Aviation Investigation Final Report

Location:	Beaumont, Texas	**Accident Number:**	CEN17LA290
Date & Time:	July 28, 2017, 15:32 Local	**Registration:**	N722TX
Aircraft:	HELICOPTERES GUIMBAL CABRI G2	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The student pilot was practicing basic hovering skills under the supervision of the flight instructor. Due to the high air temperature and minimal airflow over the engine, the engine oil temperature had increased beyond the approved limits. The flight instructor decided to fly a low-altitude circuit along the perimeter of the airport to increase the airflow and cool the engine. The low-altitude circuit was performed at an altitude of about 100 ft above ground level and at a speed of about 60 knots. About halfway around the circuit, the oil temperature had returned to normal, and all other engine indications were normal at that time. However, during the turn at the southwest corner of the airport, which was about three-quarters of the way around the circuit, the helicopter began to lose altitude and would not respond to the flight instructor's control inputs. The flight instructor was unable to regain control, and the helicopter subsequently impacted the ground.

Postaccident examination of the helicopter did not reveal any anomalies consistent with a preimpact failure or malfunction. In addition, the flight instructor stated that there were no issues with the helicopter before the accident. Impact marks showed that the main rotor blades struck the ground before the landing skids, which was consistent with a bank angle of at least 40° at the time of the accident.

According to information that the helicopter manufacturer provided, the engine power and helicopter performance required to maintain altitude while maneuvering exceeded the power and performance available with the elevated density altitude conditions at the time of the accident flight, which resulted in a loss of altitude and an impact with the ground.

Probable Cause and Findings

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

The flight instructor's low-altitude maneuvering, which exceeded the helicopter's performance capability in the high-density altitude conditions and resulted in a loss of control.

Findings

Personnel issues	Aircraft control - Instructor/check pilot
Aircraft	(general) - Capability exceeded
Environmental issues	High density altitude - Effect on operation

Factual Information

History of Flight

Maneuvering-low-alt flying	Loss of control in flight (Defining event)
Maneuvering-low-alt flying	Collision with terr/obj (non-CFIT)

On July 28, 2017, at 1532 central daylight time, a Helicopteres Guimbal Cabri G2 helicopter, N722TX, was substantially damaged when it impacted terrain while maneuvering at the Beaumont Municipal Airport (BMT), Beaumont, Texas. The flight instructor and student pilot sustained minor injuries. The helicopter was registered to American Helicopter Leasing Corp and operated by Texas Rotorwing LLC as a Title 14 Code of Federal Regulations Part 91 instructional flight. Day visual meteorological conditions prevailed. The flight was not operated on a flight plan. The local flight originated from BMT about 1500.

The flight instructor reported that he and the student had completed three normal approaches and then practiced basic hover skills at the north ramp area of the airport. A high engine oil temperature condition occurred during the hovering maneuver due to the ambient air temperature and the reduced airflow available for engine cooling. To increase engine airflow and reduce the engine temperature, he performed a low altitude circuit at 60 knots, about 100 ft above ground level (agl), around the perimeter of the airport. About halfway around the perimeter, the oil temperature had returned to the normal operating range and all other engine indications were normal at that time. However, during the turn at the southwest corner of the airport, the helicopter began to lose altitude and would not respond to his control inputs. His efforts to regain control were not successful and the helicopter impacted the open grass area on the airport southwest of the runway.

The instructor noted that the helicopter was loaded within the gross weight and center-of-gravity limitations. He added that the turns were never more than 45 degrees angle of bank. He reported that there were no anomalies with regard to the helicopter, and that the high temperatures, low wind, and high density altitude likely resulted in the accident.

A Federal Aviation Administration inspector responded to the accident site and conducted an examination of the helicopter. The flight instructor informed him that he was completing a turn, during which the helicopter was unable to maintain altitude. The helicopter came to rest on its right side. The main rotor blades were fragmented, and the tail boom was partially separated. Impact marks suggested that the main rotor had struck the ground followed by a landing skid. His examination of the flight control system did not reveal any pre-impact anomalies.

Weather conditions reported by the BMT Automated Weather Observing System (AWOS) did not include any wind information. The most recent observation recorded a temperature and dew point of 35 degrees Celsius and 21 degrees Celsius, respectively. The calculated density altitude was about 2,650 feet.

Wind conditions reported by the Jack Brooks Regional Airport (BPT) Automated Surface Observing System (ASOS), located about 12 miles southeast of BMT, were variable at 4 knots at the 1453 observation and variable at 3 knots at the 1553 observation.

The maximum engine power was derated as installed in the Cabri G2 helicopter to 145 hp for both takeoff and continuous operation. However, under the accident conditions, the engine was capable of producing approximately 160 hp. Application of full throttle by the pilot would be expected to provide 160 hp under the accident conditions. Engine performance was referenced to the 145 hp continuous limit, with 100% power corresponding to 145 hp and 111% power corresponding to 160 hp. In addition, the helicopter geometry implied that an angle of bank in excess of 40° would result in the main rotors impacting the ground before the landing skids.

The helicopter manufacturer stated that at an operating weight of 1,440 lbs. (650 kg) about 90% engine power would be required to maintain an in-ground-effect (IGE) hover at 32 ft agl and 32°C. Application of full throttle (111% power) would have provided a 21% power margin for an IGE hover under the accident conditions. However, maintaining altitude in a 45° bank turn would require a 1.4 load factor which exceeded the available 21% power margin.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	36,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	August 2, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 8, 2015
Flight Time:	715 hours (Total, all aircraft), 452 hours (Total, this make and model), 653 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	60,Male
Airplane Rating(s):	None	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3 hours (Total, all aircraft), 3 hours (Total, this make and model), 0 hours (Pilot In Command, all aircraft), 3 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	HELICOPTERES GUIMBAL	**Registration:**	N722TX
Model/Series:	CABRI G2	**Aircraft Category:**	Helicopter
Year of Manufacture:	2016	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1171
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	July 1, 2017 Continuous airworthiness	**Certified Max Gross Wt.:**	1543 lbs
Time Since Last Inspection:	9 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	159.9 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-360-J2A
Registered Owner:	American Helicopter Leasing Corp LLC	**Rated Power:**	145 Horsepower
Operator:	Texas Rotorwing Academy	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	BPT,15 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	125°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 4800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.89 inches Hg	**Temperature/Dew Point:**	35°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Beaumont, TX (BMT)	**Type of Flight Plan Filed:**	None
Destination:	Beaumont, TX (BMT)	**Type of Clearance:**	None
Departure Time:	15:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Beaumont Muni BMT	**Runway Surface Type:**	Grass/turf
Airport Elevation:	32 ft msl	**Runway Surface Condition:**	Dry;Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	30.070278,-94.214996(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Christopher Cotton; FAA Flight Standards; Houston, TX
Original Publish Date:	December 19, 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=95696