Aviation Investigation Final Report

Location:	Asheville, North Carolina	**Accident Number:**	ERA10LA323
Date & Time:	June 21, 2010, 14:00 Local	**Registration:**	N247FG
Aircraft:	Schweizer 269C-1	**Aircraft Damage:**	Substantial
Defining Event:	Settling with power/vortex ring state	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Other work use		

Analysis

The pilot departed for a local photo documentary flight with the helicopter about 80 pounds under gross weight. About 20 minutes after departure, the passenger spotted an area of invasive plant species which he wanted to film. The pilot then performed a 360-degree turn and approached the area in straight and level flight, between 30-40 knots to maintain translational lift. The passenger reported that they were closer than usual as they lined up for the approach. The pilot heard a pitch change in the engine and lowered the collective slightly and increased the throttle; however, the helicopter began to descend. Shortly after, the pilot stated, "she's settling," and the passenger noted they were nearing the top of the trees going about 5-10 mph. The passenger reported that the helicopter came to a very slow stop above the trees and then felt like they were slowly sinking. He stated the engine felt like it was bogging down just prior to the helicopter beginning a slow, straight descent until the rotor blades impacted trees and the helicopter dropped to the ground. The engine was test run on the helicopter and no preimpact mechanical anomalies were noted. Examination of a videotape taken by the passenger during the accident sequence revealed that the engine continued to run, with no discernible engine anomalies prior to the accident. According to the Federal Aviation Administration's Rotorcraft Flying Handbook, "settling with power" defines when the helicopter keeps settling even though full engine power is applied. Among the conditions listed that were conducive to settling with power were: attempting to hover out of ground effect without maintaining precise altitude control, or downwind or steep power approaches at low forward airspeed.

Probable Cause and Findings

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

The pilot's failure to maintain forward airspeed, which resulted in a settling with power encounter.

Findings

Personnel issues	Incorrect action performance - Pilot
Aircraft	Airspeed - Not attained/maintained
Environmental issues	Tailwind - Effect on operation

Factual Information

History of Flight

Maneuvering-hover	Settling with power/vortex ring state (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On June 21, 2010, at 1400 eastern daylight time, a Schweizer 269C-1 helicopter, N247FG, was substantially damaged when it impacted terrain following a loss of engine power in Asheville, North Carolina. The certificated commercial pilot and the passenger were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight which originated at Foothills Regional Airport (MRN), Morgantown, North Carolina. The aerial photography flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

The purpose of the flight was for the passenger to film footage for a documentary, specifically capturing the local “kudzu,” an invasive plant species.

According to the pilot, they departed Asheville Regional Airport (AVL), Asheville, North Carolina around 1045 and flew in the local area, filming, until they needed to refuel. The pilot then landed at MRN. The helicopter was fueled with 19 gallons of fuel, filling the fuel tanks to 25 gallons of total fuel. The pilot then departed MRN and flew southwest toward AVL. After about 20 minutes, the passenger spotted an area of “kudzu” he wanted to film. The pilot performed a 360-degree turn and approached the area “straight and level between 30-40 knots to maintain translational lift.” As the helicopter was abeam the “kudzu” the pilot heard a pitch change in the engine and noted that the engine/rotor rpm was “in the bottom of the green,” and dropping lower. The helicopter was also descending into the trees. The pilot lowered the collective slightly and increased the throttle “to get the rpm back,” however the helicopter continued to descend. The engine continued to run, but it was “bogging down.” Shortly after, the helicopter impacted the “kudzu,” and rolled to the left.

The passenger reported that they were "several hundred feet above the trees," and as they started to pass the first batch of kudzu he noticed they "were a little closer than usual." Shortly after, the pilot stated, "she's settling". According to the passenger, the pilot didn't sound concerned and he continued filming. About 10 seconds later, the pilot stated, "we're going to go down". The passenger noted they were "right on top of the trees going about 5-10mph."

The passenger reported that the helicopter came to a very slow stop above the trees and then felt like they were slowly sinking. He stated that the engine felt like "it was bogging down," just prior to the helicopter beginning a slow, vertical decent until the rotor blades impacted trees

and the helicopter dropped to the ground.

PERSONNEL INFORMATION

The pilot held a commercial pilot certificate and a flight instructor certificate with ratings for rotorcraft-helicopter and instrument helicopter. His most recent FAA second-class medical certificate was issued on November 19, 2007.

The pilot reported 441 hours of total flight experience, 221 of which were in make and model of the accident helicopter. He also reported 33 hours in the previous 90 days, all of which were in make and model.

AIRCRAFT INFORMATION

The helicopter was powered by a single Lycoming HO-360-C1A, 180-horsepower engine. It was manufactured in 2001.

The most recent annual inspection was completed on April 6, 2010, at a total aircraft time of 3,749 hours.

A weight and balance calculation was performed for the accident flight, which resulted in an approximate weight of 1,670 pounds. The maximum gross weight for the helicopter was 1,750.

METEOROLOGICAL INFORMATION

The weather reported at AVL, 18 nautical miles to the southwest, at 1354, included wind from 190 degrees at 5 knots, 10 miles visibility, clear skies, temperature 29 degrees C, dew point 17 degrees C and altimeter setting 30.19 inches mercury.

The calculated density altitude was 4,400 feet.

WRECKAGE AND IMPACT INFORMATION

Examination of the helicopter by a Federal Aviation Administration (FAA) inspector revealed that the main rotor blades sustained substantial damage. The helicopter was removed from the accident site and transported to a secure facility for further examination. The engine was test run on the helicopter, and would not start initially. The spark plugs were removed from the engine and the number 2 and 4 cylinder plugs were oil-fouled. They were cleaned and reinstalled and the engine was started again. It ran and power was increased to about 1,500 rpm. A magneto check was performed and a 50-rpm drop was noted on each magneto. An idle mixture check was performed as the helicopter was shut down. According to the inspector, the engine appeared to be running rich with arise of about 150 rpm.

ADDITIONAL INFORMATION

The passenger provided a videotape which was taken during the accident sequence. Examination of the video revealed that the engine continued to run, with no change in power, during the accident sequence.

According to the FAA Rotorcraft Flying Handbook, vortex ring state (settling with power) describes an aerodynamic condition where a helicopter may be in a vertical descent with up to maximum power applied, and little or no cyclic authority. The term “settling with power” comes from the fact that the helicopter keeps settling even though full engine power is applied.

Among the conditions listed which were conducive to settling with power were: attempting to hover out of ground effect without maintaining precise altitude control, and downwind or steep power approaches at low forward airspeed.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	42,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter; Instrument helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	November 19, 2007
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	June 21, 2009
Flight Time:	441 hours (Total, all aircraft), 221 hours (Total, this make and model), 374 hours (Pilot In Command, all aircraft), 33 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Schweizer	**Registration:**	N247FG
Model/Series:	269C-1	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	0123
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	April 6, 2010 Annual	**Certified Max Gross Wt.:**	1750 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3749 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Not installed	**Engine Model/Series:**	HO-360
Registered Owner:	SPITZER MATTHEW	**Rated Power:**	180 Horsepower
Operator:	WNC Aviation	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	AVL,2165 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	13:54 Local	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.19 inches Hg	**Temperature/Dew Point:**	29°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Morganton, NC (MRN)	**Type of Flight Plan Filed:**	None
Destination:	Asheville, NC (AVL)	**Type of Clearance:**	None
Departure Time:	13:30 Local	**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	35.436111,-82.541946(est)

Administrative Information

Investigator In Charge (IIC):	Andrews, Jill
Additional Participating Persons:	Kenny Newell; FAA/FSDO; Charlotte, NC
Original Publish Date:	May 19, 2011
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=76398