



Aviation Investigation Final Report

Location:	Marion, North Carolina	Accident Number:	ERA21LA073
Date & Time:	December 13, 2020, 10:45 Local	Registration:	N138CT
Aircraft:	Flight Design CTSW	Aircraft Damage:	Substantial
Defining Event:	Loss of control in flight	Injuries:	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and passenger were departing for a cross-country flight in calm wind conditions. Shortly after liftoff, at an airspeed of about 46 knots, the airplane suddenly yawed to the right and came back down on the runway. The pilot elected to reject the takeoff. The airplane continued to veer to the right, and the airplane departed the runway and entered an area of soft terrain. The nose landing gear collapsed, and the airplane nosed over, resulting in substantial damage to the airframe. Following the accident, the pilot thought that the rudder had malfunctioned. However, examination of the flight controls revealed no evidence of a preaccident malfunction or anomaly. Thus, the pilot likely did not maintain yaw control of the airplane during the takeoff.

Probable Cause and Findings

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

The pilot's failure to maintain airplane control during takeoff, resulting in a rejected takeoff and runway excursion.

Findings

Aircraft	Yaw control - Not attained/maintained
Personnel issues	Aircraft control - Pilot

Factual Information

History of Flight

Takeoff	Loss of control in flight (Defining event)
Takeoff-rejected takeoff	Runway excursion
Takeoff-rejected takeoff	Nose over/nose down

On December 13, 2020, about 1045 eastern standard time, a Flight Design CTSW, N138CT, was substantially damaged when it was involved in an accident near Marion, North Carolina. The airline transport pilot and one passenger sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that all preflight operations were routine for the cross-country flight to Frankfort, Kentucky. Shortly after liftoff at an airspeed of about 46 knots, the airplane suddenly yawed to the right and came back down on the runway. The pilot elected to reject the takeoff, but the airplane continued to veer to the right. The airplane then departed the runway and entered an area of soft terrain. The nosewheel collapsed, and the airplane nosed over.

The pilot also reported that the takeoff gross weight was 1,310 pounds, which was 10 pounds below maximum gross weight for the airplane. He also reported that “something failed in the rudder.”

Postaccident examination of the airplane found that the nose gear had collapsed and was crushed into the lower fuselage. The vertical stabilizer and rudder were structurally damaged. Flight control continuity was established from the rudder to the cockpit rudder pedals. The pedals were jammed and would not move. Further examination revealed that the collapsed nose gear bent the rod between the rudder pedal assembly and the nose gear steering linkage. Otherwise, the rudder was free and clear with full travel available. Flight control continuity was also confirmed from the elevator and ailerons to the cockpit controls.

Pilot Information

Certificate:	Airline transport; Flight instructor	Age:	46, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	June 8, 2020
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	November 29, 2020
Flight Time:	12851 hours (Total, all aircraft), 41 hours (Total, this make and model), 11000 hours (Pilot In Command, all aircraft), 45 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Flight Design	Registration:	N138CT
Model/Series:	CTSW	Aircraft Category:	Airplane
Year of Manufacture:	2007	Amateur Built:	
Airworthiness Certificate:	Special light-sport (Special)	Serial Number:	07-09-25
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	August 5, 2020 Annual	Certified Max Gross Wt.:	1320 lbs
Time Since Last Inspection:	14 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	491 Hrs at time of accident	Engine Manufacturer:	Rotax
ELT:	C91 installed, activated, did not aid in locating accident	Engine Model/Series:	912ULS2
Registered Owner:	On file	Rated Power:	100 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:	FQD,1078 ft msl	Distance from Accident Site:	18 Nautical Miles
Observation Time:	10:55 Local	Direction from Accident Site:	168°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	None / None
Wind Direction:		Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.12 inches Hg	Temperature/Dew Point:	14°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Marion , NC	Type of Flight Plan Filed:	None
Destination:	Frankfort, KY (FFT)	Type of Clearance:	None
Departure Time:		Type of Airspace:	Class G

Airport Information

Airport:	Shiflet Field 9A9	Runway Surface Type:	Grass/turf
Airport Elevation:	1212 ft msl	Runway Surface Condition:	Dry
Runway Used:	10	IFR Approach:	None
Runway Length/Width:	3340 ft / 180 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 Minor	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Minor	Latitude, Longitude:	35.7203,-82.0141(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	Stephen Tucker; FAA/FSDO; Charlotte, NC
Original Publish Date:	October 13, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102411

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