

At around 1:40 PM, our pilot, Mason, and I were in our plane preparing to ride to the runway. I saw another plane that was supposed to take off before ours begin to lift off the ground while going down the runway, although the angle of incline was much less than expected. A few seconds later, the plane began to decline. A moment later, it started to gain some more lift, but it soon tilted too far to the right and I lost sight of it as it began to decline once more.

GAVIN DOROTHY


MOUNT HOLLY, NC

28120

Time 1:44

The air plane left the ground
and would not climb. after about 20 seconds
it banked hard right and down
The wings also were a little shaky

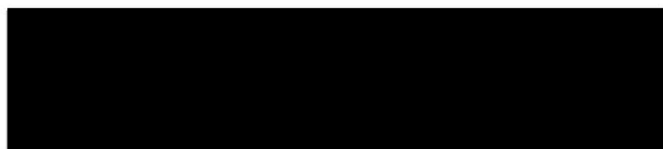
approx 1:30 PM

I was standing by the bench / picnic table area outside the fence watching the W.O.W C-172 (white w/ blue + black trim) take-off to the ~~north~~ north.

The a/c got airborne at or before the ramp area but did not climb above 10-15 feet as it continued above the runway and did not seem to establish a sustained rate of climb. Just before I lost sight of the a/c the wings rocked with the starboard wing dropping first but still appeared to maintain directional control and altitude (still 10-15 feet).

After I lost sight I watched to see if the a/c would appear above the hangar and/or the trees. It did not. About 5-10 seconds later I thought I heard the distant sounds of a crash/impact. No smoke or dust cloud was observed. I moved out

to the ramp toward the runway to see if I could see anything. Michael Star was exiting a airplane on the ramp and started toward the end of the runway ~~toward~~ in the direction of the a/c. I notified Steve Buehlymer + Mark Ott in the hangar the "the club 172 didn't get off the runway"



2:07 PM Aug 2, 2021

I was standing and talking with Geoff just outside the fence near the hangar. We turned to watch the Cessna take off. It looked unusual to me as, after it was airborne, it was flying level down the runway, ^{at} about $\frac{1}{2}$ the height of the trees. My immediate thought was that the pilot was demonstrating "ground effect",^{*} because the airplane was flying low and level and slow. Just before it flew to where a building was obstructing our view, the plane rolled a little to the right and then, I think, back to level. Immediately after that, our view was obstructed by a building.

* I have a degree in Aeronautical Engineering and years ago had my single engine land license (~100 hrs).

Jeff Gladstone

[REDACTED]
Sioux Center, IA 51250
[REDACTED]

Inspector Statement

Aircraft: N3090U

On Monday, August 6, 2021 at approximately 1410 EST, I was notified by my FLM of a non-fatal aircraft accident in Waxhaw, NC. The accident involved a Cessna 172E carrying 1 pilot and 2 passengers. The pilot was reportedly uninjured but both passengers sustained minor injuries. I arrived on scene at 1600 the same day (EMS had come and gone by that time) and observed the following:

Tire marks on an off airport property gravel driveway, and grassy area that appeared to be headed for an opening in the wooded area.

The aircraft's right wing tip was located on the ground and was the farthest back from the fuselage.

The aircraft's left wing tip was stuck in a tree.

The left wing contacted a different tree which removed a section of the wing.

The left side of the horizontal stabilizer and elevator were subsequently torn from the fuselage.

Small aircraft parts were scattered along the way leading up to aircraft.

Nose landing gear suffered impact damage.

The aircraft came to rest in a nose down, inverted position leaning against a tree, and supported by its right wing. Its final resting place was estimated to be 200 yards from touchdown point.

Additional observations:

The cockpit window, aircraft equipment, and personal items were on the ground near the front of the plane.

Fuel leakage was minimal and initially contained by a small inflatable pool. A funnel and gas can were added to the containment efforts to catch the avgas dripping out of the right wing closed gas cap.

Tailboom buckled.

Flight control cables were broken and parted.

Engine mounts were broken and the engine had shifted within the engine compartment.

One propeller blade was visible and did not appear to be damaged. However, once the aircraft was righted, the other propeller blade was bent aft.

Gascolator housing was loose.

Impact damage to both wings and engine cowling

Michael Guidice
FAAIIIC



MEMORANDUM FOR RECORD

Todd Gunther
Air Safety Investigator
Eastern Region

Date: September 14, 2021

Subject: Information Provided by Glenn Grubb – JAARS, International Director of Safety NTSB Case Number: ERA21LA313

According to Mr. Grubb:

- JAARS was hosting the Brigade Air flight camp at their airfield (N52) when the Wings over Waxhaw (WOW) Cessna 172 experienced an off-airport landing. While not an official JAARS activity, JAARS was heavily involved in all aspects (management, maintenance, flight) of the flight camp.
- He assisted Inspector Michael Guidice (FAA) with his onsite investigation, and also conducted some interviews and conducted an examination of the performance numbers and compared that to the actual flight of the accident.

During an interview with Mr. Reed (the pilot): he received the following information:

- There were two hard-abort points designated in the briefing for the event, one for each runway. The pilot confused the abort points and used the one defined for runway 22 while departing from runway 04. The briefing was in bulletized form followed by a verbal description.
- The aircraft was airborne by the (incorrect) abort point when the pilot realized that the climb performance was not going clear the distant tree line.



MEMORANDUM FOR RECORD

Todd Gunther
Air Safety Investigator
Eastern Region

Date: September 15, 2021

Subject: Information Provided by Rachael Stoner – President of Wings Over Waxhaw
NTSB Case Number: ERA21LA313

Ms. Stoner provided the following information:

- N3090U was being flown for the Brigade Air Camp at JAARS, Inc. The accident flight was the third flight in that aircraft for the camp. The use of the aircraft was donated to JAARS, for the purpose of the camp. JAARS pays for the fuel for all of the aircraft being flown for the camp.
- JAARS partners with Brigade Air to offer a Christian youth mentoring curriculum and mission aviation camp program with the goal of encouraging young people to seriously consider God's calling on their lives to serve in missionary aviation. Wings Over Waxhaw Flying Club, Inc. was participating as a volunteer aircraft owner, providing a club pilot (Tim Reed) access to the airplane for the week of August 2-6, 2021.

Date: 2 August 2021
Time: roughly 1:15pm
SOB: PIC Tim Reed & two campers
Injuries: minor
Weather:
CAVOK
Winds VRB@6, prevailing from 360°
Altimeter: 30.01
OAT: 85 deg F (measured just prior to takeoff)

All weather information was procured from aviationweather.gov and from direct observation. The altimeter was set to 600' MSL just prior to takeoff at the top of runway 4.

The incident occurred on takeoff from N52 (Townsend Field, Waxhaw NC). After the rotation point (just after the windsock on the corner fence), the aircraft became airborne and gained roughly 50 feet. I maintained Vy (80mph), but the aircraft failed to climb. I momentarily decreased the speed towards Vx to see if the aircraft would respond with a best-angle climb. It did not, and so I returned to 80mph. I heard no anomalous sounds from the engine or any decrease in rpm during the takeoff run. Sensing that the airplane would not clear the trees beyond the departure end (the trees were getting closer and I was not able to see any more trees appearing beyond), I momentarily reduced power to idle to land on the airport complex on the remaining runway and overrun. However, as I was thinking about the rapid deceleration forces of hitting the chain-link fence and bars, I elected to add power and land in the grass lawn just beyond the airport. After adding enough power to make the lawn, I reduced power to idle and touched down prior to the wooded area. On rollout, I felt the plane go towards a gap in the trees and then pull left just before the plane tipped onto the nose.

I realized that both of us in the front were hanging forward on our seatbelts and was immediately concerned about the fuel leaking from the airplane. The back-seat passenger easily got out and assisted the front seat passenger. My pant leg was snagged between the chair and the panel, so I grabbed the fabric and ripped it until I felt I was free at which point I disembarked. I made sure to secure the site by directing the campers up the hill and away from the crash site. After a few minutes, I returned to the airplane to ensure that the master switch was off, at which point I had to tug on the front windscreen to gain access to the cabin (the windscreen was already partially popped).

I had flown this particular airplane several times over the past few weeks, including a flight on a similar day (Saturday). My flight at that time consisted of 1.7 hours with 9 takeoffs and landings, simulated engine out approaches, airwork, no flap landings, go-arounds, and short field takeoffs.

On the day of the flight, I was not ill, no medications were being used, stress was not significant. I had not had any alcohol within the preceding 24 hours (I submitted a drug and BAC sample with JAARS HR that can back up this statement.), I had a good night's rest (according to my

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fitbit I got 7 hrs 22 minutes of sleep and an "82 sleep score", which indicates quality of sleep), I was not experiencing and pertinent emotions at the time of the flight.

The morning of this flight, I and a ground observer noted that the plane's climb angle was not as steep as normal. We attributed this to the aircraft loading and the high density altitude (roughly 2,600'). Given that, we determined to double-check performance calculations. Over lunch, I ran some conservative numbers from our loading and the POH. I planned for Max gross weight (2300 lbs) and zero headwind at 85 deg F, which yielded numbers roughly 950' for the ground run and 1680' for distance to clear the obstacle. I say these numbers are conservative as I did not factor in the headwind component we were consistently experiencing or the 4 percent down-slope of the runway from the threshold to midfield. I considered the headwind and slope as two pieces of risk mitigation for the takeoff. The other mitigation was weight. I planned for 300 lbs for my passengers, which was more than actual. I also determined that for max gross weight (2300 lbs). We were likely closer to 2000 lbs at takeoff (1389 Empty + 150 lbs fuel (25 gallons) + 230 lbs (myself) and + 220 lbs (2 pax)), which was another performance mitigating factor.

In the morning, I performed a thorough preflight inspection according to the checklist in the aircraft and found no pertinent discrepancies. In addition, I did a thorough run-up in accordance with the aircraft checklist. Upon returning to the aircraft after lunch, I double-checked my fuel load (12 and 13 gallons for a total of 25 gallons), oil quantity (7 quarts), and a walkaround inspection (the aircraft was locked/secured and chained down for only 50 minutes between flights). I performed a full engine/systems runup at the end of the runway to verify systems were normal. All ops checks came back within normal parameters - mags smooth and drops (individual and differential) within limits, and all systems within the green. Given the hot day, we had also been talking about spark-plug fouling on the Cherokee that another pilot was flying, so I was especially attuned to the possibility. When the mag-check returned a smooth & even drop, however, I determined that spark-plug fouling was not a concern for the flight.

Given all of this, with the mitigating factors for a high-DA day, I believed that we were operating with margin. In addition to this, I figured that planning for a V_y takeoff would leave me V_x as an "out" if the climb performance was less than expected. However, in spite of all these mitigating factors, the airplane would not climb and we were forced to execute an emergency landing in the yard just past the departure end of runway 4 with a rollout into the wooded area beyond.

Mike Guidice (Charlotte FSDO) asked me about the possibility of being outside of the balance envelope for the airplane. There are several factors that lead me to believe that balance was not a contributing factor to this accident. One factor is that we (Rachael Stoner) and I had personally weighed, recorded, and performed adverse loading checks for the possible aircraft loadings for both the Cherokee 160 and the C172 used during this event. All parameters were within the normal operating range of both aircraft. She performed this check on Foreflight and sent screenshots of the loading to Chuck Daly, our chief pilot. Another factor is the actual loading at the time of my flight. I had the lighter student (85 lbs) in the front seat and the heavier student (130 lbs) in the backseat of the airplane. In this case, that would have decreased the



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drag on the tail and would positively affect the performance of the aircraft for takeoff. Another factor was the trim setting and aircraft feel. Immediately prior to the takeoff, we performed the takeoff checklist IAW the aircraft checklist. That checklist included ensuring the trim was in the takeoff range, which I did by visually checking the trim indicator within the green arc. The other factor was the aircraft feedback. When you fly a plane at the fore or aft limits of the CG, the elevator pressure difference is noticeable (most of my experience with that is flying the Cessna 206 during training and operation in AK, Northern WA, and Eastern Oregon). I did not receive any such elevator feedback on this takeoff to indicate that the aircraft was loaded on the edge of the envelope.

On my preflight, I made a special point to check the oil filter and safetying. The filter was safetied in the correct direction to prevent loosening.

Another question from Mike Guidice was regarding the use of flaps. I operated a zero flap takeoff in accordance with the POH. Cessnas of these years only recommend the use of 10 degrees flaps where an obstacle is not in play. The POH states that any advantage (using 10 degrees flaps) gained in a shortened ground run is lost in the climb over the obstacle.

One additional aspect of this flight was the morning briefing. During this briefing, we discussed how the 1st taxiway (34.86443698835516, -80.74730215012603) would be the abort point for takeoff. I made the decision to make the windsock at the corner of the fence (34.86390660087942, -80.74783590971238) my abort point, which was roughly 230' earlier than the taxiway.

In retrospect, there are only two interventions I can think of that would have improved this situation. One is leaning to peak RPM prior to takeoff. This is a technique that can be employed for high DA takeoffs and may have made a marginal difference. The other technique that I can think of is choosing an earlier abort point. This would likely lead to safe takeoffs being aborted but could possibly have precluded this situation. On this day, however, I had already chosen the windsock as a conservative abort point and felt I was operating with ample safety margin.

Name, printed: Timothy J Reed

Name, signed:  _____

Today's Date: 4 August 2021

RECORD OF ☐ VISIT ☐ CONFERENCE OR ☒ TELEPHONE CALL		TIME 3:45 PM	DATE 08/02/2021
NAME(S) OF PERSON(S) CONTACTED OR IN CONFERENCE AND LOCATION		ROUTING	
		SYMBOL	INITIALS
Michael Guidice, Todd Gunther(NTSB)			
Timothy Reed- N3090U Pilot			
SUBJECT N3090U Accident			
DIGEST Initial phone interview of Mr. Reed followed up with an on-site interview.			
Contacted Mr. Reed upon notification of accident and asked him to provide me with details			
about his most recent flight in N3909U. He stated he was attempting to depart from JAARs -			
Townsend Airport on a Part 91 flight with two passengers on board. Once airborne and at			
approximately 50ft AGL, he noticed the aircraft failed to continue its climb.			
Thinking he would not clear the trees at the departure end of the runway, he reduced power			
to land at the airport on the remaining runway. Realizing there was not enough runway left			
and did not want to impact the fence, he added power. The aircraft cleared the fence and			
touched down in the grass across the street (Radin Rd) from the airport. The aircraft			
continued on into the wooded area before coming to rest in a nose down inverted position			
against a tree. The pilot and both passengers exited the aircraft and were met by Jaars			
personne, and subsequently assessed by EMS. The 2 passengers sustained minor injuries and			
were treated and released.			
CONCLUSION, ACTION TAKEN, OR REQUIRED			
DATE 06/25/2021	TITLE FAA IIC	SIGNATURE	

RECORD OF ☒ VISIT ☐ CONFERENCE OR ☐ TELEPHONE CALL		TIME 4:30 PM	DATE 08/03/2021
NAME(S) OF PERSON(S) CONTACTED OR IN CONFERENCE AND LOCATION		ROUTING	
		SYMBOL	INITIALS
Michael Guidice, Todd Gunther(NTSB)			
Michael Mahn- Pilot			
Rachael Stoner- Wings over Waxhaw President			
SUBJECT N3090U Accident			
DIGEST Phone interview with Michael Mahn			
Mr. Mahn flew N3090U for 2.9hrs(N52>RDU>N52)on the morning of August 2 2021. He stated that			
the aircraft operated without any noted anomalies.			
Ms. Stoner's location was inside N8757N which was positioned approx. midfield, facing the			
departure end of Rwy 4. During the on-site interview, Ms. Stoner provided the following			
information:			
The aircraft (N3090U) appeared to be performing a normal take-off 2-3ft above the runway.			
She noticed the flaps were at 0 degrees and thought he was demonstrating ground effect to			
his campers (passengers).			
With approximately 1/3 of available runway remaining, she was expecting to see an abrupt			
pull-up to clear obstacles. "Seemed like something was holding the airplane down from			
above" and wondered if there was a wind shear issue.			
At the final windsock at 15-20 AGL, N3090U pitched down and rolled to the right. She			
thought he was going to abort, however, the aircraft suddenly pitched up and rolled left.			
The aircraft departed airport property and she lost sight of it.			
CONCLUSION, ACTION TAKEN, OR REQUIRED			
DATE 06/25/2021	TITLE FAA IIC	SIGNATURE	