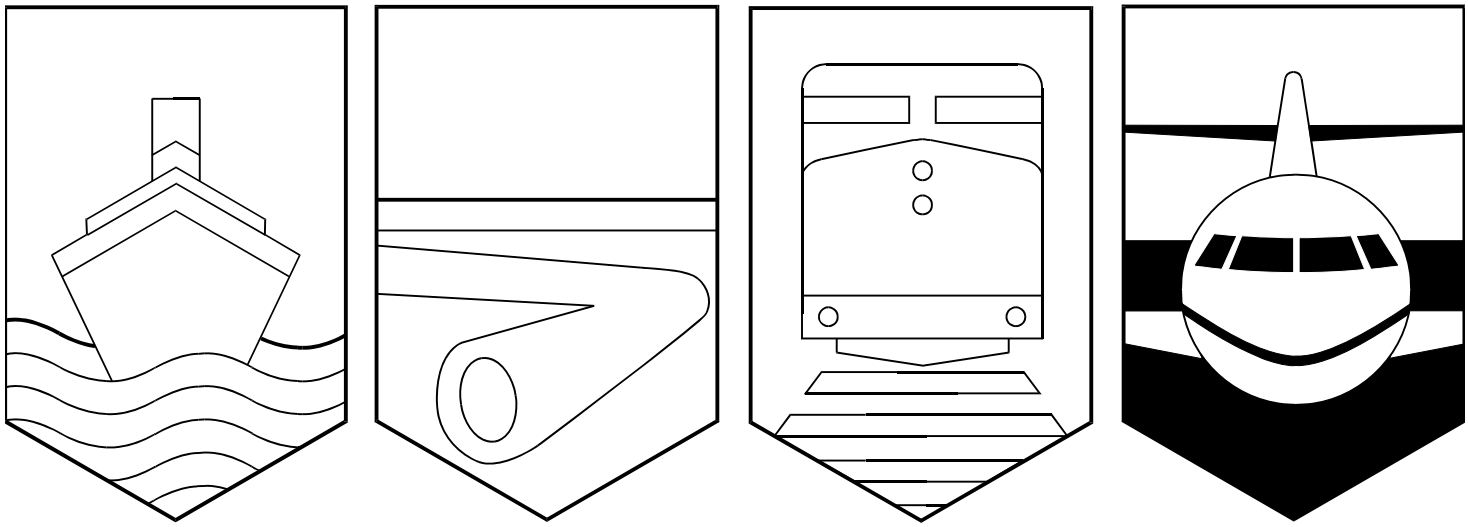
Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada



AVIATION OCCURRENCE REPORT

UNCONTROLLED DESCENT - SPIN

BEECHCRAFT B35 BONANZA N8784A
PORT MAITLAND, ONTARIO 12 nm SW
27 SEPTEMBER 1994

REPORT NUMBER A94O0265

Canada

MANDATE OF THE TSB

The Canadian Transportation Accident Investigation and Safety Board Act provides the legal framework governing the TSB's activities. Basically, the TSB has a mandate to advance safety in the marine, pipeline, rail, and aviation modes of transportation by:

- conducting independent investigations and, if necessary, public inquiries into transportation occurrences in order to make findings as to their causes and contributing factors;
- reporting publicly on its investigations and public inquiries and on the related findings;
- identifying safety deficiencies as evidenced by transportation occurrences;
- making recommendations designed to eliminate or reduce any such safety deficiencies; and
- conducting special studies and special investigations on transportation safety matters.

It is not the function of the Board to assign fault or determine civil or criminal liability. However, the Board must not refrain from fully reporting on the causes and contributing factors merely because fault or liability might be inferred from the Board's findings.

INDEPENDENCE

To enable the public to have confidence in the transportation accident investigation process, it is essential that the investigating agency be, and be seen to be, independent and free from any conflicts of interest when it investigates accidents, identifies safety deficiencies, and makes safety recommendations. Independence is a key feature of the TSB. The Board reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from other government agencies and departments. Its independence enables it to be fully objective in arriving at its conclusions and recommendations.

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Aviation Occurrence Report

Uncontrolled Descent - Spin

Beechcraft B35 Bonanza N8784A
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Synopsis

The pilot departed Santa Fe, New Mexico, on a two-day visual flight rules flight to Burlington, Vermont. During the second day of the trip and while overflying Lake Erie, the pilot reported to Air Traffic Control that the aircraft was in a spin. The Beechcraft Bonanza descended rapidly and disappeared from the controller's radar indicator module. The aircraft struck the surface of Lake Erie at high speed and was destroyed. The pilot sustained fatal injuries.

The Board determined that the non-instrument-rated pilot continued flight into known adverse weather conditions and lost control of the aircraft.

Ce rapport est également disponible en français.

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1.0 Factual Information

1.1 History of the Flight

The pilot was the private owner of the aircraft and was conducting a visual flight rules (VFR)[1] flight from Santa Fe, New Mexico, to Burlington, Vermont. During the first day of the two-day trip, the pilot flew from Santa Fe to Fall City, Nebraska, where he stayed overnight. On the second day, the pilot received a weather briefing from the Columbus, Nebraska, Flight Service Station (FSS) and then departed Fall City for a flight to Jacksonville, Illinois, where the aircraft landed and was refuelled. While at Jacksonville, the pilot telephoned the St. Louis, Missouri, FSS and received the weather information for both the Cleveland, Ohio, and Burlington, Vermont, areas. The aircraft departed Jacksonville at 1145 central daylight saving time (CDT)[2] for a final destination of Burlington.

The pilot conducted his VFR flight at various altitudes and was climbing to 13,500 feet above sea level (asl) while overflying Lake Erie. The pilot reported to Air Traffic Control (ATC) that he was deviating to the northeast to circumnavigate some cloud activity. Approximately eight minutes later, the pilot reported to ATC that the aircraft was in a spin. Shortly thereafter, the aircraft target was no longer observed on the controller's radar screen.

The aircraft struck the surface of Lake Erie at latitude 42°42'N and longitude 079°45'W, at approximately 1659 eastern daylight saving time (EDT)[3], during the hours of daylight, at an elevation of 600 feet asl.

1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	1	-	-	1
Serious	-	-	-	-
Minor/None	-	-	-	-
Total	1	-	-	1

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

There was no other damage.

1.5 Personnel Information

	Pilot-in-command
Age	62
Pilot Licence	Private (USA)
Medical Expiry Date	1 Feb 95
Total Flying Hours	687
Hours on Type	575
Hours Last 90 Days	35
Hours on Type Last 90 Days	35
Hours on Duty Prior to Occurrence	N/A
Hours off Duty Prior to Work Period	N/A

The 62-year-old private pilot was properly licensed and was in possession of a valid third class medical certificate issued by the

1 See Glossary for all abbreviations and acronyms.

2 CDT is equivalent to Coordinated Universal Time (UTC) minus five hours.

3 All times are EDT (UTC minus four hours) unless otherwise stated.

Federal Aviation Administration (FAA). At the time of the occurrence, he did not have an instrument rating nor had he ever held such a rating. He was the owner of the Beechcraft Bonanza aircraft involved in the accident.

The pilot was a businessman who used the aircraft to conduct many of his business trips. Most of his flying was throughout the United States and parts of Canada.

1.6 Aircraft Information

Manufacturer	Beechcraft
Type and Model	B35 Bonanza
Year of Manufacture	1950
Serial Number	D-2207
Certificate of Airworthiness (Flight Permit)	Valid
Total Airframe Time	1,775+ hr
Engine Type (number of)	E-185-8
Propeller/Rotor Type (number of)	Hartzell HC-A2V20-4A1
Maximum Allowable Take-off Weight	2,750 lb
Recommended Fuel Type(s)	100 LL
Fuel Type Used	100 LL

1.7 Meteorological Information

A low pressure centre over central Lake Huron at 0800 drifted slowly northeastward to lie just north of Muskoka by 1400 and then northwestward to near Sudbury by 2000. A cold front had outstripped the low and was oriented north to south over central Lake Ontario at 0800. By 2000, the cold front had moved eastward to lie just east of Lake Ontario. In the wake of the cold front, the air mass was unstable, as evidenced by both surface observations and radar reports of showers and thunderstorms between 0800 and 2000. Broken to overcast altocumulus cloud covered southern Ontario, with the cloud scattering over eastern Lake Erie and adjacent areas by 2000. However, stratocumulus cloud was reported throughout the day with mainly broken ceilings roughly 2,000 to 3,000 feet above ground level (agl). In addition, towering cumulus and cumulonimbus were reported with the showers and thunderstorms. Ceilings as low as 800 feet asl were reported with a thunderstorm at St. Catharines, Ontario. Horizontal visibilities were generally seven to ten miles with visibilities of four to six miles reported in showers. Visibilities further lowered to two miles in thunderstorms, but could have been as low as one-half mile in the strong thunderstorms documented in the radar reports. As well, stratus ceilings of 200 to 800 feet and visibilities of one to three miles in light drizzle and fog were forecast in the onshore flow off the Great Lakes. Although no weather reports for the area were found, these low ceilings and visibilities were possible over Lake Erie as cool air passed over the relatively warm lake water.

Conditions were generally VFR with frequent marginal visual flight rules (MVFR) conditions due to lower ceilings and visibilities in showers. Conditions were briefly in the instrument flight rules (IFR) category due to low ceilings and visibilities in thunderstorms as well as due to stratus and fog over Lake Erie.

The presence of the low pressure centre in the vicinity of Lake Huron and Georgian Bay kept the surface winds mainly southwesterly behind the cold front, as opposed to the usual northwesterly flow. The pressure gradient produced surface winds of 10 to 15 knots with gusts to 20 knots between 1400 and 1800. Gusts as high as 27 knots were reported at Buffalo, New York, due to unstable conditions over Lake Erie. Eastern Lake Erie water temperatures in the range of 15 to 18 degrees Celsius and air temperatures of 12 to 14 degrees Celsius combined to produce unstable conditions in the low levels. These gusty surface winds likely produced some moderate mechanical turbulence in the low levels although no pilot reports were available.

In addition, moderate convective turbulence would have been experienced near towering cumulus with severe turbulence likely in the vicinity of the cumulonimbus. Unstable conditions in both the low levels and aloft, combined with gusty surface winds, made moderate turbulence favourable throughout the atmosphere.

At the time of the occurrence, Buffalo was reporting the hourly weather observation at 1650 to be a measured ceiling of 3,500 feet broken, 6,500 feet broken, 10,000 feet overcast, visibility six miles with light rain showers, temperature 66 degrees Fahrenheit, dew point 53 degrees Fahrenheit, wind 220 degrees true at 14 knots gusting to 27 knots and the altimeter setting 29.69.

1.8 Radar Recordings

The Radar Modernization Program (RAMP) radar data was collected from the Toronto Area Control Centre (ACC) and was forwarded to the TSB Engineering Branch Laboratory in Ottawa, Ontario. The data showed the aircraft was climbing slowly to an altitude of 13,300 feet asl before rapidly descending to 7,900 feet asl. The aircraft climbed again to 8,900 feet asl and then descended rapidly to 7,600 feet asl. Again the aircraft climbed to 9,100 feet asl and then descended into Lake Erie.

The radar data depicted a meandering track as the aircraft slowly climbed to 13,300 feet asl. The aircraft turned to the right as it was rapidly descending to 7,900 feet asl, and was again observed to turn to the right during its final uncontrolled descent.

1.9 Communications

Prior to departing Fall City, the pilot contacted the Columbus FSS and received a weather briefing for his intended flight to Burlington. The weather briefer advised the pilot of a storm system moving through the Great Lakes Region and the IFR conditions associated with it. The briefing also included forecast thunderstorm activity between the Toronto, Ontario, area and upstate New York regions.

While at Jacksonville, the pilot telephoned the St. Louis FSS and received weather information for Cleveland and Burlington.

While en route, the pilot contacted the Kankakee, Illinois, FSS and received additional weather information at 1316. At 1442, the pilot gave the Kankakee FSS an in-flight pilot report of the weather conditions (PIREP). His description of the cloud condition indicated that he was flying the aircraft by VFR on top of cloud.

At 1542, the pilot contacted Cleveland Approach and reported his position to be 10 miles east of Sandusky, Ohio. The pilot was advised that he could expect to encounter some weather 60 miles ahead of his position. At 1601, Cleveland Approach advised the pilot that he was about to encounter a line of thunderstorms in 20 miles.

At 1602, the pilot contacted Erie Approach and was again advised of thunderstorm cell activity in the area. At 1614, the pilot reported that he was vacating 9,500 feet asl for a higher altitude in order to maintain visual flight conditions. Twenty-five seconds later, the pilot advised that he was going to descend the aircraft back down to 9,500 feet asl and that he saw a hole that he could get through. At this time, ATC queried the pilot as to his IFR rating status and the pilot stated that he was not IFR rated. At 1619, Erie Approach gave Cleveland Centre a VFR point out of N8784A at 10,500 feet asl. At 1621, Erie Approach advised the pilot of more weather to the north and to the east of his current position. The pilot advised that he was descending the aircraft again. ATC advised the pilot to maintain VFR at all times and to advise if he was unable to do so. At 1623, the pilot queried ATC as to when the weather conditions would improve to the east. ATC gave the pilot a suggested heading to fly through the area of weather and again instructed the pilot to maintain VFR flight at 9,500 feet asl. The pilot acknowledged the instructions and advised that he was going to descend the aircraft again. At 1632, the pilot announced that he was climbing the aircraft to maintain VFR flight.

At 1643, the pilot contacted Cleveland Centre and advised that he was trying to climb the aircraft to 11,500 feet asl. At 1647, the pilot advised that he was climbing the aircraft to 12,500 feet asl and that he was trying to avoid an area of weather to the east of his position.

At 1653, the pilot contacted the Buffalo radar sector at Cleveland Centre for further flight following. At 1658, the pilot advised ATC that he was in trouble and that the aircraft was in a spin. This was the pilot's last radio transmission.

1.10 Autopsy Examination

An autopsy of the deceased pilot was conducted, and it was concluded that the cause of death was multiple injuries due to blunt trauma and drowning. Toxicological samples tested negative for ethanol, carbon monoxide, cyanide, and drug screen.

1.11 Wreckage and Impact Information

The aircraft was found five days after the accident using sonar mapping. The aircraft was located on the bottom of Lake Erie, 12 miles southwest of Port Maitland, Ontario, at an approximate depth of 95 feet. The aircraft was mostly intact and was in an inverted position on the lake floor. The only aircraft structure missing was a fuel wing tip tank which was found on the water surface earlier during the search and rescue stage.

The Ontario Provincial Police (OPP) divers secured the aircraft, which was lifted onto a barge and then brought to Dunnville, Ontario. The pilot was seated in the left seat with all elements of the "H" style restraint system still intact.

Examination revealed that the aircraft struck the water surface in a slightly nose-down, right-wing-low attitude. The underside of the aircraft was vertically compressed. Impact damage was sustained by the entire aircraft excluding the rear V-tail section. The pilot's control yoke was separated from the control cross arm. The control cross arm was fractured between the yoke and the central pillar. Continuity of the controls was verified to be operational.

1.12 Additional Information

About the time of the occurrence, a helicopter pilot returned to Port Maitland after a three-minute flight because of thunderstorm activity over Lake Erie.

2.0 Analysis

2.1 The Weather

The pilot was given a weather briefing before departure from Nebraska about a storm system moving through the Great Lakes Region and the IFR conditions that were associated with the system. The briefing included forecast conditions which also cited thunderstorm activity in the area for the entire period.

While en route at a time of 1542, the pilot was advised by ATC that he could expect to encounter some weather sixty miles ahead of his position. Again, at 1601, the pilot was advised by ATC that he was about to encounter a line of thunderstorms which were twenty miles ahead of his position. One minute later, another ATC agency advised the pilot of thunderstorm cell activity in the area. It could not be determined why the pilot continued his flight into known adverse weather conditions.

The pilot announced to ATC that he saw a hole in the surrounding cloud formations and that he thought he could get through. This statement indicated that the weather was not visual meteorological conditions (VMC) and, as a result, the air traffic controller queried the pilot as to his IFR status. The pilot advised that he was not IFR rated. At 1621, the pilot was advised of more weather to the north and to the east of his position. It could not be determined why the pilot continued his flight in that direction.

2.2 The Radar Data

Analysis of the recorded radar data showed that the pilot lost control of the aircraft twice and then regained control and climbed the aircraft to 9,100 feet asl before control was lost again for the third and last time.

2.3 The Aircraft Wreckage

Examination of the aircraft wreckage revealed vertical compression which indicated that the pilot may have attempted to recover control of the aircraft just prior to impact with the water surface.

3.0 Conclusions

3.1 Findings

1. Thunderstorm activity was present over Lake Erie at the time of the occurrence.

2. Various ATC agencies advised the pilot four times of inclement weather that he would encounter en route.

3. The pilot continued his flight into known adverse weather conditions.

4. The recorded radar data showed that control of the aircraft was lost on three occasions prior to impact with the water surface.

5. Examination of the aircraft wreckage revealed that the pilot may have attempted to recover control of the aircraft just prior to impact.

3.2 Causes

The non-instrument-rated pilot continued flight into known adverse weather conditions and lost control of the aircraft.

4.0 Safety Action

The Board has no aviation safety recommendations to issue at this time.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson John W. Stants, and members Zita Brunet and Hugh MacNeil, authorized the release of this report on 01 June 1995.

Appendix A - List of Supporting Reports

The following TSB Engineering Branch Laboratory Reports were completed:

LP 162/94 - Airspeed Indicator; and
LP 173/94 - Radar Analysis.

These reports are available upon request from the Transportation Safety Board of Canada.

Appendix B - Glossary

ACC	Area Control Centre
agl	above ground level
asl	above sea level
ATC	air traffic control
CDT	central daylight saving time
EDT	eastern daylight saving time
FAA	Federal Aviation Administration
FSS	Flight Service Station
hr	hour(s)
IFR	instrument flight rules
lb	pound(s)
MVFR	marginal visual flight rules
N/A	not available
nm	nautical miles
OPP	Ontario Provincial Police
PIREP	pilot report of weather conditions in flight
RAMP	Radar Modernization Program
TSB	Transportation Safety Board of Canada
UTC	Coordinated Universal Time
VFR	visual flight rules
VMC	visual meteorological conditions
°	degree(s)
'	minute(s)

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