Aviation Investigation Final Report

Location:	CASTLE ROCK, Colorado	**Accident Number:**	FTW98LA183
Date & Time:	April 16, 1998, 15:45 Local	**Registration:**	N5693D
Aircraft:	Enstrom 280C	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor was conducting an introductory flight with a new student. While demonstrating emergency procedures at approximately 400 feet above the ground, the helicopter lost engine power. Determining the ground unsuitable for landing, he turned south and aimed for a flat area of terrain. He cushioned the landing with the collective, then sank 6 inches into the ground. Examination of the engine disclosed no abnormalities, however a postaccident functional test of the engine revealed a malfunction in the engine-driven fuel pump. When the electrically-driven boost pump was switched to the OFF position, power fluctuations were noted. All three rotor blades were bent, and the tail boom was severed.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Malfunction of the engine-driven fuel pump. Factors were unsuitable terrain, soft ground, and a berm.

Findings

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

Findings
1. (C) FUEL SYSTEM,PUMP - MALFUNCTION

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Findings
2. TERRAIN CONDITION - SOFT

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (F) TERRAIN CONDITION - SOFT
4. (F) TERRAIN CONDITION - GROUND
5. (F) TERRAIN CONDITION - BERM
6. (F) TERRAIN CONDITION - NONE SUITABLE

Factual Information

On April 16, 1998, at 1545 mountain daylight time, an Enstrom 280C helicopter, N5693D, sustained substantial damage during an emergency landing while on an instructional flight near Castle Rock, Colorado. The certified flight instructor and student were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for this local area flight which originated at Centennial Airport, Englewood, Colorado, at 1530. The flight was operating under Title 14 CFR Part 91 when the accident occurred.

According to the flight instructor, he was conducting an introductory flight with a new student. Fifteen minutes after departure, he began demonstrating emergency procedures. While approximately 400 feet above the ground, he reduced the throttle to 2000 rpm. After scanning the instrument panel, he noted the rotor rpm was indicating 350, and the engine rpm was indicating 0. He "lowered the collective to [the] stop, rolled the throttle back and forth, and depressed the starter for approximately 300 feet - 9 seconds."

Determining that the ground was unsuitable for landing, he turned south and aimed for a "flat place in [a] gully." He cushioned the landing with the collective, then sank 6 inches into the ground. The helicopter stopped abruptly, then rolled forward. The main rotor struck a berm, causing "rotor torque to be transferred to [the] fuselage, twisting it to [the] left." In a nose down attitude of approximately 20 degrees, the fuselage turned 180 degrees with a nose high attitude of about 70 degrees.

Examination of the engine disclosed no abnormalities; however, a postaccident functional test of the engine revealed a malfunction in the engine-driven fuel pump. After a normal start, the engine ran for approximately two minutes and the throttle was advanced to 2,900 rpm. After five minutes of operation, the engine sounded steady and normal indications were present. When the electrically-driven boost pump was switched to the OFF position, power fluctuations were noted with the engine-driven fuel pump operating. The engine was shut off for approximately five minutes, then restarted. The engine was operated with both the electric fuel pump ON and OFF. During periods with the electrically-driven boost pump OFF, the engine rpm indications on the tachometer fluctuated approximately 700 rpm.

All three rotor blades were bent, and the tail boom was severed.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	35,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 1 Expired	**Last FAA Medical Exam:**	March 19, 1996
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	1093 hours (Total, all aircraft), 45 hours (Total, this make and model), 949 hours (Pilot In Command, all aircraft), 72 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Enstrom	**Registration:**	N5693D
Model/Series:	280C 280C	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1192
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	March 31, 1998 100 hour	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:	15 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3048 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	HIO-360-E1AD
Registered Owner:	DENVER HELICOPTERS SERVICES	**Rated Power:**	205 Horsepower
Operator:	ROBERT B. WELCH	**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	APA ,5883 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	16:50 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Scattered / 4000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Overcast / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ENGLEWOOD , CO (APA)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	15:30 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	39.370376,-104.850097(est)

Administrative Information

Investigator In Charge (IIC):	Wiemeyer, Norman
Additional Participating Persons:	DALE W SHUEL; DENVER , CO
Original Publish Date:	February 15, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=20580