National Transportation Safety Board
Aviation Accident Final Report

Location:	AITKIN, MN	**Accident Number:**	CHI96FA184
Date & Time:	06/02/1996, 1317 CDT	**Registration:**	N9114Q
Aircraft:	Piper PA-46-310P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane was in cruise flight at 17,000 feet msl when the pilot told Minneapolis ARTCC 'We're picking up some ice and rain, and we're going to turn around.' ARTCC approved the request. Two minutes later the pilot told ARTCC that 'We're looking for some help to get around this weather southbound.' ARTCC told the pilot that he could turn either east or west. The pilot turned west, then 4 minutes later turned back to the south. The pilot then told ARTCC that they were still encountering weather. ARTCC directed the pilot to turn north and then east whenever he could. Approximately 1 minute later ARTCC radar showed the airplane in a rapid descent. The pilot then told ARTCC 'Minneapolis center, N9114Q is out of control.' The pilot had received a FSS briefing prior to takeoff, and was advised of convective conditions and precipitation building to the south along his intended route of flight. The airplane was approximately 548 pounds over maximum takeoff weight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's continued flight into known adverse weather conditions and the pilot exceeding the design stress limits of the airplane. Factors contributing to this accident were: the thunderstorms, hail, and wind gusts, and the airplane's over maximum gross weight condition.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
1. (F) WEATHER CONDITION - THUNDERSTORM
2. (F) WEATHER CONDITION - HAIL
3. (F) WEATHER CONDITION - GUSTS
4. (C) FLIGHT INTO KNOWN ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: DESCENT - UNCONTROLLED

Findings
5. (F) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
6. WING,SPAR - OVERLOAD
7. (C) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
8. WING - SEPARATION

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On June 2, 1996, at 1317 central daylight time (cdt), a Piper, PA-46-310P, N9114Q, operated by a private pilot, was destroyed when during cruise flight it broke up, and subsequently impacted the terrain near Aitkin, Minnesota. Instrument meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under 14 CFR Part 91. An IFR flight plan was on file. The pilot and three passengers on board were fatally injured. The flight originated at International Falls, Minnesota, at 1220 cdt, and was en route to Ottumwa, Iowa.

The pilot arrived at the Sioux Lookout, Ontario, Canada, Flight Service Station (FSS) and received a weather briefing at 1042 cdt. He requested the weather forecast for a route of flight originating at Sioux Lookout, stopping at International Falls, Minnesota, and continuing to a final destination of Ottumwa, Iowa. Following the briefing, the pilot filed an IFR flight plan to International Falls, Minnesota. The pilot departed Sioux Lookout at approximately 1115 cdt.

At 1208 cdt, the pilot contacted the Princeton, Minnesota, Flight Service Station by telephone from International Falls, Minnesota.

The pilot filed an IFR flight plan from International Falls, Minnesota, to Ottumwa, Iowa. The pilot also requested and received winds aloft.

At 1218 cdt, the pilot called for his IFR clearance. One minute later, Minneapolis Air Route Traffic Control Center (ARTCC) Sector 25 issued the pilot a clearance from International Falls, Minnesota, to Ottumwa, Iowa, via direct, and to climb and maintain 15,000 feet mean sea level (msl). The airplane departed International Falls, Minnesota, shortly after the pilot received the clearance.

At 1243 cdt, the pilot requested and received from Minneapolis ARTCC Sector 25, clearance to 17,000 feet msl.

At 1303 cdt, the pilot was directed to change radio frequencies. The pilot checked in with Minneapolis ARTCC Sector 10, and reported being at 17,000 feet msl.

At 1305:55 cdt, the pilot said to Minneapolis ARTCC, "we're going to make a one eighty here and get back out of some of this weather here. We're picking up some ice and rain, and we're going to turn around." Minneapolis ARTCC, awaiting a clearance readback from another airplane, responded by telling the pilot to "hold on to your request. I'll be back with you in two minutes."

Minneapolis ARTCC radar showed the pilot initiate a right turn to a heading of 334 degrees magnetic. He completed the turn at 1308:55 cdt.

At 1306:46 cdt, Minneapolis ARTCC approved the pilot's request to "turn back north."

At 1308:55 cdt, the pilot told Minneapolis ARTCC that they were on a 350-degree heading at 17,000 feet msl, and "we're looking for some help to get around this weather southbound." Minneapolis ARTCC told the pilot, "looks like you can go either east or west. Right now west, it looks like about twenty miles 'til you can turn southeast. Maybe thirty miles (if you go) south." The pilot elected to turn west.

At 1310:25 cdt, Minneapolis ARTCC radar showed the pilot initiate a left turn to a heading of 272-degrees magnetic. He completed the turn at 1312:31 cdt. The pilot remained on an

approximate heading of 268-degrees magnetic for one minute and 36 seconds.

At 1314:07 cdt, Minneapolis ARTCC radar showed the pilot initiate a second left turn to a heading of 210-degrees magnetic. He completed the turn at 1315:19 cdt.

At 1314:57 cdt, the pilot said to Minneapolis ARTCC, "We're still encountering some weather here at 17,000 (feet msl). We're heading southbound now. Any suggestions for us now?" Minneapolis ARTCC told the pilot that it "looks like you're going back into that area that you avoided before right now," and directed the pilot to "turn northbound and then east whenever you can." The pilot responded, "Okay, northbound." Minneapolis ARTCC then said to the pilot, "I'd suggest you turn north and go east. I know when you go east, you go over Duluth, you'll be able to go straight south." The pilot asked, "How far east?" Minneapolis ARTCC responded, "about forty miles." The pilot said, "okay."

At 1316:19 cdt, Minneapolis ARTCC radar showed the airplane in a rapid descent.

At 1316:24 cdt, the pilot said over the radio, "Minneapolis center, N9114Q is out of control."

At 1316:42, Minneapolis ARTCC said, "N9114Q, how do you hear?" At 1316:45, the pilot said, "114Q is here." Minneapolis ARTCC responded, "Go ahead sir, what do you have?"

The pilot's final recorded transmission at 1316:49 was, "We're descending."

At 1317:37, the pilot of Messaba Flight 2927 told Minneapolis ARTCC that he heard the radio calls of N9114Q and said, "he seemed a little shaken there. He sounded like he was in a spin. I don't know if he's in the weather." The center requested that the pilot of Messaba Flight 2927 try to raise the pilot of N9114Q. After several attempts, the pilot of Messaba Flight 2927 told Minneapolis ARTCC, "The last transmission he made, he said it felt like he didn't have a tail."

A witness, piloting his Cessna 182 near Little Falls, Minnesota, monitored the transmissions made by the pilot of N9114Q. The witness stated that the pilot said that his airplane was out of control and that he was in a flat spin. The pilot reported being at 14,000 feet mean sea level (msl) and descending 4,000 feet per minute. The witness recalls that the pilot specifically said, "I can't get it out of a flat spin. It (the airplane) is acting like it didn't have a tail." After that statement, the witness did not hear any further transmissions from the pilot.

PERSONNEL INFORMATION

The pilot had 1,817 total flying hours, 1,084 hours in the PA-46-310P. The pilot had attended PA-46-310P ground and flight refresher training conducted by Attitudes International, Incorporated, at Olathe, Kansas on April 26, 1996.

A certified flight instructor for Ottumwa Flying Service, Ottumwa, Iowa, who had flown with the pilot since March of 1989 and had given the pilot his previous biennial flight review, stated that the pilot "flew in spurts. One thing I did notice when I first flew with him was that he tended to use the autopilot a lot. We tried to get over that, and I had him hand- fly the airplane." He also stated that although the pilot had an instrument rating, he was not comfortable flying in meteorological conditions. He would go out of his way to avoid weather of any kind.

AIRCRAFT INFORMATION

The airplane was owned and operated by Home Oil Stations, Incorporated, Ottumwa, Iowa, of which the pilot was chief executive officer. The airplane was used for business and pleasure.

The airplane had an annual inspection performed on May 24, 1996, by Des Moines Flying Service, Incorporated, Des Moines, Iowa. The airplane was parked and routinely maintained by Ottumwa Flying Service, at Ottumwa, Iowa.

METEOROLOGICAL CONDITIONS

At 1255 cdt, the National Weather Service issued Convective SIGMET 48C, valid until 1555 cdt, which reported from an area 20 miles south of International Falls, Minnesota, to Duluth, Minnesota, to 50 miles north-northeast of Minneapolis/Saint Paul, Minnesota, to 20 miles south-southeast of Bemigji, Minnesota, severe thunderstorms moving from the west at 20 miles per hour; tops to 30,000 feet MSL; Hail to one-inch in diameter, and possible wind gusts to 50 knots.

The weather observer at Aitkin, Minnesota, at 1255 cdt, reported a measured broken ceiling of 4,400 feet MSL, 5,000 feet MSL broken and 6,000 feet MSL overcast, 10 miles visibility, winds from 210 degrees magnetic at 12 knots, gusting to 16 knots, and remarks of lightning in the vicinity and distance, north and northwest of the airport.

The pilot received a weather briefing from the weather observer at Sioux Lookout FSS, Ontario, Canada, at 1042 cdt. The observer first went over the area forecast and the current weather conditions. The MIDS computer screen showed IFR conditions east of the pilot's intended route of flight and marginal VFR to IFR conditions west of the pilot's route of flight, due to a weather feature. The weather feature to the west of the pilot's intended route was indicated on the area forecast as being a north-south line moving eastward quickly. Next the pilot requested and received actual forecasts, terminal forecasts and winds aloft for his route of flight. The terminal forecasts showed scattered conditions until 1500 cdt, then marginal VFR to VFR ceilings with thunderstorm activity.

The pilot received an updated weather briefing while at International Falls, Minnesota, from the Princeton, Minnesota, Flight Service Station at 1708 cdt. Princeton FSS advised the pilot of convective conditions and precipitation building over the previous twenty minutes, twenty miles south of International Falls and 75 miles north of Minneapolis, Minnesota. The pilot responded, "I can see some stuff there in the middle of the state, maybe Brainerd, around there somewhere on the radar screen here at International Falls." The pilot also told Princeton FSS that he could see it looking out of the window.

WRECKAGE AND IMPACT INFORMATION

The NTSB on scene investigation began on June 3, 1996, at 0930 cdt.

The airplane's main wreckage was resting upright in a level, wooded tamarack swamp, 7 miles north of Aitkin, Minnesota. The fuselage was oriented on a magnetic heading of 180 degrees. There was damage to a tree just forward of the airplane's left wing. There was no other damage to surrounding trees or bushes. Other airplane components, including the right outboard wing and empennage, were located within 1.1 miles of the main wreckage on a 135-degree mean heading.

The main wreckage consisted of the fuselage forward of the cabin pressure bulkhead, the left wing, the right wing from the wing root to the spar splice, the engine and the propeller. The fuselage, forward of the windshield, and the cowling were bent down. The engine and propeller were submerged in water, beneath the cowling. The fuselage, aft of the cowling running rearward to the cabin pressure bulkhead, was crushed upward underneath along its

entire length. The right forward cabin floor was bent up approximately 10 inches. The top of the fuselage had compressed inward approximately 8 inches. There were numerous wrinkles in the skin along the entire length of the fuselage. A 10 inch fracture was observed in the top left side of the fuselage above the top right corner of the main cabin door. The main cabin door was found open. The lower door was bent outward. The latching mechanism was undamaged. The upper instrument panel was bent down and buckled in the middle. The lower part of the instrument panel was bent in and forward. The fuselage aft of the pressure bulkhead had separated at the rivet line. Black rubber scuffs and paint transfers matching paint from the wing, were observed along the upper right fuselage approximately 18 inches forward of the cabin pressure bulkhead and running at a 40 degree angle to the airplane's longitudinal axis, aft to the rivet line. The metal at the rivet line was bent down and left. The rivets were absent and the rivet holes were stretched predominately down and rearward.

The underside of the left wing was crushed upward along its entire span. The leading edge and upper surface of the left wing showed numerous bends and skin wrinkles. The left aileron was attached to the left wing at the inboard hinge and bellcrank. It was detached at the outboard hinge. The left main gear was in its wheel well and was undamaged. The gear door was bent inward. Examination of the left wing center and forward spars revealed buckling forward at the root. The aft spar showed no evidence of buckling. The smell of fuel was prevalent.

The inboard one-third of the right wing was crushed upward from the wing root to the spar splice. The leading edge and upper surface showed skin wrinkles throughout. The outboard two-thirds of the wing was separated at the rivet line. The majority of the rivets were broken. The forward and center spars were buckled forward and fractured upward. The aft spar had broken aft and up. The deicing boot tube at the right wing's leading edge was bent up 45-degrees beginning at the spar splice, and broken 6 inches beyond the spar splice. The fuel vent line aft of the deicing boot line, was bent up 80-degrees beginning at the spar splice, and separated at two clamps, 13 inches beyond the spar splice. The right wing fuel line was bent aft and slightly up. It was broken 8 inches beyond the spar splice. The right main gear was in its wheel well and was undamaged. The gear door was bent up and inward.

The right outboard wing section was located near a rice paddy, 3,000 feet from the main wreckage on a 132-degree heading. The wing section had separated at the spar splice. The rivets along the attachment seam were gone. The forward and center spars were buckled forward, bent upward and fractured upward. The aft spar was bent aft and upward and broken upward. The upper wing skin exhibited 30-degree lateral wrinkle lines running longitudinally from the wing separation point. A six-inch tear in the leading edge of the wing section was observed 38 inches inboard of the wingtip. The metal at the tear was crushed in and bent upward. Paint scrapes matching paint from the fuselage was found in the metal. Several tears in the deicing boot were observed running longitudinal to the leading edge at 40-degree angles. A large dent was observed in the leading edge of the wing section approximately 26 inches inboard of the wingtip. The upper wing skin in this area was bent upward and aft. A wing skin panel aft of this dent was pushed up and separated along the rivet line from the wingtip inward to the lateral seam behind the dent. The right aileron had separated from the wing. The outboard hinge mount was broken off.

The outboard two-thirds of the right aileron was located along a dike, 3,800 feet from the main wreckage on a 131-degree heading. The aileron section was broken along the rivet line near the inboard attach hinge. The outboard hinge was still attached. Metal where the flight control

actuator was located was bent inward. The skin displayed some wrinkling.

The empennage, consisting of the tailcone, rudder and right horizontal stabilizer was located partially submerged in the center of a rice paddy, 3,600 feet from the main wreckage on a 135-degree heading. The tailcone was separated at the rivet line running laterally around the circumference of the fuselage just aft of the pressure bulkhead location. All of the rivets were gone. The rivet holes in the tailcone metal were elongated longitudinally. The metal skin forming the tailcone section was opened up and bent rearward. Flight control cables to the elevator and rudder were stretched and broken and displayed fraying at the fractures. Rudder and elevator stops showed no signs of repeated strikes or unusual wear. The main spar to the vertical stabilizer was bent straight rearward forming a "C"-shaped curvature. The rudder remained attached to the spar at the center and lower hinges. The metal was opened up where the rudder attached to the spar and was twisted rearward and to the right. The right horizontal stabilizer was bent upward, twisted inboard and aft. The right horizontal stabilizer rear main spar was broken upward approximately 8-inches outboard of the stabilizer root.

The vertical stabilizer was located in a brush area 4,800 feet from the main wreckage on a 137-degree heading. The vertical stabilizer skin was blown open and bent outward. The rivets along the edge where the stabilizer attaches to the vertical spar were gone. The metal at the rivet holes was elongated forward and inward. A large dent was located in the leading edge of the stabilizer approximately at the middle. A 13-inch diameter, "C"-shaped dent was observed beginning at the base of the vertical stabilizer and running aft and down along the bottom. Black rubber scuff marks were discovered running up the right side of the stabilizer. The left horizontal stabilizer was located next to the vertical stabilizer. The left horizontal stabilizer spar was bent aft and broken at the root. The forward attach bolt fitting had been elongated and broken. The skin showed wrinkling throughout. The three hinge points for the elevator were broken. The middle hinge mount was bent to the left. The outboard hinge mount was missing.

The left one-half of the elevator was discovered 3,200 feet from the main wreckage on a 138-degree heading. The elevator was broken at the center rivet line. The rudder spar extended 15 inches beyond the rivet line and was broken upward. The trim tab remained with the left half of the elevator. It was bent up approximately 45 degrees and aft 25 degrees at the middle.

During wreckage recovery from the accident site, the engine and propeller were examined. The engine revealed upward crush to the oil sump and lower components. The lower engine mounts were broken. The exhaust system pipes were crushed upward. The propeller was attached to the engine at the flange. The spinner was crushed upward. Both propeller blades showed minor damage. No evidence of torsional bending or chordwise scratching was observed. Flight control continuity was confirmed at the accident site.

The engine and its components were retained for further testing.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed on June 3, 1996, at St. Joseph's Medical Center, Brainerd, Minnesota. The autopsies revealed no evidence of physical incapacitation or impairment. The results of FAA toxicology testing of specimens from the pilot were negative for all tests conducted.

TESTS AND RESEARCH

The engine was examined at Teledyne Continental Motors, Mobile, Alabama, on July 18, 1996. No anomalies were revealed with the engine.

ADDITIONAL INFORMATION

Airport fuel records indicate the airplane was serviced at International Falls, Minnesota, just prior to takeoff. Weight and balance was figured by The New Piper Aircraft, Incorporated, based upon the load configuration of the airplane. The pilot's weight was taken from his most recent medical certificate. Passengers' weights were estimations made by the Aitkin County Medical Examiner. The maximum weight for takeoff specified in the pilot operating handbook is 4,100 pounds. The aft center of gravity limit, at maximum gross weight is 146.42 inches.

	Weight	Arm	Moment
Basic Airplane	2806.07	134.7	377977.629
Pilot	250	135.50	33875
Copilot	250	135.50	33875
Passenger Seat #4	170	177.0	30090
Passenger Seat #5	250	218.75	54687.5
Baggage, Forward	103.45	88.60	9165.67
Baggage, Aft	125	248.23	31028.75
Fuel	693	150.31	104164.83
Total	4647.52	145.19	674864.00

Parties to the investigation were the Federal Aviation Administration Flight Standards District Office, Minneapolis, Minnesota, The New Piper Aircraft, Incorporated, Vero Beach, Florida, and Teledyne Continental Motors, Mobile, Alabama.

All wreckage was released and returned to United States Aviation Underwriters, Incorporated.

Pilot Information

Certificate:	Private	**Age:**	53, Male
Airplane Rating(s):	Single-engine Land; Single-engine Sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	05/04/1995
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1817 hours (Total, all aircraft), 1084 hours (Total, this make and model), 1817 hours (Pilot In Command, all aircraft), 47 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N9114Q
Model/Series:	PA-46-310P PA-46-310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	4608049
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	05/24/1996, Annual	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:	27 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	1049 Hours	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520-BE1
Registered Owner:	HOME OIL STATIONS, INC	**Rated Power:**	310 hp
Operator:	HOME OIL STATIONS, INC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	AIT, 1205 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	1315 CDT	**Direction from Accident Site:**	165°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 4800 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	12 knots / 16 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	17°C / 9°C
Precipitation and Obscuration:			
Departure Point:	INT'L FALLS, MN (INF)	**Type of Flight Plan Filed:**	IFR
Destination:	OTTUMWA, IA (OTM)	**Type of Clearance:**	IFR
Departure Time:	1220 CDT	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	DAVID C BOWLING	**Report Date:**	10/14/1997
Additional Participating Persons:			
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		