National Transportation Safety Board
Aviation Accident Final Report

Location:	Council Bluffs, IA	**Accident Number:**	CHI07FA073
Date & Time:	02/16/2007, 2104 CST	**Registration:**	N111SC
Aircraft:	Cessna 340A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

The flight was on a VHF Omni Range (VOR) instrument approach to the destination airport at the time of the accident. Radar track data indicated that the airplane passed the VOR at 2,800 feet. After passing the VOR, it turned right, becoming established on an approximate 017-degree magnetic course. The published final approach course was 341 degrees. The airplane subsequently entered a left turn, followed immediately by a right turn, until the final radar data point. Altitude returns indicated that the pilot initiated a descent from 2,800 feet upon passing the VOR. The airplane descended through 2,000 feet during the initial right turn, and reached a minimum altitude of 1,400 feet. The altitude associated with the final data point was 1,600 feet. The initial impact point was about 0.18 nautical miles from the final radar data point, at an approximate elevation of 1,235 feet. The minimum descent altitude for the approach procedure was 1,720 feet. Review of weather data indicated the potential for moderate turbulence and low-level wind shear in the vicinity of the accident site. In addition, icing potential data indicated that the pilot likely encountered severe icing conditions during descent and approach. The pilot obtained a preflight weather briefing, during which the briefer advised the pilot of current Airman's Meteorological Information advisories for moderate icing and moderate turbulence along the route of flight. The briefer also provided several pilot reports for icing and turbulence. A postaccident inspection of the airframe and engines did not reveal any anomalies associated with a preimpact failure or malfunction.

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 adverse weather, and his failure to maintain altitude during the instrument approach. Contributing factors were the presence of severe icing, moderate turbulence, and low-level wind shear.

Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER
Phase of Operation: APPROACH

Findings
1. (C) FLIGHT INTO ADVERSE WEATHER - CONTINUED - PILOT IN COMMAND
2. (F) WEATHER CONDITION - ICING CONDITIONS
3. (F) WEATHER CONDITION - TURBULENCE
4. (F) WEATHER CONDITION - WINDSHEAR

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

Findings
5. (C) ALTITUDE - NOT MAINTAINED - PILOT IN COMMAND
6. TERRAIN CONDITION - DIRT BANK/RISING EMBANKMENT

Factual Information

HISTORY OF FLIGHT

On February 16, 2007, at 2104 central standard time, a Cessna 340A, N111SC, piloted by an airline transport pilot, was destroyed during an in-flight collision with terrain and trees 3 nautical miles south-southeast of Council Bluffs Municipal Airport (CBF), Council Bluffs, Iowa. The business flight was operating under 14 CFR Part 91 on an instrument flight rules (IFR) flight plan. Night instrument meteorological conditions prevailed in the vicinity about the time of the accident. The pilot and three passengers sustained fatal injuries. The flight departed Northwest Arkansas Regional Airport (XNA), Fayetteville, Arkansas, about 1903. The intended destination was CBF.

Earlier on the day of the accident, the pilot and passengers flew from CBF to Jasper County Airport (JAS), Jasper, Texas, with an intermediate fuel stop at Fort Smith Regional Airport (FSM), Fort Smith, Arkansas. The initial outbound flight departed CBF about 0719 and arrived at JAS approximately 1050.

The airport manager at JAS reported that the pilot ate lunch at the airport, and that he contacted flight service to obtain a weather briefing. He added that the briefing seemed thorough, and the pilot appeared to be "very knowledgeable." He added that the airplane seemed to be well maintained.

The pilot obtained a preflight weather briefing for the return flights from Montgomery County Automated Flight Service Station (AFSS) at 1553. The briefer informed the pilot of the possibility of encountering moderate icing conditions and moderate turbulence during the flight.

The first leg of the return flight departed JAS about 1629 and arrived at XNA approximately 1827. The accident flight refueled and subsequently departed XNA approximately 1903.

The Federal Aviation Administration (FAA) provided radar track data and a transcript of air traffic control communications with the accident flight. Altitudes related to the track data are referenced to mean sea level and distances are in nautical miles.

At 1904:07 (HHMM:SS), the initial radar data point was recorded approximately 1.15 miles southwest of XNA. The Mode-C altitude associated with that data point was 3,700 feet. The track data indicated that the flight proceeded on-course toward the intended destination. The flight climbed to a cruise altitude of 10,000 feet until about 2002:02, when it initiated a climbed to 12,000 feet, while in the vicinity of Kansas City, Missouri.

About 2039:05, the flight began a descent from 12,000 feet and leveled at 11,000 feet. At 2043:56, the flight established radio contact with Omaha Terminal Radar Approach Control (TRACON). The pilot reported that the airplane was in level flight at 11,000 feet at that time.

At 2044:12, the flight was instructed to descend at pilot's discretion to 5,000 feet and proceed direct to the Omaha Very-High-Frequency Omni Range (VOR) navigation station. The pilot requested the VOR-A approach into CBF. Track data indicated that the pilot subsequently began the descent about 2044:51. The controller informed the pilot of reports of light to moderate icing below 9,000 feet.

At 2051:23, the flight was cleared for the VOR-A approach into CBF. The controller instructed

the pilot to maintain 3,000 feet until established on the approach. The aircraft was approximately 26 miles south of CBF at that time and descending through 7,000 feet. About 2055:34, the pilot leveled at 3,000 feet, at which time the aircraft was approximately 15 miles south of CBF. The controller informed the pilot of wind gusts to 39 knots at Omaha Eppley Airfield. The controller released the pilot to the CBF Common Traffic Advisory Frequency (CTAF) at 2058:20. The flight was approximately 10 miles south of CBF at that time. No further communications were received from the accident airplane.

The VOR-A approach procedure into CBF required the pilot to cross the Omaha VOR at or above 2,800 feet. After passing the VOR inbound to the airport, the pilot was to track the 341-degree radial and initiate a descent to the minimum descent altitude (MDA) of 1,720 feet. Flight visibility of 1 statute mile was required to descend below the MDA and land.

The track data indicated that the airplane passed approximately 0.25 miles east of the Omaha VOR about 2101:53 at 2,800 feet. In the 2 minutes prior to reaching the VOR, the aircraft's ground track was approximately 345 degrees magnetic. Upon passing the VOR, the track data indicated that the airplane began a turn to the right, reaching an approximate magnetic course of 017 degrees. During this time the Mode-C altitude returns indicated that the airplane began a descent, reaching 2,000 feet at 2102:34. The track indicated that about 2102:39, the airplane began a left turn followed by a right turn until the final data point at 2103:11. The altitude associated with this final data point was 1,600 feet. The data indicated the airplane reached a minimum altitude of 1,400 feet during the right turn about 2102:57. The magnetic bearing from the VOR to the final radar data point was approximately 345 degrees.

The initial impact point was located approximately 0.18 miles northeast of the final radar track data point. This was about 2.2 miles from the VOR and 3.1 miles from CBF. The elevation of the initial impact point was about 1,235 feet.

PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate with single and multi-engine land airplane ratings. His single engine rating was limited to commercial pilot privileges. He held a flight instructor certificate with single and multi-engine airplane, and instrument airplane ratings. He also held a ground instructor certificate with an advanced rating. The pilot held a first-class airman medical certificate issued on August 29, 2006. The certificate was issued without restrictions or limitations.

Logbook endorsements indicated that the pilot had completed a flight review, instrument proficiency check, and high altitude/pressurized aircraft checkout on December 21, 2005. His most recent logbook entry was dated February 9, 2007. Additionally, on the day of the accident, he had flown approximately 7 additional hours.

According to the information available, the pilot had accumulated about 3,275 hours total flight time. Of that total, 1,045 hours were in multi-engine airplanes, 105 hours were in actual instrument conditions, and 94 hours under simulated instrument conditions. Total night flight time at the time of the accident was about 326 hours.

During the 30-day period prior to the accident, the pilot had flown about 55 hours total flight time, all of which were in multi-engine airplanes. Of that flight time, approximately 12 hours were in the accident airplane and about 11 hours were at night. He had flown about 4 hours in actual instrument conditions, including 10 instrument approaches.

During the 90-day period prior to the accident, the pilot had accumulated approximately 124 hours total flight time, of which 109 hours were in multi-engine airplanes. About 16 hours were in the accident airplane, and 28 hours were at night. He had flown about 8 hours in actual instrument conditions and 1 hour under simulated instrument conditions, including 16 instrument approaches.

During the 6-month period prior to the accident, he had flown approximately 306 hours total flight time. Of that total, about 26 hours were in actual instrument conditions and 1 hour was under simulated instrument conditions, including 26 instrument approaches.

AIRCRAFT INFORMATION

The accident airplane was a 1977 Cessna 340A, s/n 340A0335. It was a pressurized, six-place, twin-engine airplane, equipped with retractable tricycle landing gear. It was equipped with inflatable deice boots to provide in-flight icing protection. Two 310-horsepower Continental TSIO-520-NB engines powered the airplane.

According to the maintenance logbooks, the most recent annual inspection was completed on January 11, 2007, at 6,416.5 total airframe hours. At the time of the annual inspection, the left engine, s/n 527095, had accumulated 2,500 hours total time and 899 hours since overhaul. The right engine, s/n 527070, had accumulated 2,390 hours total time and 899 hours since overhaul.

METEOROLOGICAL CONDITIONS

Weather conditions recorded by the CBF Automated Weather Observation System (AWOS), located about 3 miles north of the accident site, were:

At 2055, automated observation, wind from 300 degrees at 18 knots, gusting to 23 knots; visibility 1-3/4 miles in unknown precipitation; overcast cloud ceiling at 1,000 feet above ground level (agl); temperature 0 degrees Celsius; dew point -1 degree Celsius; and altimeter 29.61 inches of mercury.

At 2115, automated observation, wind from 330 degrees at 25 knots, gusting to 36 knots, visibility 3/4 mile in unknown precipitation; overcast cloud ceiling at 1,000 feet agl; temperature -1 degree Celsius; dew point -3 degrees Celsius; and altimeter 29.61 inches of mercury.

Weather conditions recorded by the Eppley Airfield (OMA) Automated Surface Observation System (ASOS), located about 10 miles northwest of the accident site, were:

At 2056, special observation, wind from 330 degrees at 27 knots, gusting to 37 knots; visibility 3/4 miles in light snow and mist; broken cloud ceiling at 1,300 feet agl; overcast cloud layer at 1,800 feet agl; temperature -1 degree Celsius; dew point -3 degree Celsius; and altimeter 29.62 inches of mercury.

At 2111, special observation, wind from 340 degrees at 30 knots, gusting to 43 knots, visibility 1/2 mile in moderate snow and blowing snow; scattered clouds at 1,000 feet agl; broken cloud ceiling at 1,500 feet agl; overcast cloud layer at 2,000 feet agl; temperature -3 degrees Celsius; dew point -4 degrees Celsius; and altimeter 29.64 inches of mercury.

In-flight weather advisories had been issued for the route of flight. Airman's Meteorological

Information (AIRMET) Tango, issued at 1545, warned of moderate turbulence below 18,000 feet, with conditions ending in the vicinity of the accident site about 2100. The AIRMET also warned of the potential of low-level wind shear (LLWS), with conditions in the vicinity of the accident site continuing beyond 2100 through 0300.

AIRMET Zulu, issued at 1545, warned of moderate icing conditions below 12,000 feet in the vicinity of the accident site. These conditions were forecast to end by 2100. However, the next issuance of AIRMET Zulu, at 2045, noted the possibility of moderate icing below 16,000 feet until 0100.

The National Weather Service archived Current Icing Potential (CIP) and Supercooled Large Droplet (SLD) Icing Potential data for 2100 was reviewed. The CIP indicated a 20 to 40 percent chance of icing at the flight's cruise altitude of 12,000 feet. The SLD data was consistent with a greater than 40 percent chance of severe icing conditions at 12,000 feet. However, the probability of icing increased between 9,000 feet and 3,000 feet, with a greater than 70 percent probability of icing conditions. The data was consistent with a high probability of moderate to likely severe icing conditions in the vicinity of the accident site.

Several pilot reports were on file that reported in-flight icing encounters in the vicinity of CBF. At 1955, a Beechcraft Airliner (BE99) reported moderate mixed icing during descent between 9,000 feet msl and 4,500 feet msl. The airplane was 15 miles to 60 miles west of Eppley Airfield (OMA).

At 1952, an Embraer Regional Jet (EMB145) over Omaha reported moderate rain and light rime icing during descent between 8,200 feet msl and 3,200 feet msl. At 1944, a Canadair Regional Jet (CRJ2) over OMA reported light mixed icing during climb between 5,000 feet msl and 10,000 feet msl.

Sunset was at 1758 and civil twilight ended at 1827 -- approximately 2-1/2 hours prior to the accident -- in the vicinity of CBF.

AIDS TO NAVIGATION

At the time of the accident, the flight had been cleared for the VOR-A instrument approach into CBF. The principal navigational fix for the approach was the Omaha VOR, which was located 5.3 nautical miles south-southeast of CBF.

The approach procedure required the pilot to cross the VOR at a minimum altitude of 2,800 feet msl. Upon crossing the VOR, the pilot was to track the 341-degree radial and permitted to descend to the minimum descent altitude (MDA) of 1,720 feet msl. A visibility of 1 statute mile was required to descend below the MDA and land.

The approach plate noted that the airport elevation was 1,253 feet.

WRECKAGE AND IMPACT INFORMATION

The accident site was located in an agricultural field 3.1 nautical miles south of CBF. This was approximately 2.2 nautical miles north of the Omaha VOR. The elevation of the field at the point of initial impact was approximately 1,235 feet. The entire debris path, from the beginning of the initial impact point to the right engine, was approximately 532 feet. The debris path, from the mid-point of the ground impact scar to the main wreckage, was oriented on a 072-degree magnetic bearing.

The initial impact ground scar was oriented on an approximate magnetic bearing of 056

degrees. It was about 80 feet long by 10 feet wide. Fragments of red plastic consistent with the lower rotating beacon lens were recovered from the area of the initial impact.

Approximately 90 feet east of the ground scar was a 10-foot rising embankment oriented in a north-south direction. The slope of the embankment exhibited a depression in the vegetation. The right aileron was separated from the airframe and located between the initial impact and the embankment.

Approximately 155 feet from the top of the embankment was a north-south oriented tree line, approximately 20 feet deep. The right and left wing tip tanks were fragmented and lying in the vicinity of the embankment and in the tree line. The left and right propeller assemblies were separated from the engines and located near the tree line. The left engine was separated from the airframe and came to rest adjacent to a tree. The right wing was separated and came to rest in the tree line.

The left wing, main wreckage, and right engine came to rest in the agricultural field on the opposite side of the tree line. The left wing was approximately 50 feet past the tree line. The main wreckage, which consisted of the fuselage and empennage, was approximately 155 feet past the tree line. The right engine, which had separated from the airframe, came to rest approximately 250 past the tree line. The elevation of the field east of the tree line was about 1,248 feet.

The left wing exhibited damage consistent with impact forces and post-impact fire. The left aileron had separated from the wing; however, it was lying in position under the outboard portion of the wing.

The fuselage came to rest on its right side. The cockpit and forward cabin were exposed due to impact forces and post-impact fire. The entire fuselage exhibited thermal signatures consistent with the post-impact fire. The empennage was separated from the fuselage; however, it came to rest adjacent to it. The horizontal and vertical stabilizers exhibited leading edge crushing. The right elevator and the rudder remained attached to the right horizontal and vertical stabilizers, respectively. The left elevator was separated from the horizontal stabilizer and came to rest near the main wreckage.

Breaks in the flight control cables were frayed consistent with overload failure. The right aileron bellcrank was dislocated from the wing. The left aileron bellcrank remained in place within the wing and appeared intact. The rudder moment arms remained attached to the rudder torque tube. The rudder cables remained secured to the moment arms. The elevator control and trim cables remained attached to the bellcrank assembly; however, the assembly was dislocated from the airframe.

Both engines were separated from the airframe, and both propeller assemblies were separated from the engines. Propeller flange and bolt fracture signatures appeared consistent with overload failure. Examination of both engines did not reveal any anomalies characteristic of a pre-impact failure or malfunction.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy of the pilot was performed on February 18, 2007, at the state medical examiner's office in Ankeny, Iowa. The pilot's death was attributed to blunt force injuries sustained in the accident. The FAA Civil Aerospace Medical Institute toxicology report was negative for all tests performed.

Pilot Information

Certificate:	Airline Transport	**Age:**	51, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Without Waivers/Limitations	**Last FAA Medical Exam:**	08/01/2006
Occupational Pilot:		**Last Flight Review or Equivalent:**	12/01/2005
Flight Time:	3275 hours (Total, all aircraft), 3165 hours (Pilot In Command, all aircraft), 124 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N111SC
Model/Series:	340A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	340A0335
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	01/01/2007, Annual	**Certified Max Gross Wt.:**	5990 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	6417 Hours as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-520-NB
Registered Owner:	Color Ink Inc.	**Rated Power:**	310 hp
Operator:	Color Ink Inc.	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	CBF, 1253 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	2055 CST	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	1.75 Miles
Lowest Ceiling:	Overcast / 1000 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	18 knots / 23 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.61 inches Hg	**Temperature/Dew Point:**	0°C / -1°C
Precipitation and Obscuration:	Unknown Precipitation		
Departure Point:	Fayetteville, AR (XNA)	**Type of Flight Plan Filed:**	IFR
Destination:	Council Bluffs, IA (CBF)	**Type of Clearance:**	IFR
Departure Time:	1903 CST	**Type of Airspace:**	

Airport Information

Airport:	Coucil Bluffs Muni (CBF)	**Runway Surface Type:**	
Airport Elevation:	1253 ft	**Runway Surface Condition:**	
Runway Used:	NA	**IFR Approach:**	VOR
Runway Length/Width:		**VFR Approach/Landing:**	None

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:**	41.200278, -95.733889

Administrative Information

Investigator In Charge (IIC):	Tim Sorensen	**Report Date:**	04/30/2008
Additional Participating Persons:	John Graham; FAA-Lincoln FSDO; Lincoln, NE Steve Miller; Cessna Aircraft Company; Wichita, KS Andrew Swick; Teledyne Continental Motors, Inc.; Mobile, AL		
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/.		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.