



# Aviation Investigation Final Report

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<b>Location:</b>	Watervliet, Michigan	<b>Accident Number:</b>	GAA17CA347
<b>Date &amp; Time:</b>	June 16, 2017, 19:20 Local	<b>Registration:</b>	N9404E
<b>Aircraft:</b>	Aeronca 11AC	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Aircraft loading event	<b>Injuries:</b>	1 Minor, 1 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Instructional		

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## Analysis

The flight instructor reported that, during the takeoff climb from a grass runway with the student pilot flying, about 25 ft above ground the "climb rate became stagnant." He added that he instructed the student to "lower the nose slightly," but after "several seconds the airplane did not resume a normal climb rate." The flight instructor took the flight controls and noticed that they were "sluggish" and it felt as if the airplane was caught in "wind swirls" and downdrafts. Subsequently, the flight instructor made a "small left turn" toward a small gap in the tree line ahead and the airplane impacted a heavily wooded/treed area.

The fuselage and both wings sustained substantial damage.

The flight instructor reported that there were no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

According to the flight instructor, the airplane departed "loaded at gross weight." The student pilot reported that the flight instructor did not discuss weight and balance with him before flight.

During postaccident interviews with the National Transportation Safety Board investigator-in-charge, the student and flight instructor each reported their personal weight and a total of 10 gallons of fuel on board at takeoff. Based upon the information provided, the takeoff weight was 1,389 lbs, which was 139 lbs over the maximum gross weight (1,250 lbs) published in the airplane Pilot's Operating Handbook. The airplane's center of gravity for takeoff was within limits at 18.65 (12.4 to 22.0).

An automated weather observation station 8 nautical miles (nm) southwest of the accident site reported that, about the time of the accident, the wind was from 200° at 5 knots, temperature 82°F (28°C), dewpoint 54°F (12°C), and barometric setting of 29.76 inches of mercury. The calculated density altitude 8 nm southwest was 2,648 ft. The flight instructor reported that they took off from runway 20, which was 2,600 ft long.

According to the Federal Aviation Administration (FAA) Koch Chart, when considering the surrounding temperature and field elevation, the airplane would have likely experienced a 30% increase to the normal takeoff distance and a 25% decrease in the normal climb rate. The airplane's POH did not publish takeoff performance information.

The FAA Pilot's Handbook of Aeronautical Knowledge stated, in part:

#### Effect of Weight on Flight Performance

The takeoff/climb and landing performance of an aircraft are determined on the basis of its maximum allowable takeoff and landing weights. A heavier gross weight results in a longer takeoff run and shallower climb, and a faster touchdown speed and longer landing roll. Even a minor overload may make it impossible for the aircraft to clear an obstacle that normally would not be a problem during takeoff under more favorable conditions.

#### Runway Surface and Gradient

Runway conditions affect takeoff and landing performance. Typically, performance chart information assumes paved, level, smooth, and dry runway surfaces. Since no two runways are alike, the runway surface differs from one runway to another, as does the runway gradient or slope.

Runway surfaces vary widely from one airport to another. The runway surface encountered may be concrete, asphalt, gravel, dirt, or grass. The runway surface for a specific airport is noted in the Chart Supplement U.S. (formerly Airport/Facility Directory). Any surface that is not hard and smooth increases the ground roll during takeoff. This is due to the inability of the tires to roll smoothly along the runway. Tires can sink into soft, grassy, or muddy runways. Potholes or other ruts in the pavement can be the cause of poor tire movement along the runway.

It is likely that the airplane was unable to clear trees at the end of the runway due to the decrease in takeoff performance, which resulted from the high-density altitude, the turf runway, and a takeoff weight over maximum gross weight.

## Probable Cause and Findings

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

The flight instructor's inadequate preflight planning, which resulted in a takeoff over maximum gross weight from a turf runway in high-density altitude conditions and the airplane's inability to attain a climb rate and subsequent collision with trees.

## Findings

<b>Personnel issues</b>	Weight/balance calculations - Instructor/check pilot
<b>Personnel issues</b>	Decision making/judgment - Instructor/check pilot
<b>Aircraft</b>	Maximum weight - Capability exceeded
<b>Aircraft</b>	Climb rate - Attain/maintain not possible
<b>Environmental issues</b>	Tree(s) - Contributed to outcome
<b>Environmental issues</b>	(general) - Contributed to outcome
<b>Environmental issues</b>	High density altitude - Effect on operation

## Factual Information

### History of Flight

<b>Prior to flight</b>	Aircraft loading event (Defining event)
<b>Initial climb</b>	Miscellaneous/other
<b>Initial climb</b>	Collision with terr/obj (non-CFIT)

### Flight instructor Information

<b>Certificate:</b>	Airline transport; Commercial; Flight instructor	<b>Age:</b>	36, Male
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea; Multi-engine land; Multi-engine sea	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Glider	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	March 30, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	July 19, 2016
<b>Flight Time:</b>	(Estimated) 8500 hours (Total, all aircraft), 100 hours (Total, this make and model), 4 hours (Last 30 days, all aircraft)		

### Student pilot Information

<b>Certificate:</b>	Student	<b>Age:</b>	27, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	February 9, 2006
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>			

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Aeronca	<b>Registration:</b>	N9404E
<b>Model/Series:</b>	11AC	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1946	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	11AC-1041
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	June 10, 2017 Annual	<b>Certified Max Gross Wt.:</b>	1250 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	as of last inspection	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	C91 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	A&C 65 SERIES
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	65 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KBEH,649 ft msl	<b>Distance from Accident Site:</b>	8 Nautical Miles
<b>Observation Time:</b>	23:53 Local	<b>Direction from Accident Site:</b>	230°
<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>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/ None
<b>Wind Direction:</b>	200°	<b>Turbulence Severity Forecast/Actual:</b>	/ N/A
<b>Altimeter Setting:</b>	29.76 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 12°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Watervliet, MI (40C )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Watervliet, MI (40C )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	19:20 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	WATERVLIET MUNI 40C	<b>Runway Surface Type:</b>	Grass/turf
<b>Airport Elevation:</b>	656 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	20	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	2600 ft / 200 ft	<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor, 1 None	<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, 1 None	<b>Latitude, Longitude:</b>	42.2,-86.25(est)

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gerhardt, Adam
<b>Additional Participating Persons:</b>	Thomas G Kozura; FAA/ FSDO; Grand Rapids, MI
<b>Original Publish Date:</b>	September 22, 2017
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	This accident report documents the factual circumstances of this accident as described to the NTSB.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=95392">https://data.nts.gov/Docket?ProjectID=95392</a>

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](#).