National Transportation Safety Board
Aviation Accident Final Report

Location:	BERNARD, IA	**Accident Number:**	CHI96FA146
Date & Time:	04/29/1996, 1515 CDT	**Registration:**	N341DA
Aircraft:	Cessna 421	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

During flight, the pilot reported shutting down the left engine due to a loss of oil pressure. He declared an emergency and diverted toward an alternate airport. However, while diverting, radar and radio contact were lost, and the airplane crashed. The wreckage path covered a distance of approximately 60 feet; the descent angle during impact was estimated to be about 45 degrees. Oil was found behind the left engine, on the left flap, on the bottom of the left horizontal stabilizer, and on the bottom of the fuselage. Also, fuel stains were seen in the grass around the airplane. No preimpact fire indications were found. The pilot had reported low oil pressure in the left engine before the accident flight, and purchased seven quarts of oil before departing. No indications of power at impact were seen on either engine or propeller. Numerous abnormalities existed with the left engine. No discrepancies were noted with the right engine. The farmer who found the wreckage reported that sleet was falling at the time of the accident. The pilot of another aircraft reported structural icing conditions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's operation of the airplane with known deficiencies, subsequent loss of oil from the left engine, and the pilot's failure to maintain minimum controllable airspeed (VMC), while diverting to an alternate airport. Factors relating to the accident were: a leak from an unknown component in the left engine oil system, and the local weather condition.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF
Phase of Operation: CRUISE

Findings
1. 1 ENGINE
2. (F) LUBRICATING SYSTEM - UNDETERMINED
3. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - DISREGARDED - PILOT IN COMMAND
4. (C) FLUID,OIL - LEAK
5. PROPELLER FEATHERING - ATTEMPTED - PILOT IN COMMAND
6. FLIGHT TO NEW DESTINATION - INITIATED

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH

Findings
7. (F) WEATHER CONDITION - ICING CONDITIONS
8. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND
9. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On April 29, 1996, at 1515 central daylight time (cdt), a Cessna 421, N341DA, piloted by an airline transport rated pilot, was destroyed when it impacted with terrain during a snow storm. The pilot reported low oil pressure on the left engine to Chicago Center, during the flight. The pilot and two passengers were fatally injured. The 14 CFR Part 135 flight was operating on a IFR flight plan, and instrument meteorological conditions prevailed at the time of the accident. The airplane departed from Cedar Rapids, Iowa, with an intended destination of General Mitchell International Airport, Milwaukee, Wisconsin.

N341DA was on an IFR flight plan when it arrived at Cedar Rapids, Iowa. During the inbound flight to Cedar Rapids Airport the pilot reported fluctuating oil pressure. Tapes from the Cedar Rapids approach/tower recorded approximately ten minutes of time difference between the pilots report of fluctuating oil pressure, and the time the tower operator told the pilot to contact ground control. A transcript of the pilots conversation with Chicago Center on the accident flight is included as a supplement to this report.

WRECKAGE AND IMPACT INFORMATION

The wreckage path for N341DA covered a distance of approximately 60 feet, on a magnetic heading of 100 degrees. The investigator in charge (IIC) approximated the descent angle at 45 degrees. Both left and right propellers had only a small portion of one blade visible above the surface of the earth. The tail section of the fuselage was separated just aft of the rear pressure bulkhead, and the cockpit area had sustained extensive crushing. The landing gear and the flaps were found in the retracted position. Oil was found behind the left engine, on the left flap area, on the bottom of the left horizontal and on the bottom of the fuselage. Grass stains, which appeared similar to fuel stains, were seen by the IIC behind the left tip tank.

The left propeller blade appeared to be in a normal flight position, the right propeller blade appeared to be in a feathered position. No signs of any significant cord wise scratches, or leading edge damage was found on either propeller. The spinner on the right propeller had scratches which were parallel to the right engine's crankshaft.

The aileron cables were continuous from their surfaces to the cockpit area, except for one left aileron cable which showed signs similar to an overload failure. One trim cable running to the tail area showed signs similar to an overload failure. The rudder cables were attached to the rudder pedals and the rudder. Both rudder cables were pinched in the cockpit area where the fuselage crushing occurred. The elevator cables were continuous from the cockpit area to the elevator. All balance weights and hinge attachment bolts for the rudder and elevator were attached and no indications of flutter were found.

The cockpit vacuum gauge was found with the needle indicating four and one half inches of vacuum. Both the pilots artificial horizon, and the copilots directional gyro showed evidence similar to rotational rubbing at impact, when disassembled. The vertical speed indicator was found with an indicated rate of descent of 4,000 feet per minute.

The electric boost pump, and the electric transfer pump for the left wing both operated and would pump water when tested by the IIC on May 1, 1996. Both the left and right fuel valves were found in the off position when the inspection covers were removed on the wings. The left

fuel valve cockpit selector was found between the left auxiliary tank and the left main tank. The position of the right fuel valve cockpit selector could not be determined.

Because of the lack of engine power indications on both the propellers and engines, it was decided to send both engines, and the propellers to Mobile, Alabama, for further analysis.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy on the pilot was performed by the Midwest Pathology Associates, Silvis, Illinois. The toxicological testing performed by the Federal Aviation Administration, Oklahoma City, Oklahoma, was negative for all tests conducted.

FIRE

The right engine and the right wing outboard of the engine nacelle had sustained fire damage. Portions of the tail section were also damaged by fire. No indications of any preimpact fire were noted by the IIC.

TESTS AND RESEARCH

The engines were inspected at the manufacturers facilities between June 3 and June 5, 1996. Numerous discrepancies existed with the left engine. No discrepancies were noted with the right engine. The gear teeth from the left engine's starter drive were found in the engines oil pan. The case hardness of the left engine's starter drive was within the manufacturers specifications when tested at an independent laboratory. The right engine's turbo charger turbine blades showed signs similar to rotational scoring at impact. The engine manufacturer's reports for both engines are included as a supplement to this report.

The propellers were also inspected between June 3 and June 5, 1996. The pilot reported during the accident flight at time 2006:05 "... it looks like the prop has finally gone into feather." The aircraft's airframe logbook had an entry which indicated that overhauled propellers were installed on August 10, 1995. The aircraft manufacturer has shown that a windmilling propeller causes a loss in climb rate of 400 feet per minute, on this airplane. The propeller manufacturer's report for both propellers is included as a supplement to this report.

ADDITIONAL DATA/INFORMATION

Witnesses at Cedar Rapids, Iowa reported that when N341DA landed at Cedar Rapids, there was a large amount of oil visible around the airplane's left engine. The pilot also reported to a mechanic that on the trip to Cedar Rapids, Iowa, that the left engine oil pressure gauge was indicating low oil pressure. Witnesses reported the pilot purchased seven quarts of oil, before departure. Before departure a mechanic had to tighten the left starter which was reported to be loose. Both oil caps were found attached to their engines in the wreckage. The left engine starter was broken loose from its attachment, and both left starter attachment nuts were found tight against the broken engine casting. No indications of any electrical arcing was found around the left starter wiring.

The farmer who initially found the wreckage reported in a written statement, that the only sound he heard was a large thump, and did not recall hearing any engine noise. The farmer also reported that it was sleeting at the time of the accident, and he could not see the aircraft the approximately 75 yards from his house.

A pilot flying aircraft, N2858M, which was being vectored for an instrument approach behind N341DA reported to the IIC continual light icing in flight, at the time of the accident. The pilot

said that he was terminating his flight early because of the icing.

Radar data for the accident flight was also obtained from Chicago Center. At time 2003:23 the altitude read out from the radar data showed N341DA at 8,900 feet mean sea level. At time 2004:45 the radar data showed N341DA at 5,900 feet mean sea level, and this was the last radar data with any altitude information. At the times of 2007:33, and 2008:53 the pilot of N341DA reported altitudes of 3,000, and 2.3 respectively.

Pilot Information

Certificate:	Airline Transport	**Age:**	46, 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):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	11/01/1994
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6100 hours (Total, all aircraft), 4020 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N341DA
Model/Series:	421 421	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	0181
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	08/10/1995, Annual	**Certified Max Gross Wt.:**	6800 lbs
Time Since Last Inspection:	72 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	6804 Hours	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	GTSIO-520-D
Registered Owner:	MONARCH AVIATION	**Rated Power:**	375 hp
Operator:	MONARCH AVIATION	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	DBQ, 1076 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	1556 CDT	**Direction from Accident Site:**	20°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	1.75 Miles
Lowest Ceiling:	Broken / 500 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	16 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	1°C / 0°C
Precipitation and Obscuration:			
Departure Point:	CEDAR RAPIDS, IA (CID)	**Type of Flight Plan Filed:**	IFR
Destination:	MILWAUKEE, WI (MKE)	**Type of Clearance:**	IFR
Departure Time:	0000	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	DAVID A BOLDENOW	**Report Date:**	04/03/1997
Additional Participating Persons:	JAMES SMITH; DES MOINES, IA RANDY VANDENHUL; WICHITA, KS JOHN KENT; 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/.		