



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Washington, D.C. 20594

AIRWORTHINESS GROUP CHAIRMAN'S FACTUAL REPORT

January 31, 2018

A. ACCIDENT: WPR17FA117

Operator: Private
Location: Ventura, California
Date: June 1, 2017
Time: 1155 Pacific Daylight Time
Aircraft: Cessna 180
Registration: N3683C

B. AIRWORTHINESS GROUP

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

Member: Kate Benhoff
 National Transportation Safety Board
 Seattle, Washington

Member: Andrew Hall
 Textron Aviation
 Wichita, Kansas

Member: Beth Gamble
 Textron Aviation
 Wichita, Kansas

Member: Frank Motter
 Federal Aviation Administration
 Van Nuys, California

C. SUMMARY

On June 1, 2017, about 1155 Pacific daylight time, a Cessna 180 airplane, N3683C, experienced an inflight break up and was destroyed when it impacted terrain about 7 miles west-northwest of Ventura, California. The private pilot was fatally injured. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 91. Visual meteorological conditions (VMC) prevailed, and no flight plan had been filed. The local personal flight departed Santa Paula Airport (SZP), Santa Paula, California about 1110.

D. DETAILS OF THE INVESTIGATION

1.0 Airplane

The Cessna 180 is a four-seat, single engine, strut-braced high wing general aviation airplane produced between 1953 and 1981 (Figures 1 and 2¹). The airplane is of all metal construction, has a conventional tail and is equipped with fixed conventional landing gear. The airplane is powered by a six-cylinder reciprocating engine driving a 2-blade constant speed tractor propeller. The airplane is 26 feet, 2-1/16 inches long, has a wingspan of 36 feet, and a tail height of 7 feet, 6-3/8 inches. The wings on the Cessna 180 are attached to the airplane at three points. Single lug and clevis fittings on the forward and aft spars are used to attach the wing to the fuselage above the cockpit. A strut is installed between the lower fuselage and the wing forward spar near the mid span point. Primary flight control is accomplished through conventional yokes and rudder pedals for the two front seats driving reversible cable circuits for the ailerons, elevators, and rudder. The wing flaps are controlled through a handle located between the two front seats driving reversible cable circuits. Pitch trim is accomplished through a control wheel located to the left of the flap handle between the two front seats driving a reversible cable circuit to the pitch trim actuators in the empennage. The pitch trim actuators change the incidence of the horizontal stabilizer to provide pitch trim. Rudder trim is accomplished through a ground adjustable tab and there is no aileron trim provided.

The accident airplane fuselage was painted white and red with blue stripes (Figure 3). The wings and empennage were painted white with red and blue stripes on the vertical stabilizer, rudder, and the lower surface of the wing tips. The accident airplane, S/N 31182, was manufactured in 1954.

2.0 Debris Field

The airplane debris was scattered throughout an oil field in mountainous, brush covered terrain near Ventura, California. The main wreckage site contained the fuselage from the nose of the airplane to fuselage station (STA) 172 and was located on an oil pad cleared of brush at the top of one of the mountains about 1,015 feet above sea level. The main wreckage site was about 16 miles west of Santa Paula Airport and about 7 miles west-northwest of Ventura (Figure 4).

All of the recovered debris was located south of the main wreckage and most was recovered within about ½ mile. The furthest piece of debris was a section of right wing leading edge that was found on the beach about 1.5 miles south of the main wreckage (Figures 5 and 6). The engine and

¹ All figures are presented in Appendix A to this report.

propeller separated as a unit from the airplane and were recovered embedded in a road about 510 feet southwest of the main wreckage. The empennage separated as a unit and was recovered about 455 feet south-southeast of the main wreckage. The right inboard wing was recovered about 420 feet south-southeast of the main wreckage and the left inboard wing was recovered about 295 feet southeast of the main wreckage. The right wingtip and outboard wing were recovered about 970 feet south-southeast of the main wreckage and the left wingtip and outboard wing were recovered about 2,235 feet south of the main wreckage. The pilot was ejected during the accident sequence and the remains were recovered between 250 feet and 350 feet south of the main wreckage.

3.0 Wreckage Examination

The wreckage was examined on-scene June 2-5, 2017, by NTSB representatives. The wreckage was recovered to the Air Transport facility in Phoenix, Arizona, and a follow up wreckage exam was conducted August 16-17, 2017, with representatives of the NTSB, FAA, and Textron Aviation.

3.1 Main Wreckage (Fuselage)

The main wreckage contained the fuselage from the nose of the airplane to STA 172 and came to rest between two parallel sets of power lines (Figure 7). One single power line was fractured and ran underneath the fuselage. The fuselage came to rest upright and was crushed vertically. The lower engine cowlings remained attached but were crushed upward and splayed open. The upper cowlings were separated and recovered in the debris field. The doorframes were fractured and crushed vertically. The antennas were intact on top of fuselage. The main landing gear remained intact and attached to the lower fuselage. The windshield was separated, and several pieces of plexiglass were recovered in the debris field. Both doors were separated from the fuselage at the hinges and recovered in the debris field with minimal damage. The right door was adjacent to the main wreckage initially but went missing after the first day². The left door was recovered about 1,290 feet south of the main wreckage. The engine truss mount was mostly intact and attached to the firewall at the 4 mounting points. The left upper truss tube was fractured and the firewall was folded forward in that area. The engine separated from the airplane and was recovered in the debris field. The engine case fractured through the 4 cradle mounts and the lower portion of the mounts remained attached to the truss. The engine case fractures all had a dull, grainy appearance consistent with ductile overload.

One rudder cable extended out of the aft end of aft fuselage. The other rudder cable, both elevator cables, and the pitch trim cables were fractured in the lower fuselage beneath the passenger compartment. The cables all exhibited a splayed, broom straw appearance consistent with tension overload. Continuity was established from the broken ends of the elevator, rudder and pitch trim cables to the yokes, rudder pedals, and trim wheel in the cockpit. There was a tear in the lower left fuselage corner that extended forward to STA 108 and through the STA 140 bulkhead. The skin along the tear was curled and exhibited parallel scratches in the paint. The aft fuselage upper left and right stringers and skin were deformed downward from STA 140 to STA 172.

² The right door was examined and photographed before it went missing. Review of security camera footage did not provide any useful information on the missing door.

The upper center wing section skin on the left side was folded up adjacent to the wing attach points. The left forward spar wing attach fitting was intact on the fuselage side with the bolt installed. The wing lug was fractured and portions remained captured in the fuselage clevis. The left aft spar wing attach fitting was intact with the bolt installed. The left wing aft spar fitting was fractured from the wing aft spar at the outboard end of the fitting and remained attached at the attach point. The left wing aft spar fitting was deformed upward. The right wing forward and aft attach points were intact with the bolts installed. The right wing forward spar was fractured 10-11 inches outboard of the attach point. The forward spar web and aft L-angle were fractured about 10 inches outboard of the attach point. The forward fitting strap was intact to the production edge (11 inches outboard of the attach point) and the aft fitting straps were intact to the production edges (6 inches outboard of the attach point). The right forward spar, upper spar cap structure was twisted leading edge down outboard of the attach point. The right wing aft spar was fractured about 15 inches outboard of the attach point. Continuity of the left and right aileron cables was established from the yoke to the fractured cable ends at the wing roots. Continuity of the flap cables was established from the handle to the fractured cable ends at the wing roots. The fractured cable ends exhibited a splayed, broom straw appearance consistent with tension overload.

The right wing strut was intact and attached to the fuselage at the lower end. There was a dent in the upper surface of the right strut about 8 inches above the lower attach point with no damage to the paint around the dent. A portion of the right wing forward spar, about 18 inches long, was attached to the top of the right strut. The upper fittings and bolt were intact.

The lower portion of the left wing strut remained attached to the fuselage. The left strut was fractured about 9 inches above the lower attach point. The airfoil-shaped tubular strut was crushed and flattened along the forward half and splayed open along the aft half at the fracture point. The fractures had a dull, grainy appearance consistent with ductile overload.

The left seat remained in the cabin with its back folded over forward but was not attached to the floor. There was no obvious deformation to the left seat attach points. The left seat left lap belt was frayed and separated between 21 and 33 inches above the floor attach point (Figure 8). The left seat right lap belt was pulled from the floor structure and not recovered. The left seat shoulder harness was frayed and separated about 20 inches below the inertia reel with the belt fully extended (Figure 9). The left seat belt buckle, right lap belt, a portion of the left lap belt, and the shoulder harnesses were not recovered. The right seat was intact in the cabin and its shoulder and lap belts were attached and buckled in the seat. The shoulder harness splits into two about 30 inches below the inertia reel. The Amsafe shoulder harness inertia reels were marked with P/N 4071-1-031-2257, and CONFORMS TO TSO-C114.

3.2 Right Wing

Almost all of the right wing was recovered in six pieces (Figure 10). A section of leading edge between wing station (WS) 100 and WS 122 was not recovered. The largest section included most of the wing structure from the root outboard to WS 112. The wing attach fittings and portions of the forward and aft spars were separated and attached to the fuselage. About 66 inches of the forward spar and about 60 inches of the inboard leading edge was intact on this section. The forward spar was fractured about 12 inches inboard of the strut attach point. The forward spar upper spar cap was curled upward at the fracture point and there was no noticeable deformation of

the lower spar cap. The entire upper wing skin out to WS 208, the aft spar, the inboard half of the right aileron, and the right flap were attached to this piece. The aileron and flap were free to move. The attached section of right inboard aileron was about 55 inches long and both the inboard and center hinges were intact. The aileron bell crank was installed in the wing and both the aileron control and balance cables were attached. The right aileron cable was fractured near the wing root and the aileron balance cable was fractured about 118 inches from the bell crank. The flap cables were attached to the bell crank and fractured at the wing root. The fractured cable ends exhibited a splayed, broom straw appearance consistent with tension overload. The fuel tank remained installed and the fuel cap was in place. There were breaches in the fuel tank where the forward and aft spars and wing fittings were fractured from the wing with only minimal fuel left in the tank. There was an area of mechanical damage on the upper skin about 34 inches outboard of the root and about 2 inches aft of the forward spar that exhibited metal curling, smearing, and fracture of the upper wing skin and fuel tank skin. The wing section was recovered adjacent to an oil pipe with a valve attached. The valve exhibited damage and deformation with white paint transfer. There were areas of blue paint transfer noted on the inboard upper wing skin.

The next largest piece of right wing included the outboard lower wing skin, forward spar, and the right wingtip. The outboard forward spar was fractured near WS 104 and intact to the tip at WS 208. The lower wing skin was intact from the forward spar to the aft spar and from WS 112 to WS 208 with all or portions of 4 stringers attached. The lower skin panel was fractured at the inboard end near WS 112. The outboard leading edge skin panel and leading edge ribs between WS 190 and WS 208 were intact and installed. Portions of 4 leading edge ribs and 3 center wing ribs remained attached but were damaged. The right wingtip was intact, attached, and mostly undamaged with the red wingtip light installed.

The right outboard leading edge skin section found on the beach extended from about WS 122 to WS 190 and from the upper production edge to the lower production edge. All of the rivets attaching the panel to the forward spar and leading edge ribs were pulled through and the panel was splayed open flat.

The separated outboard section of right aileron was about 52 inches long and included the outboard hinge and a section of the false spar. The piece was deformed aft and downward and the counterweight was attached.

A section of the right wing forward spar, about 18 inches long, was attached to the upper end of the right strut as mentioned previously. The spar fractured about 7 inches outboard of the attach point at the end of the wing fitting and about 12 inches inboard of the attach point. The fractures at the inboard and outboard ends of the spar piece matched the forward spar fractures described above. There was evidence of over travel on the upper end of the strut in both directions. It was more severe on the lower side of the strut. The strut was jammed against the spar opposite of its normal position. The inboard and outboard ends of the spar piece were twisted leading edge down.

The final piece of the right wing recovered was a section of leading edge, about 17 inches long, normally installed immediately forward and inboard of the strut attach point. There was a strut access panel installed on the lower surface. The outboard edge was a production edge and the inboard edge was fractured. The upper, inboard fractured portion was curled upon itself.

3.3 Left Wing

Almost all of the left wing structure was recovered in the debris field but was noticeably more damaged and fragmented than the right wing (Figure 11). A section of the left wing leading edge between WS 190 and WS 208 and a portion of the left aileron between WS 100 and WS 127 were not recovered. The largest section of left wing included most of the inboard wing structure from the root outboard to the diagonal rib installed between WS 72 at the forward spar and WS 56 at the trailing edge. The forward spar wing attach fitting remained installed and the upper inboard quadrant of the lug was fractured from the lug and retained in the fuselage clevis. The aft spar wing attach fitting was fractured from the wing and attached to the fuselage. The aft spar out to about WS 100 and the left flap remained attached and were deformed aft. The left wing leading edge and upper spar cap were deformed downward at the fracture location near WS 72. The lower skin and stringers immediately outboard of the diagonal rib were deformed downward. The fuel tank remained installed and the fuel cap was in place. There were no breaches in the fuel tank but the fuel line was fractured at the wing root. There was residual fuel in the left fuel tank. The left flap cables were fractured at the wing root and continuity was established between the fractures and the flap bell crank. The fractured cable ends exhibited a splayed, broom straw appearance consistent with tension overload. The left aileron bell crank and cables were not recovered.

The upper 85 inches of left wing strut remained attached to a portion of the left wing forward spar. The strut was mostly undamaged except for a dent on the upper surface about 32 inches below the upper attach point with no damage to the paint around the dent. The upper fittings and bolt were intact. There was evidence of overtravel on the lower strut surface at the upper end. The strut was jammed against the spar opposite of its normal position. The airfoil-shaped tubular strut was crushed and flattened at the fracture point. The fractures had a dull, grainy appearance consistent with ductile overload. The forward spar section attached to the left strut was about 54 inches long and extended about 26 inches inboard of the attach point to about WS 72 and about 28 inches outboard to about WS 128. The left wing forward spar upper cap aft L-angle and aft strap were fractured near WS 72 and were deformed down and twisted leading edge down. The forward spar lower cap and spar web were buckled and fractured near WS 72 and WS 128. The upper spar cap forward L-angle was intact from production edge to production edge between WS 72 and WS 128. The upper cap aft L-angle was fractured near WS 128. The upper spar cap aft strap was intact to the production edge at WS 136 and was deformed down about 90 degrees. The WS 72, 86, and 100 center wing ribs and the lower skin between the diagonal rib and WS 100 remained attached to the spar.

The next largest piece of left wing included outboard lower wing skin, aft spar, upper wing skin, and the left wingtip. The left lower wing skin from WS 127 outboard to WS 208 was attached with significant deformation and multiple fractures. Most of the center wing ribs were separated from the skin. Most of the upper wing skin panel from WS 190 to WS 208 remained attached. The aft spar from about WS 100 to WS 208 was attached along with most of the trailing edge skin panels but was fractured in multiple places. The left wingtip was mostly intact with minor damage. All of the fasteners along the lower surface were pulled free. The left upper wing skin from about WS 136 to WS 190 was separated and recovered adjacent to this section of left wing.

A section of the left wing forward spar from WS 128 to WS 208 was recovered separately with leading edge skin attached. Portions of the center wing ribs were attached to the rear side of the

spar. The leading edge from the inboard end of the piece out to about WS 184 was attached but deformed. The landing light cover was fractured and missing and one of the bulbs was fractured. The other bulb was intact.

The left aileron separated from the wing and about 75% was recovered in 2 pieces. The outboard section of left aileron was about 52 inches long and had the outboard hinge attached. The wing side of the hinge was fractured. The aileron counterweight remained attached to the outboard section of left aileron. The trailing edge was buckled and most of the rivets were popped. The center section of the left aileron was about 30 inches long and contained the center hinge. About 18 inches of the wing aft spar remained attached to the center hinge. The inboard portion of the left aileron was not recovered.

The remainder of the recovered left wing was separated into 8 smaller pieces. All of the pieces were matched to the structure above and exhibited significant damage and deformation.

3.4 Empennage

The Empennage separated as a unit from the fuselage at the STA 172 bulkhead location. Both horizontal stabilizers, the left elevator, the vertical stabilizer, the rudder, and the tail wheel remained attached. The right elevator and both elevator counterweights were recovered separately. The rudder counterweight was not recovered. The rivets normally installed through the STA 172 bulkhead, forward fuselage skin, and empennage skin from the right side fuselage stringer around the top to the left upper corner of the fuselage were all popped and the holes in the bulkhead and fuselage skins were intact with little damage. The remaining rivets in the bulkhead and fuselage skins were intact and installed. The STA 172 bulkhead remained installed in the empennage but was buckled and deformed. The forward fuselage skins were fractured forward of the STA 172 bulkhead from the right side fuselage stringer around the bottom to the left upper corner of the fuselage. The tail lift tube was crushed downward and fractured with parallel gouging consistent with a cable strike on the upper surface adjacent to the damage and fracture.

The rudder cables remained attached to the rudder control horn, the elevator cables remained attached to the elevator bell crank, and the pitch trim cables remained attached to the chain at the pitch trim actuators. The right rudder cable was fractured about 14 inches forward of the STA 172 bulkhead and the left rudder cable was fractured about 53 inches forward of the STA 172 bulkhead. The lower elevator cable was fractured about 57 inches forward of the STA 172 bulkhead and the upper elevator cable was fractured about 61 inches forward of the STA 172 bulkhead. Both pitch trim cables were fractured about 40 inches forward of the STA 172 bulkhead. The fractured cable ends exhibited a splayed, broom straw appearance consistent with tension overload. The pitch trim chain remained engaged with the sprockets on the lower ends of the actuators. The left pitch trim actuator remained connected at both ends. The right pitch trim actuator remained connected at the lower end and the stabilizer fitting at the upper end was separated from the stabilizer. The distance between the lower actuator attach point and the lower surface of the horizontal stabilizer measured 7.75 inches on scene. The pitch trim actuators were removed during the follow up examination and the extension of both measured 8.25 inches between attach points. These measurements correspond to a horizontal stabilizer incidence of -5° to -7° . Both actuators were free to move.

The vertical stabilizer was damaged and deformed to the left with crushing damage to the right side (Figures 12 and 13). The dorsal fin remained attached to the vertical stabilizer and was deformed

about 180 degrees around to the right. There were some small areas of red and blue paint transfer on the right side of the dorsal fin and vertical stabilizer. The rudder was mostly intact except the rudder counterweight was separated. The upper and center rudder hinges were fractured from the vertical stabilizer and the rudder was deformed to the left. The rudder was attached to the empennage at the lower bell crank. The left horizontal stabilizer was deformed up about 20 degrees along a diagonal line from stabilizer station (SS) 16 at the leading edge to SS 29 at the aft spar. The left horizontal stabilizer spars were fractured, and the upper and lower skins were buckled diagonally in line with the deformation. The left elevator, minus the counterweight, was attached to the stabilizer and deformed up in line with the horizontal stabilizer. The rivets between the elevator torque tube and the center fitting on the elevator bell crank were sheared. The right horizontal stabilizer was deformed down and aft and twisted leading edge down about 90 degrees along a diagonal line from the root rib at the leading edge (SS 7) to about SS 24 on the aft spar. The right horizontal stabilizer spars were fractured, and the upper and lower skins were buckled diagonally in line with the deformation. There was black rubber transfer on the right empennage skin below the location of the right horizontal stabilizer. The right elevator was separated from the stabilizer and was deformed downward in line with the horizontal stabilizer. The right elevator counterweight was separated from the right elevator. The center fitting remained installed on the right elevator torque tube but the ears on the center fitting were fractured.

3.5 Engine

The engine and propeller separated as a unit from the airplane and were recovered south of the main wreckage. The engine was mostly intact and its left side was embedded about 2 feet in a road. The right cylinders were intact and undamaged while the left cylinders suffered extensive impact damage. The propeller blades were bent and there was no evidence of rotation on the blades.

4.0 Maintenance³

The most recent annual inspection was completed and entered in the logbook on March 14, 2017, at a total time of 4566.1 hours. The most recent maintenance entry in the logbook was the installation of a battery charger harness on May 5, 2017, at a total time of 4572.6 hours. The most recent transponder test was performed on March 7, 2016.

In November 2016, the horizontal stabilizer and right elevator were repaired due to an unknown event. The horizontal stabilizer was rebuilt with all new inboard and outboard skins, aft spar, and ribs. The right elevator was rebuilt with new upper and lower skins and a serviceable cap. The horizontal stabilizer and both elevators were repainted and the elevators were balanced prior to reinstallation. The pitch trim actuators were also replaced with new units at this time.

In January 2005, the outboard right wing and the right elevator were repaired due to damage from a ground accident. The wing and leading edge ribs at WS 190 and WS 208, the wingtip, upper and lower wing skins, and the auxiliary spar were replaced on the right wing. The spar and leading edge were replaced on the right elevator.

³ See Attachment 1 to this report for the pertinent maintenance records.