



# Aviation Investigation Final Report

<b>Location:</b>	Farmington, Delaware	<b>Accident Number:</b>	ERA14LA321
<b>Date &amp; Time:</b>	June 18, 2014, 19:30 Local	<b>Registration:</b>	N891JC
<b>Aircraft:</b>	GRUMMAN ACFT ENG COR- SCHWEIZER G 164B	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Aerodynamic stall/spin	<b>Injuries:</b>	1 Minor
<b>Flight Conducted Under:</b>	Part 137: Agricultural		

## Analysis

The pilot reported that the takeoff was normal for the agricultural flight and that he subsequently reduced the manifold pressure to 32 inches and the propeller speed to about 2,000 rpm. After the airplane reached about 150 ft above ground level during the climbout, he commanded a left bank, and the airplane immediately began to "settle." He rolled the airplane to a wings-level attitude; however, the airplane subsequently made an uncommanded right roll, which he described as "similar to entering a stall." He attempted to activate the product "dump" handle; however, he inadvertently activated the "spray" handle. He again attempted to activate the "dump" handle; however, due to the airplane's low altitude, he did not have time to do so, and the airplane then impacted terrain. Examination of the engine revealed that the intermediate gear had three teeth sheared off; however, this likely occurred during the accident sequence and did not contribute to the accident. No other preimpact abnormalities that would have precluded normal operation were noted.

Although the airplane was below its maximum takeoff weight, the density altitude around the time of the accident was calculated to be about 2,100 ft, which would have decreased the airplane's climb rate by about 20 percent. Therefore, it is likely that the decreased climb rate, the pilot-commanded reduction in engine power, and the loss of lift developed during the left bank led to the airplane exceeding its critical angle-of-attack and then experiencing an aerodynamic stall at too low an altitude for the pilot to affect a recovery before the airplane impacted the ground. Although it is possible that the pilot reapplied full power following the first indication of a stall, he was likely more focused on unloading the product to reduce the total weight of the airplane than on recovering from the stall.

## 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 for a takeoff in high-density altitude conditions and his decision to reduce power during the initial climb, which led to the airplane exceeding its critical angle-of-attack and experiencing an aerodynamic stall.

## Findings

<b>Personnel issues</b>	Aircraft control - Pilot
<b>Aircraft</b>	Angle of attack - Capability exceeded
<b>Aircraft</b>	Airspeed - Not attained/maintained
<b>Environmental issues</b>	High density altitude - Effect on equipment
<b>Personnel issues</b>	Flight planning/navigation - Pilot
<b>Personnel issues</b>	Decision making/judgment - Pilot

# Factual Information

## History of Flight

<b>Initial climb</b>	Aerodynamic stall/spin (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)
<b>Landing-landing roll</b>	Nose over/nose down

## HISTORY OF FLIGHT

On June 18, 2014, about 1930 eastern daylight time, a Grumman Aircraft G-164B, N891JC, impacted the ground during a forced landing shortly after takeoff near Chorman Airport (D74), Farmington, Delaware. The airplane was owned and operated by Chorman Spraying, LLC as an aerial application flight. The commercial pilot received minor injuries and the airplane sustained substantial damage to the fuselage and empennage. Visual meteorological conditions prevailed and no flight plan had been filed for the local flight, which was operated under the provisions of Title 14 Code of Federal Regulations Part 137. The flight was originating at the time of the accident.

According to the pilot, he flew the airplane in the morning and returned to the airport about 1900, to load the hopper tank with insecticide and water, for a flight to a nearby watermelon farm. After loading the product and fueling the airplane, he taxied out, performed the required pre-takeoff checklist items, and departed to the north. After departure, he maneuvered the airplane in order to climb out to the right of the runway's extended centerline to avoid overflying a residence. He further reported that he reduced the manifold pressure back to 32 inches and the propeller speed to about 2,000 rpm. Approximately 150 feet above ground level, he commanded a slight left bank towards the west and immediately the airplane started to "settle." The pilot leveled the wings; however, the airplane started an uncommanded right bank "similar to entering a stall." He attempted to pull the product "dump" handle, but inadvertently activated the "spray" handle. He then attempted to pull the dump handle again, but was unable to do so due to the airplane's close proximity to the ground. The airplane subsequently impacted a field, nosed over, and came to rest inverted.

## PERSONNEL INFORMATION

According to the pilot and Federal Aviation Administration (FAA) records, the pilot held a commercial pilot certificate with a rating for airplane single-engine land, multiengine land, and instrument airplane. He also held a flight instructor certificate for airplane single and multiengine land, and instrument airplane. The pilot's most recent second-class medical certificate was issued on October 24, 2013. According to the pilot, he had accumulated 2,306 hours of total flight time and 573 hours of flight time in the accident airplane make and model.

## AIRCRAFT INFORMATION

According to the pilot and the operator's records, the single-engine, tailwheel-equipped biplane was manufactured in 1977. It was powered by a Pratt and Whitney radial engine with 10,125 hours of time in service and 553.53 hours since major overhaul. The most recent annual inspection was recorded on May 8, 2014.

#### METEROLOGICAL INFORMATION

The 1854 recorded weather observation at Sussex County Airport (GED), Georgetown, Delaware, located 15 miles to the southeast of the accident location, included wind from 210 degrees at 8 knots, visibility 10 miles, clear skies, temperature 33 degrees C, dew point 20 degrees C; barometric altimeter 29.96 inches of mercury. The density altitude was about 2,100 feet.

#### AIRPORT INFORMATION

The airport was a privately owned airport and at the time of the accident did not have a control tower. It was equipped with a single runway designated 16/34. The runway was 3,588 feet long and 37 feet wide and the runway surface was considered "in poor condition." The airport elevation was 66 feet above mean sea level.

#### WRECKAGE AND IMPACT INFORMATION

Examination of the airplane by a FAA inspector, following the airplane's recovery from the field, revealed that the airplane's fuselage, vertical stabilizer, and rudder were substantially damaged. Rotation of the engine, by hand, was accomplished utilizing the propeller hub, which revealed continuity through the engine and thumb compression on some of the cylinders. However, there was no rotation through the supercharger and the impeller was not rotating.

#### TEST AND RESEARCH

The engine was examined, under the supervision of the NTSB Investigator-in-Charge, and during the examination the engine was noted as exhibiting minimal damage. When the engine was rotated by hand, utilizing a crankshaft turning bar, some internal binding was noted and the impeller did not rotate. Thumb compression was observed on all cylinders. Due to the internal binding, an engine run was not possible and the engine was disassembled. During the disassembly it was noted that the intermediate gear had three teeth that were impact sheared, and further examination of the gear revealed no other damage. Examination of the engine revealed no evidence of preimpact anomalies that would have precluded normal operation. For a detailed report on the engine examination refer to the public docket for this accident.

#### ADDITIONAL INFORMATION

According to the pilot and operator, the airplane was fueled with 80 gallons of fuel and had 250 gallons of product in the forward hopper tank, just prior to departure. The airplane weight at the time of the accident was about 6,934 pounds, and the maximum gross weight for the airplane was 7,564 pounds.

Density Altitude

Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25A) noted that density altitude represents pressure altitude corrected for nonstandard temperature. A decrease in air density corresponds with an increase in density altitude and a decrease in airplane performance. Density altitude is used in calculating airplane performance.

FAA Pamphlet FAA-P-8740-2 (2008), "Density Altitude," defines density altitude as "pressure altitude corrected for non-standard temperature variations." Density altitude can affect aircraft performance. As density altitude increases, air density decreases, which results in decreased aircraft performance. According to the Koch chart on page 3 of the pamphlet, and based on the conditions at the time of the accident, 91 degrees F and pressure altitude of about sea level, the airplane's climb rate would have been reduced by about 20 percent.

## Pilot Information

<b>Certificate:</b>	Commercial; Flight instructor	<b>Age:</b>	42
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Single
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane multi-engine; Instrument airplane	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	October 24, 2013
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	February 22, 2013
<b>Flight Time:</b>	2306 hours (Total, all aircraft), 573 hours (Total, this make and model), 2197 hours (Pilot In Command, all aircraft), 76 hours (Last 90 days, all aircraft), 76 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	GRUMMAN ACFT ENG COR-SCHWEIZER	<b>Registration:</b>	N891JC
<b>Model/Series:</b>	G 164B	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1977	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Restricted (Special)	<b>Serial Number:</b>	193B
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	May 8, 2014 Annual	<b>Certified Max Gross Wt.:</b>	7564 lbs
<b>Time Since Last Inspection:</b>	146 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	12108 Hrs at time of accident	<b>Engine Manufacturer:</b>	Pratt and Whitney
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	R-1340-AN1
<b>Registered Owner:</b>	CHORMAN SPRAYING LLC	<b>Rated Power:</b>	600 Horsepower
<b>Operator:</b>	CHORMAN SPRAYING LLC	<b>Operating Certificate(s) Held:</b>	Agricultural aircraft (137)
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	KVFG

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KGED, 51 ft msl	<b>Distance from Accident Site:</b>	15 Nautical Miles
<b>Observation Time:</b>	18:54 Local	<b>Direction from Accident Site:</b>	128°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	8 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	210°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.95 inches Hg	<b>Temperature/Dew Point:</b>	33°C / 20°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Farmington, DE (D74 )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Farmington, DE (D74 )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	18:30 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	CHORMAN D74	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	66 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>	34	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	3588 ft / 37 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Minor	<b>Latitude, Longitude:</b>	38.843055,-75.60778(est)

## Administrative Information

**Investigator In Charge (IIC):** Etcher, Shawn

**Additional Participating Persons:** Robert V Drapala; FAA/FSDO; Philadelphia, PA  
Ronald A Hollis; Covington Aircraft Engines, Inc.; Okmulgee, OK

**Original Publish Date:** June 1, 2015

**Last Revision Date:**

**Investigation Class:** [Class](#)

**Note:**

**Investigation Docket:** <https://data.nts.gov/Docket?ProjectID=89580>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).