Aviation Investigation Final Report

Location:	Merritt Island, Florida	**Accident Number:**	ERA17LA311
Date & Time:	September 3, 2017, 09:20 Local	**Registration:**	N544DG
Aircraft:	Piper PA32R	**Aircraft Damage:**	Substantial
Defining Event:	Aerodynamic stall/spin	**Injuries:**	4 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot attempted to take off for the personal flight with three passengers from a 3,601-ft-long asphalt runway. Video footage and a witness confirmed that the airplane did not rotate and become airborne until it was near the end of the runway. The nose initially pitched up about 5°, and the airplane climbed about 20 to 30 ft above ground level. As the airplane approached trees, the nose pitched up about 15° and the left wing dropped, consistent with a stall. Examination of the wreckage did not reveal any evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation. Pilot estimates regarding occupant/baggage weights and the available fuel on board suggest that the airplane was slightly below its maximum allowable takeoff weight. However, although the exact baggage weight and fuel load during takeoff could not be determined, witness estimates of baggage weight and the airplane's total capacity for usable fuel suggest that the airplane was likely at or above its maximum gross weight.

The pilot reported that he rotated the airplane at 80 knots. He also initially reported that he attempted the takeoff with "two notches" of flap extension but subsequently stated that the takeoff was with the flaps retracted. Although performance data indicate that the takeoff could be accomplished in about 2,900 ft at maximum gross weight with flaps retracted, the pilot likely did not fly the airplane at the optimal airspeeds recommended in the pilot's operating handbook for the airplane make and model, which were 64 knots at rotation and 69 knots at an altitude of 50 ft.

Probable Cause and Findings

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

The pilot's inadequate preflight planning and improper takeoff technique, which resulted in an exceedance of the airplane's critical angle of attack and an aerodynamic stall.

Findings

Personnel issues	Weight/balance calculations - Pilot
Personnel issues	Performance calculations - Pilot
Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Not attained/maintained

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Takeoff	Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On September 3, 2017, about 0920 eastern daylight time, a Piper PA-32R-300, N544DG, was substantially damaged when it collided with water during takeoff at Merritt Island Airport (KCOF), Merritt Island, Florida. The private pilot and three passengers were not injured. The personal flight was conducted under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed and a visual flight rules flight plan was filed for the planned flight to Marsh Harbour International Airport (MYAM), Marsh Harbour, Bahamas.

The pilot reported that prior to the flight, he fueled the airplane to a total of 80 gallons of 100-low-lead aviation gasoline. He then completed a preflight inspection of the airplane and subsequent engine run-up prior to takeoff, with no anomalies noted. The pilot added that although the automated surface observation system reported the wind from 350° at 5 knots, the wind was light and variable at the time of the accident. Additionally, an airplane was in the airport traffic pattern and using runway 11, so the pilot elected to depart in that direction. The pilot initially stated that he extended the flaps "two notches" and rotated the airplane at 80 knots, about two-thirds down the 3,601-foot asphalt runway. He later stated that the flaps were retracted during the takeoff attempt.

A witness, who was a flight instructor at a fixed-based-operator, was standing near a hangar and observed the accident takeoff. The witness stated that his attention was drawn to the accident airplane as it used more of a ground roll during the takeoff attempt than what he was accustomed to seeing. Specifically, the airplane did not rotate until about 2,300 feet down the runway. The nose initially pitched up about 5° and the airplane climbed about 20 to 30 feet above ground level. Then, as the airplane approached trees, the nose pitched up about 15° and the left wing dropped, consistent with a stall. The witness added that the pilot initially reported the engine "quit," but the witness heard engine noise throughout the takeoff, until the airplane impacted the water.

Review of airport surveillance video revealed that the airplane had not lifted off as it traveled off the right side of camera view, about 600 feet prior to the departure end of the runway.

Examination of the wreckage by a Federal Aviation Administration inspector did not reveal any preimpact mechanical malfunctions. The inspector rotated the propeller and confirmed crankshaft, camshaft, and valve train continuity to the rear accessory section of the engine. During rotation, the inspector noted saltwater emitting from the exhaust. The inspector did not attempt a test-run of the engine as saltwater remained in the engine and had corroded one of the magnetos.

The pilot provided weights of the occupants and baggage, and estimated 75 gallons of fuel onboard at takeoff. Based on information provided by the pilot, the airplane was about 117 lbs. below its maximum

takeoff weight of 3,600 lbs. The witness estimated 12 bags on board and their combined weight more than double the 100 lbs. that the pilot reported; however, the bags were wet after the accident and could not be accurately weighed. Additionally, the airplane held a total of 94 gallons of useable fuel and the exact fuel load during the takeoff attempt could not be determined.

The recorded weather at an airport located about 8 miles southeast of the accident site, at 0853, was: wind from 330° at 6 knots; visibility 10 miles; few clouds at 6,500 ft; temperature 26° C; dew point 24° C; altimeter 30.09 inches of mercury.

Review of a pilot's operating handbook for the make and model airplane revealed that at 80° F, with flaps retracted, at 3,600 lbs., with a 3-knot tailwind, at sea level, the airplane required about 2,900 feet to clear a 50-foot barrier. The data assumed a liftoff speed of 64 knots and a barrier speed of 69 knots.

Pilot Information

Certificate:	Private	**Age:**	43,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	March 26, 2014
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	February 18, 2016
Flight Time:	627 hours (Total, all aircraft), 65 hours (Total, this make and model), 627 hours (Pilot In Command, all aircraft), 10 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N544DG
Model/Series:	PA32R 300	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-7780440
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	September 1, 2016 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	113 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1897 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-540
Registered Owner:	On file	**Rated Power:**	300 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:	KCOF,8 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	08:58 Local	**Direction from Accident Site:**	150°
Lowest Cloud Condition:	Few	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.09 inches Hg	**Temperature/Dew Point:**	26°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Merritt Island, FL (KCOI)	**Type of Flight Plan Filed:**	VFR
Destination:	(MYAM)	**Type of Clearance:**	None
Departure Time:	09:20 Local	**Type of Airspace:**	

Airport Information

Airport:	Merritt Island Airport KCOI	**Runway Surface Type:**	Asphalt
Airport Elevation:	6 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	11	**IFR Approach:**	None
Runway Length/Width:	3601 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 None	**Latitude, Longitude:**	28.341667,-80.685554(est)

Administrative Information

Investigator In Charge (IIC):	Gretz, Robert
Additional Participating Persons:	Brian Humphrey; FAA/FSDO; Orlando, FL
Original Publish Date:	April 8, 2019
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=95951