Aviation Investigation Final Report

Location:	Ontario, California	**Accident Number:**	WPR17LA158
Date & Time:	July 19, 2017, 10:10 Local	**Registration:**	N5697B
Aircraft:	Enstrom F 28C	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The solo student pilot reported that he entered the downwind leg to set up for the helicopter's first landing of the day. When abeam the touchdown location, he conducted the prelanding checks with no anomalies noted. Before turning onto the base leg, the pilot lowered the collective, reduced the throttle, and started to descend about 100 ft per minute. During the descent, he observed that the engine rpm was slightly above 2,900 rpm. He reduced the throttle, and the rpm reduced slightly; however, it again increased to 2,900 rpm, and the manifold pressure was about 10 inches of mercury. When the helicopter was about 400 ft above ground level, the pilot heard the engine sound increase, and he observed that the engine rpm had increased to between about 3,300 and 3,500 rpm. The helicopter was unable to reach the runway, so the pilot continued to descend it toward a pasture, and it landed hard in the dirt.

A postaccident airframe and engine examination and subsequent engine run revealed no preimpact anomalies that would have precluded normal operation. The observed damage to the main rotor blades was consistent with blade coning, a condition indicative of low main rotor rpm. It is likely that the student pilot mismanaged the main rotor rpm during the descent, which resulted in a low rotor rpm and a high descent rate during landing.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The student pilot's mismanagement of the main rotor rpm, which resulted in low rotor rpm, a high descent rate, and a subsequent hard landing.

Findings

Personnel issues	Aircraft control - Student/instructed pilot
Personnel issues	Use of equip/system - Student/instructed pilot
Aircraft	Main rotor blade system - Incorrect use/operation
Aircraft	Descent rate - Not attained/maintained
Aircraft	Prop/rotor parameters - Not attained/maintained

Factual Information

History of Flight

Approach-VFR pattern downwind	Loss of control in flight (Defining event)
Approach-VFR pattern downwind	Off-field or emergency landing

On July 19, 2017, about 1010 Pacific daylight time, an Enstrom F28-C rotorcraft, N5697B, descended rapidly and landed hard in a dirt pasture about 1/2-mile northeast of the Chino Airport (CNO), Ontario, California. The student pilot, sole occupant, was seriously injured and the helicopter sustained substantial damage to the tailboom and main rotor blades. The helicopter was registered to Dubois Aviation Inc and operated by the pilot as a 14 *Code of Federal Regulations* Part 91 solo instructional flight. Visual meteorological conditions prevailed and no flight plan was filed. The flight originated from CNO about 1005.

The student pilot reported he entered the downwind leg to set up for the first landing of the day. When abeam his touchdown location, he conducted the prelanding checks with no anomalies noted. Prior to turning base he lowered the collective, reduced the throttle, and started to descend at about 100 feet per minute. During the descent, he observed the engine RPM to be slightly above 2,900 RPM, and he reduced the throttle. The RPMs reduced slightly, however, went back to 2,900 RPM, and the manifold pressure was about 10 inches of Hg. About 400 feet above the ground, he heard the engine sound increase and he observed 3,300-3,500 RPM. Unable to make the runway, he continued to descend towards a pasture and landed hard in the dirt.

A postaccident airframe and engine examination revealed no preimpact anomalies that would have precluded normal operation. Flight control continuity was established from the cockpit controls to the main rotorhead. The tailrotor driveshaft was turned and rotation was observed from the tail rotor gear to the main rotor mast. The main rotor blades remained intact and exhibited signatures consistent with coning. The lower spark plugs were removed from the engine and the engine was rotated from the cooling fan. Thumb compression was obtained on all cylinders in proper firing order, and the impulse coupling was heard clicking from the left magneto. The spark plugs were reinstalled, and the engine was prepared for an engine run. The engine ran normally for several minutes at various RPMs. Normal operating pressures and temperatures were observed, and there were no fuel or oil leaks observed. The engine was shutdown normally with no anomalies noted.

Pilot Information

Certificate:	Student	**Age:**	37,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	March 21, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	33 hours (Total, all aircraft), 33 hours (Total, this make and model), 1 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Enstrom	**Registration:**	N5697B
Model/Series:	F 28C	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	505-2
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	May 5, 2017 100 hour	**Certified Max Gross Wt.:**	2350 lbs
Time Since Last Inspection:	20 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	3715 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	HIO-360-E1AO
Registered Owner:	On file	**Rated Power:**	200 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CNO,650 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Few / 15000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	29°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ontario, CA (CNO)	**Type of Flight Plan Filed:**	None
Destination:	Ontario, CA (CNO)	**Type of Clearance:**	None
Departure Time:	10:10 Local	**Type of Airspace:**	

Airport Information

Airport:	Chino Airport CNO	**Runway Surface Type:**	Dirt
Airport Elevation:	650 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Precautionary landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	33.971389,-117.635276(est)

Administrative Information

Investigator In Charge (IIC):	Link, Samantha
Additional Participating Persons:	Robert Michaelson; Federal Aviation Administration; Riverside, CA Mark Platt; Lycoming Engines; Williamsport, PA William Taylor; Enstrom Helicopter Corporation; Menominee, MI
Original Publish Date:	January 25, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95623