¹³ Transport Canada, SOR/96-433, *Canadian Aviation Regulations* (last amended 27 June 2018), paragraph 405.11(a).

Safety action taken

BC Hydro has prioritized the schedule for the commissioning of the daytime strobe lights, which should be completed in 2021. Once this work has been completed, the NOTAM will be rescinded.

Safety message

Low-altitude flight always presents higher risk. Not all hazards, such as power transmission lines, are physically marked or can be seen in time to avoid collision.

This report concludes the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 16 December 2020. It was officially released on 07 January 2021.

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.

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

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.

TERMS OF USE

Use in legal, disciplinary or other proceedings

The *Canadian Transportation Accident Investigation and Safety Board Act* states the following:

- 7(3) No finding of the Board shall be construed as assigning fault or determining civil or criminal liability.
- 7(4) The findings of the Board are not binding on the parties to any legal, disciplinary or other proceedings.

Therefore, the TSB's investigations and the resulting reports are not created for use in the context of legal, disciplinary or other proceedings.

Notify the TSB in writing if this report is being used or might be used in such proceedings.

Non-commercial reproduction

Unless otherwise specified, you may reproduce this investigation report in whole or in part for non-commercial purposes, and in any format, without charge or further permission, provided you do the following:

- Exercise due diligence in ensuring the accuracy of the materials reproduced.
- Indicate the complete title of the materials reproduced and name the Transportation Safety Board of Canada as the author.
- Indicate that the reproduction is a copy of the version available at [URL where original document is available].

Commercial reproduction

Unless otherwise specified, you may not reproduce this investigation report, in whole or in part, for the purposes of commercial redistribution without prior written permission from the TSB.

Materials under the copyright of another party

Some of the content in this investigation report (notably images on which a source other than the TSB is named) is subject to the copyright of another party and is protected under the *Copyright Act* and international agreements. For information concerning copyright ownership and restrictions, please contact the TSB.

Citation

Transportation Safety Board of Canada, *Air Transportation Safety Investigation Report A20P0060* (released 07 January 2021).

Transportation Safety Board of Canada
200 Promenade du Portage, 4th floor
Gatineau QC K1A 1K8
819-994-3741; 1-800-387-3557
www.tsb.gc.ca
communications@tsb.gc.ca

© Her Majesty the Queen in Right of Canada, as represented by the Transportation Safety Board of Canada, 2021

Air transportation safety investigation report A20P0060

Cat. No. TU3-10/20-0060E-PDF

ISBN: 978-0-660-36962-4

This report is available on the website of the Transportation Safety Board of Canada at www.tsb.gc.ca

Le présent rapport est également disponible en français.