

Inspector's Statement

Nicholaus Kaszczuk

ASI – Operations

6/8/2018

N6180J

05/29/2018 – Assigned as assistant operations inspector to investigate an accident that happened on Sunday 5/27/2018. Missouri State Highway patrol contacted the FAA Fort Worth ROC for initial notification, which passed the police report and information to the CE03-STL-FSDO standby accident duty investigator. The pilot involved was Mr. Daniel F. Ulloa, of [REDACTED] Jonesboro, AR, Commercial Certificate [REDACTED]. Mr. Ulloa was the Pilot-in-Command (PIC) of his Air Tractor 502B, Tail# N6180J, SN# 502B-0329, conducting aerial application of agricultural fertilizers that was not able to take-off from a grass/dirt airstrip located off County Road 220 southeast of Qulin, MO. Mr. Ulloa attempted a take-off departure to the south in the aircraft sometime between 1130 – 1200 cdt on Sunday 5/27/2018 with approximate 2700lbs of fertilizer loaded onboard and with an estimated fuel load of between 130-140 gallons of Jet-A. The weather at the time of departure was sky clear, with the winds out the north-northeast at approximately 3-4 mph gusting to about 8 mph. The temperature estimated at the time to be 90° F/32° C. The airstrip has a north-south orientation with a 3' foot drainage ditch at the southern end and 35' trees, power lines, and a road at the northern end.

05/31/2018 – Inspector's Nicholaus Kaszczuk, Ryan McCarty, Travis Schwien (IIC), and Louie Bettis traveled to Poplar Bluff/Butler County, MO to investigate the accident and interview Mr. Daniel F. Ulloa. We linked up with Mr. Ulloa vicinity the Dollar General in Qulin, MO and then proceeded out to the accident site. I provided Mr. Ulloa with a Pilot's Bill of Rights (PBR) explaining its use and the meaning in addition to explaining that all personal information collected is protected under the Privacy Act. Mr. Ulloa provided the IIC with his signed statement of the event, granted access to the aircraft, provided the aircraft logbooks and maintenance records, and provided his own flight records, certificates, and logbooks.

Mr. Ulloa stated that the airstrip he was using was one of his customer's and that he had permission to use it while conducting agricultural operations and had been flying from that strip for the last 14 years. After loading the airplane with 2700 lbs of fertilizer, he started his take-off run to the south. He stated that all instruments and gauges were showing normal operating temperatures and pressures and the engine was making full power for take-off. When reaching approaching three-quarters of the length of the available runway, Mr. Ulloa stated that his tail wheel was still on the ground. The airstrip has approximately 2500' feet of useable distance

available for take-off and landing before terminating at a 3' foot ditch at the southern end. Mr. Ulloa stated that he was able to hop over the ditch, by adding full down flaps. He stated that he did not have control of the airplane at this point. The aircraft was only able to become airborne for a short distance as scaring shows it stuck the ground about 20'-25' past the ditch before coming to a rest approximately 300' feet on the other side of the ditch in an adjacent cornfield.

Upon inspection, the aircraft was found up right, partially supported by its main landing gear, fertilizer spreader, left wing flaps, and the empennage. The left main landing gear is bent up under the fuselage. The tail section of the aircraft is crushed and the tail landing gear was separated from the aircraft. The aircraft spun approximately 180° degrees and came to a rest facing north. Both wings had significant damage with the left wing and left main landing gear absorbing most of the impact and deceleration forces and contributing to the scaring along the ground trace past the ditch. The ground scaring starts approximately 20'-25' feet past the ditch and continues to about 275'-300' feet. There are alternating scar marks for when the left wing, main landing gear, and propeller individually struck the ground. All three blades of the propeller are bent indicating contact with the ground. Two of the blades show power applied on impact and one indicates the absence of power. At the site, post-accident, it was found that the MGB was seized and the propeller and hub could not be rotated by hand. Fuel was still leaking from the left wing fuel tank. All control surfaces are accounted for and control continuity was established for all control surfaces except for elevator. Due to the position of the aircraft being supported by the empennage and the substantial damage to the tail section there was binding in the control yoke and the elevator could not be moved. Additionally it was found that elevator trim was jammed. Engine controls – throttle/fuel/propeller were found in good continuity. Flaps appeared to be somewhere between 15°-20° degrees deployed, one to two points as seen on the wing indicator and flap markings.

Inspection of Mr. Ulloa's certificates and qualifications found him current and qualified in Airplane Single Engine Land with conventional gear. He has been flying tail wheel aircraft and logging PIC time since before the require training endorsement date of April 15, 1991 as per 14 CFR §61.31(i)(2) as seen by pilot logbook entries dating back to May 1987. His last flight review as per 14 CFR §61.56 was completed on April 5, 2017 and he has a current Second Class Medical exam that was completed on April 9, 2018. Mr. Ulloa is a 16,678.8 total time pilot. He stated that he usually flies around 400 hours per season, examination of his logbooks showed that he flew 315 hours in the previous year. He has approximately 3800 hours in Air Tractor model 502B's and 9700 hours across all Air Tractor type platforms. Examination of the aircraft wreckage and the logbooks for Air Tractor 502B, Tail# N6180J, SN# 502B-0329 did not reveal any airworthiness or mechanical deficiencies that could have contributed to the accident. The aircraft's registration and airworthiness were current.

Analysis of the statement provide by Mr. Ulloa, the information that he provided during his interview, examination of the aircraft wreckage debris field, and the relationship of the wreckage

location to the grass/dirt airstrip indicate that this accident can be attributed to improper performance planning for the conditions at take-off. At the time of departure, the temperature was approximately 90°F/32°C with a Density Altitude between 2539'-2780'. The airstrip is located around 487'-685' PA. The winds at the time were northerly at 3-4 mph with occasional gusts up to 8 mph. According to the AT-502B AFM, and 8000lb aircraft on a dry hard surface runway at full rated take-off power and 10° flaps would require between 2600' – 3000' for a normal take-off run over a 50' ft obstacle using the conditions from the time of the accident. The presence of a tail wind and the additional friction provided by the unimproved grass/dirt airstrip can contribute to additional runway length requirements. Additionally there is a note on the climb performance table stating 'performance will deteriorate substantially with increase in outside temperature.' Climb performance for the AT-502B has been demonstrated to exceed 664 fpm at the best rate of climb airspeed with maximum rated take-off power. Mr. Ulloa stated that he rotated at 80kts, which is below the Best-Climb (V_y) airspeed of 96kts/111mph. When he reached $\frac{3}{4}$ length of the available take-off distance and realized that his tail wheel had not come up from the ground he put in "full-flaps" in order to jump the 3' foot irrigation ditch at the end of the runway. According to the AT-502B AFM any flap setting beyond the 10° (First Position) setting creates additional drag, thus requiring additional distance for take-off and the aircraft not accelerating to V_y when airborne. The final contributing factor to the accident is the estimation that the aircraft was between 523lbs – 574lbs over maximum gross weight. From the information provided during the interview, Mr. Ulloa did not complete formal weight and balance calculations. He stated that he had approximately 130-140 gallons (871-938 lbs) of fuel and 2,700lbs of urea fertilizer on board at the time of take-off. Post-accident analysis showed an estimated aircraft weight between 8,523 – 8,574 pounds, which is over the 8000 lbs maximum gross take-off weight for the Air Tractor 502B. The CG was approaching the aft limit, but still calculated to be within limits on a calculated theoretical scale limit of +22" inches aft for a 8,560 lb aircraft. The normal envelope at 8,000 lbs is +18" to +24" and the aircraft's CG was well within these limits. The 500+ additional pounds over the allowable maximum take-off weight would require additional available runway distance for acceleration and for the aircraft to take-off. The combination of high-density altitude, hot temperatures, and high gross weight contributed to a slower than normal acceleration and longer available runway than normal required for take-off, hence the aircraft's inability to fly and the subsequent crash.

Nicholaus Kaszczuk

Aviation Safety Inspector – Operations

AFG-500 – STL – FSDO – CE03

INSPECTOR'S STATEMENT

RYAN McCARTY

AST-OPERATIONS

JUNE 9, 2018

N6180J

On Tuesday, May 29, 2018 I was made aware of an agricultural aircraft accident located near Qulin, MO. I received this notification during our general aviation weekly stand-up meeting. It was decided that I would attend this investigation for my training. Other participating inspectors were Louis Bettis (Lead), Travis Schwein (Inspector-in-charge) and Nick Kaszczuk (Level 3 training). We departed Thursday morning to conduct the investigation.

We met the pilot of the aircraft involved in the accident, Mr. Daniel Ulloa (pilot cert# [REDACTED]), at the Dollar General in Qulin, MO. Mr. Ulloa was not injured in the accident. I did not personally interview Mr. Ulloa. I photographed the scene and the records while the other inspectors performed the interview. He led us to the accident site which was located just beyond the South end of a grass landing strip to the southwest of the intersection of Butler county roads 220 and 221.

Upon arrival at the accident site, we found the aircraft where it had come to rest. The grass strip runs directly north and south. The aircraft had attempted to take off starting from the north end heading south. The accident site was approx. 300 feet from the south end of the strip with the aircraft pointed to the northwest where it had come to rest. We noted an irrigation ditch on the south end of the strip that ran from east to west. The ditch was approx. 1.5 feet deep and approx. 3 feet wide. Mr. Ulloa stated that he was able to clear that ditch when he lowered the flaps to a lower position when he realized his attempt to rotate and climb was becoming unsuccessful. The aircraft's left main landing gear appeared to have made contact with the ground and it ultimately collapsed. The aircraft yawed to the right and there is evidence of propeller strikes on the ground leading up to the site along with the ground scarring from the left main landing gear dragging on the ground. All three propeller blades had damage consistent with striking the ground under power. The tail of the aircraft struck the ground during the yaw and fractured the structural members making up the tail section and causing the tail wheel to separate from the fuselage. The tail assembly, to include rudder and elevators, was folded into the right side of the fuselage. The left wing also struck the ground and received significant damage but was still mostly intact. The right wing also sustained some damage but was intact. Control continuity of all flight controls other than the elevator was verified. The elevator was jammed due to the extensive damage of the tail section.

Verification of the maintenance logs show that the aircraft maintenance was up-to-date. The engine had just had a hot section inspection January 15, 2018. All applicable airworthiness directives had been complied with up to the date of the accident.