



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

STRUCTURES GROUP CHAIRMAN'S FACTUAL REPORT

January 25, 2018

A. ACCIDENT WPR17FA151

Location: Marineland, Florida
Date: July 13, 2017
Time: 2258 Eastern Daylight Time (EDT)
Operator: Sunrise Aviation, Inc.
Aircraft: Piper PA-44-180 Seminole, N2173S

B. STRUCTURES GROUP

Chairman: Clinton R. Crookshanks
 National Transportation Safety Board
 Denver, Colorado

Member: Damian Galbraith
 Piper Aircraft, Inc.
 Vero Beach, Florida

C. SUMMARY

On July 13, 2017, about 2258 eastern daylight time, a Piper PA-44-180, N2173S, was destroyed during a descent and subsequent inflight breakup near Marineland, Florida. The flight instructor and private pilot receiving instruction were fatally injured. The airplane was registered to and operated by Sunrise Aviation Inc., Ormond Beach, Florida, as a *14 Code of Federal Regulations Part 91* instructional flight. Visual meteorological conditions prevailed and no flight plan was filed for the cross-country flight which originated from Brunswick, Georgia, at an undetermined time with an intended destination of the Ormond Beach Municipal Airport (OMN), Ormond, Florida.

Information provided by the Federal Aviation Administration (FAA) revealed that the flight reported to Air Traffic Control that they had OMN in sight while at an altitude of about 5,400 feet mean sea level (MSL). Shortly after, radar and radio communication was lost with the accident airplane. The FAA issued an alert notice (ALNOT) shortly after. The main wreckage was located by air units about 1141 on July 14, 2017.

D. DETAILS OF THE INVESTIGATION

1.0 Airplane Overview

The Piper PA-44-180 Seminole is a twin engine, low wing, all metal airplane with a T-tail and retractable tricycle landing gear (Figure 1¹). The airplane is 27 feet, 7.2 inches long, 8 feet, 6 inches tall at the tail, and has a wingspan of 38 feet, 6.6 inches. The airplane is powered by two Lycoming O-360 reciprocating 4-cylinder engines with Hartzell 2-blade tractor propellers. The accident airplane, S/N 44-7995245 was manufactured in 1979. The station reference line diagram is shown in Figure 2.

The all metal wings are designed with a main spar located near the mid-chord point and a rear spar at the aft end of the main wing box. The flaps and ailerons are attached to the aft side of the rear spar. Wing ribs and skin make up the interspar structure. The leading edge ribs and skins are cantilevered off the front side of the main spar. The outboard wings, installed outboard of the engine nacelles, are spliced to the center wing near wing station (WS) 110. The center wing C-channel spars fit inside the outboard wing C-channel spars between about WS 106 and WS 114 with doublers installed on the upper and lower spar caps between about WS 98 and WS 148. There are additional L-angle spar caps installed on the aft sides of the upper and lower spar caps between about WS 106 and WS 122.

2.0 Wreckage Site Overview

The airplane impacted flat, marshy, tree covered terrain near Marineland, Florida, about 25 miles north-northwest of the destination airport. The main wreckage site included the wreckage of the fuselage, the center wing and attached engines, and most of the empennage. The airplane impacted inverted and was crushed vertically. The left and right outboard wings and ailerons, right stabilator, and baggage door were separated from the airplane and recovered up to 0.6 miles west-northwest of the main wreckage. The left and right flaps remained attached to the center wing in the retracted position.

3.0 Wreckage Examination

The group examined the airplane wreckage at the Florida Air Recovery facility in Jacksonville, Florida, January 24-25, 2018.

The outboard left wing was recovered about 0.48 miles west-northwest of the main wreckage. The main spar fractured about WS 105. The fiberglass wingtip was separated from the outboard wing at WS 206.7 and recovered mostly intact and undamaged. The left aileron was separated from the left outboard wing at the hinge points. Three sections of the left aileron were recovered spanning from the inboard end about WS 106 to about WS 181. The outboard portion (25 inches) of the left aileron including the aileron balance weight was not recovered. The main spar, leading edge, and upper and lower skins between about WS 105 and WS 130 were damaged and deformed up and aft indicative of an upward (positive) separation of the left outboard wing. There were several fractures and twisting deformation of the main spar structure in this area. The main spar inboard of the fracture point,

¹ All Figures are presented in Appendix A.

between about WS 93 and WS 105, was deformed aft and down. There was a semi-circular impact impression and tree debris embedded in the wing structure in this area. The aileron cables remained attached to the bell crank and there was tearing of the WS 93 rib in an aft direction at the normal cable pass through locations. The fractured ends of the aileron control and balance cables had a splayed, broomstraw appearance consistent with tension overload. The main spar fracture surfaces all had a dull, grainy appearance consistent with overstress separation. There was no evidence of any pre-existing corrosion or cracking noted on any of the fracture surfaces.

A large portion of the right outboard wing was recovered about 0.39 miles west-northwest of the main wreckage. The main spar upper cap fractured about WS 126 and the lower cap fractured about WS 148. The leading edge nose skin and ribs and lower leading edge skin were separated as a unit from the right outboard wing and recovered about 0.6 miles west-northwest of the main wreckage. A smaller piece of the leading edge lower skin about 3 feet long was also separated outboard of about WS 170. The fiberglass wingtip was separated from the outboard wing at WS 206.7 and only the upper half was recovered. The right aileron was separated from the wing at the hinge points. The entire aileron was recovered but was separated into two pieces at the center hinge point. The main spar inboard of the fracture point was deformed upward and aft outboard of about WS 105 indicative of an upward (positive) separation of the right outboard wing. The aileron cables remained attached to the bell crank and there were two cable tears through the upper wing skin inboard of the fracture point. The fractured ends of the aileron control and balance cables had a splayed, broomstraw appearance consistent with tension overload. The main spar fracture surfaces all had a dull, grainy appearance consistent with overstress separation. There was no evidence of any pre-existing corrosion or cracking noted on any of the fracture surfaces.

The vertical stabilizer was separated from the fuselage but remained connected to the fuselage by the electrical wiring. The two vertical stabilizer forward spar bolts remained installed in the stabilizer but had pulled through the fuselage fitting in an upward direction. The vertical stabilizer rear attach fitting remained attached to the fuselage but was deformed aft and left. All the rivets attaching the fitting to the vertical stabilizer rear spar were sheared. The rudder was separated from the vertical stabilizer at the hinge points and recovered at the main wreckage site. The rudder trim tab remained attached. The upper 12-18 inches of the vertical stabilizer and rudder were damaged and deformed to the left. The horizontal stabilator hinge and counterweight was torn from the upper end of the vertical stabilizer and recovered at the main wreckage site. The left stabilator was torn into several pieces and recovered wrapped around a tree at the main wreckage site. The left 28 inches and the center 29 inches of the trim tab were separated from the stabilator and recovered at the main wreckage site. The right side of the stabilator was separated from the empennage and recovered mostly intact about 0.6 miles west-northwest of the main wreckage. About 47 inches of the trim tab remained attached to the right stabilator. The right stabilator skins were buckled and there were impact impressions in the leading edge. The stabilator spar was fractured about right buttock line (BL) 7. The upper spar cap and upper stabilator skin were deformed and curled upward at the fracture point and the lower spar cap and lower stabilator skin had no obvious deformation. Matching of the fracture surfaces was indicative of the right stabilator separating in an upward direction to the left. The stabilator spar fracture surfaces all had a dull, grainy appearance consistent with overstress separation.