Aviation Investigation Final Report

Location:	Pontiac, Michigan	**Accident Number:**	CEN17LA070
Date & Time:	December 23, 2016, 16:18 Local	**Registration:**	N1337H
Aircraft:	Aeronca 15AC	**Aircraft Damage:**	Substantial
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot was concluding a local flight in the tailwheel-equipped airplane. After numerous uneventful touch-and-go landings, the pilot attempted a full-stop landing when the airplane suddenly swerved to the left shortly after touchdown. The pilot attempted to regain directional control by applying right rudder and increasing engine power for an aborted landing; however, the airplane swerved to the right and collided with a snowbank next to the runway. The airplane sustained substantial damage to both main wing spars and the rudder.

A postaccident examination revealed that the left wheel brake torque plate had separated from the landing gear axle endplate, which allowed the brake assembly to rotate with the brake disk that was attached to the wheel. The airplane had been modified with Cleveland wheels and brakes through a supplemental type certificate (STC). However, additional examination of the brake torque plates revealed that they had not been installed in accordance with the STC installation instructions. Specifically, the torque plates were not modified with two 0.25-inch holes that were required to ensure proper alignment with the landing gear axle endplate, and improperly sized bushings had been used during the installation. The improper torque plate installation allowed for movement of the torque plate and unintended transverse loading of the anchor bolts, which resulted in the fracture of the anchor bolts that secured the left brake torque plate to the axle endplate. The failure of the left brake likely caused the loss of directional control during landing.

Probable Cause and Findings

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

The improper installation of the left wheel brake torque plate by maintenance personnel, which resulted in the separation of the torque plate from the axle endplate and a loss of directional control during landing.

Findings

Aircraft	Brake - Incorrect service/maintenance
Aircraft	Brake - Failure
Personnel issues	Modification/alteration - Maintenance personnel
Personnel issues	Installation - Maintenance personnel
Personnel issues	Aircraft control - Pilot
Aircraft	Directional control - Attain/maintain not possible
Environmental issues	Snow/ice - Contributed to outcome

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Landing-landing roll	Sys/Comp malf/fail (non-power) (Defining event)
Landing-landing roll	Loss of control on ground
Landing-landing roll	Collision with terr/obj (non-CFIT)
Landing-landing roll	Nose over/nose down

On December 23, 2016, about 1618 eastern standard time, an Aeronca model 15AC airplane, N1337H, collided with a snowbank and nosed over while landing at Oakland County International Airport (PTK), Pontiac, Michigan. The private pilot was not injured, and the airplane sustained substantial damage. The airplane was registered to Samcran LLC and operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 without a flight plan. Day visual meteorological conditions prevailed for the local flight that departed PTK about 1500.

The pilot reported that the purpose of the flight was to practice landings in the tailwheel-equipped airplane. After departure, he remained in the airport traffic pattern and completed 14 uneventful touch-and-go landings before deciding to conclude the flight with a full stop landing on runway 27R. He reported that he made an uneventful full stall (three point) landing on the runway centerline. However, shortly after touchdown, the airplane suddenly swerved to the left. He attempted to regain directional control with an application of right rudder and increased engine power for an aborted landing. The airplane then swerved to the right as he simultaneously applied forward stick pressure to get the tail airborne. The airplane continued to swerve right until it collided with a 3 ft high snowbank located alongside the runway. The airplane then nosed over and came to rest in the snow-covered area located off the right side of the runway. The pilot was able to exit the airplane uninjured after releasing his lap belt.

The pilot had accumulated 205 hours in the airplane since he purchased it in May 2015. The pilot noted that most of his flight experience in the airplane, 172.9 hours, had been flown with the airplane equipped with landing floats instead of a conventional (tailwheel) landing gear. He had logged 32.1 hours of tailwheel time, all of which were flown in the accident airplane. The pilot received his tailwheel endorsement on March 11, 2016.

A postaccident examination by a Federal Aviation Administration (FAA) airworthiness inspector revealed substantial damage to both main wing spars and the rudder. The FAA inspector reported that the four 0.25 inch anchor bolts used to attach the left brake torque plate to its respective landing gear axle endplate had sheared. The unrestrained torque plate allowed the brake assembly to rotate with the brake disk that was attached to the wheel. With the forward rotation, the brake line was pulled around the gear leg until the 90° aluminum fitting that connected the brake line to the caliper assembly sheared. The tire inner sidewall exhibited a gash that partially exposed the inner tube. The inner tube did not

rupture but was partially protruding from the gash in the tire sidewall. The sheared anchor bolts had worn a grove on the inboard surface of the left brake disk.

According to maintenance documentation, on January 27, 2016, the airplane had been modified through the implementation of STC No. SA1114NW with Cleveland 8.00 x 6.00 main wheels, tires, and 6 inch external, single cylinder, dual piston brake assemblies. The landing floats were reinstalled on an unknown date during 2016. On December 17, 2016, the landing floats were removed, and the main landing gear and wheels were reinstalled to convert the airplane back into a conventional gear land airplane. The accident occurred during the second flight after the airplane was reequipped with the conventional landing gear.

The installation instructions for STC No. SA1114NW specified that the stock Cleveland brake torque plates be modified per the accompanying installation drawing No. 1200-4 and to use 0.375 inch outside diameter (OD) to 0.25 inch inside diameter (ID) bushings. Installation drawing No. 1200-4 specified that each torque plate required two 0.25 inch holes to be marked and drilled to ensure proper alignment with their respective landing gear axle endplate. Each torque plate was then attached to its respective landing gear axle endplate with four 0.25 inch anchor bolts and washers. The two 0.25 inch holes drilled in each torque plate did not require bushings when installed with a 0.25 inch anchor bolt; however, the remaining two 0.375 inch holes used to attach each torque plate required 0.375 inch OD to 0.25 inch ID bushings to properly support the 0.25 inch anchor bolts.

Further examination of the airplane revealed that both torque plates were not modified and installed in accordance with the STC No. SA1114NW installation instructions. Specifically, the supplied brake torque plates were not modified with the two additional 0.25 inch holes to ensure proper alignment with the landing gear axle endplate. Additionally, both torque plates were installed with improperly sized bushings in multiple holes. The left torque plate, which had separated from the left landing gear axle endplate, had two bushing remaining; one bushing had the correct 0.25 inch ID, the other bushing had a larger 0.3125 inch ID. The right torque plate, which remained attached to the right landing gear axle endplate, was incorrectly installed with four 0.3125 inch ID bushings.

Pilot Information

Certificate:	Private	**Age:**	53,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	October 7, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 30, 2016
Flight Time:	342 hours (Total, all aircraft), 205 hours (Total, this make and model), 253 hours (Pilot In Command, all aircraft), 49 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aeronca	**Registration:**	N1337H
Model/Series:	15AC	**Aircraft Category:**	Airplane
Year of Manufacture:	1949	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	15AC-377
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 14, 2016 Annual	**Certified Max Gross Wt.:**	2100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4380 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	C126 installed, not activated	**Engine Model/Series:**	C-145-2
Registered Owner:	On file	**Rated Power:**	145 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:	PTK,981 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	5 miles
Lowest Ceiling:	Broken / 8000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.18 inches Hg	**Temperature/Dew Point:**	1°C / -2°C
Precipitation and Obscuration:	Moderate - None - Haze		
Departure Point:	Pontiac, MI (PTK)	**Type of Flight Plan Filed:**	None
Destination:	Pontiac, MI (PTK)	**Type of Clearance:**	VFR
Departure Time:	15:00 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	Oakland County International A PTK	**Runway Surface Type:**	Asphalt
Airport Elevation:	981 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	27R	**IFR Approach:**	None
Runway Length/Width:	5676 ft / 100 ft	**VFR Approach/Landing:**	Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	42.665554,-83.420555(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Richard D Anderson; Federal Aviation Administration, East Michigan; Belleville, MI Ron Stonewall; Federal Aviation Administration, East Michigan; Belleville, MI
Original Publish Date:	April 20, 2020
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94570