NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

STRUCTURES GROUP CHAIRMAN'S FACTUAL REPORT

February 9, 2019

A. ACCIDENT WPR19FA079

Location:	Yorba Linda, California
Date:	February 3, 2019
Time:	1345 Pacific Standard Time (PST)
Operator:	Private Individual
Aircraft:	Cessna 414A, N414RS

B. STRUCTURES GROUP

Chairman:	Clinton R. Crookshanks National Transportation Safety Board Denver, Colorado
IIC:	Maja Smith National Transportation Safety Board Seattle, Washington
Member:	Ricardo Asensio Textron Aviation Wichita, Kansas

C. SUMMARY

On February 3, 2019, about 1345 Pacific standard time, a Cessna 414A, N414RS, was destroyed when it broke up in flight and collided with houses in Yorba Linda, California. The commercial pilot was fatally injured. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations, Part* 91 as a cross country personal flight. Instrument meteorological conditions prevailed and a flight plan was not filed. The flight originated from Fullerton Municipal Airport (FUL), Fullerton, California, about 1335 with an intended destination of Minden-Tahoe Airport (MEV), Minden, NV.

D. DETAILS OF THE INVESTIGATION

1.0 Airplane Overview

The Cessna 414A Chancellor is a twin engine, low wing, all metal airplane with a conventional tail and retractable tricycle landing gear (Figure 1[1]). The airplane is 36.38 feet long, 11.45 feet tall at the tail, and has a wingspan of 44.12 feet. The accident airplane was powered by two RAM Aircraft Supplemental Type Certificate (STC) Continental TSIO-520-NB reciprocating 6-cylinder engines with Hartzell 3-blade tractor propellers. The accident airplane, S/N 414A0821, was a 1982 model that was manufactured in December 1981. The station reference line diagram is shown in Figure 2. The type certificate data sheet for the airplane lists a never exceed speed (V_{NE}) of 237 knots, a maximum structural cruising speed (V_{NO}) of 203 knots, and a maneuvering speed (V_A) of 145 knots. The airplane was certificated in the normal category and the Pilot's Operating Handbook (POH) lists limit load factors of -1.44 g and +2.0 g in the Limitations section. The accident airplane was equipped with winglets and twin ventral strakes on the lower aft fuselage that were installed under an STC.

2.0 Wreckage Site Overview

The airplane impacted a residential neighborhood in Yorba Linda, California. The main wreckage was located in the back yard of a house and included the fuselage and the inboard sections of the right and left wings. The left engine was recovered in the front yard of the same house. The right engine was recovered in front of a house about 340 feet south of the main wreckage. The outboard left wing was recovered in the middle of a road about 330 feet south-southwest of the main wreckage. The outboard right wing impacted a house about 330 feet southwest of the main wreckage and was mostly consumed by fire that engulfed the house. The separated portions of the horizontal stabilizer, elevators, vertical stabilizer, rudder, winglets, and engine cowling were recovered between 500 and 900 feet south of the main wreckage.

3.0 Wreckage Examination

The group examined the airplane wreckage at the Air Transport facility in Phoenix, Arizona on February 8-9, 2019. The group focused on the wreckage of the empennage and the outboard wings.

Empennage

The one-piece horizontal stabilizer and elevators separated from the airplane and were found away from the main wreckage. The largest piece of wreckage included the left half of the horizontal stabilizer from about left buttock line[2] (LBL) 6 to the end rib at LBL 96.7, the rear spar from LBL 96.7 to right buttock line (RBL) 47.5, the left elevator from LBL 20.5 to LBL 76.5, the right elevator and attached trim tab from RBL 20.5 to RBL 47.5, the trailing edge upper and lower skins from LBL 20.5 to RBL 20.5, and the upper and lower skins between the forward and rear spars between LBL 20.5 and RBL 20.5. The upper skin on the left half of the horizontal stabilizer was pillowed downward between the ribs and stringers (Figure 3). The left half of the horizontal stabilizer was deformed downward about 80 degrees forward of the rear spar. The left horizontal stabilizer rear spar was

[1] All Figures are presented in Appendix A.
[2] Buttock lines are measured in inches outboard from the airplane centerline at buttock line 0.

deformed downward near LBL 67. The right half of the horizontal stabilizer was separated and recovered mostly intact including the leading edge, upper and lower skins, and rear spar from RBL 47.5 outboard. The upper skin on the right half of the horizontal stabilizer was pillowed downward between the ribs and stringers (Figure 4). The horizontal stabilizer forward spar was fractured about RBL 6 and LBL 6. The center section of the forward spar between about LBL 6 and RBL 6 was separated from the horizontal stabilizer and the forward attach bolts pulled through the spar web (Figure 5). The horizontal stabilizer forward spar attach bolts remained installed in the empennage bulkhead. The forward spar upper and lower caps in the center section were separated from the web. The center section lower spar cap was recovered and exhibited a distinct downward curvature from end to end. The upper center section spar cap was not identified in the recovered wreckage. The separated center section of forward spar, left and right sections of forward spar, and mating forward spar fractures were deformed consistent with downward failure of the right and left horizontal stabilizer. The left and right elevator counterweights were separated from the elevators and not identified in the recovered wreckage. The left elevator between LBL 20.5 and LBL 76.5 remained attached to the horizontal stabilizer. The left elevator was deformed aft consistent with the damage to the left horizontal stabilizer. The left elevator between LBL 76.5 and LBL 96.7 was separated from the horizontal stabilizer and mostly intact with little damage. The right elevator and trim tab between RBL 20.5 and RBL 47.5 remained attached to the horizontal stabilizer. The right elevator between RBL 47.5 and RBL 76.5 was separated from the horizontal stabilizer and not identified in the recovered wreckage. The right elevator trim tab between RBL 47.5 and RBL 76.5 was separated and recovered with little damage. The right elevator between RBL 76.5 and RBL 96.7 was separated from the horizontal stabilizer and mostly intact with little damage. The elevator torque tube bell crank arm rivets were fractured from the actuator rod.

The right side of the fuselage below the horizontal stabilizer shelf was crushed downward (Figure 6). There was paint and rubber transfer marks on the fuselage skin below the right side of the stabilizer shelf that matched the transfer marks on the lower surface of the left horizontal stabilizer inboard skin. The left side of the fuselage below the horizontal stabilizer shelf was slightly deformed downward. There was no evidence of repeated contact on the elevator stops in the empennage.

The vertical stabilizer and rudder separated from the empennage in multiple pieces. The lower end of the vertical stabilizer and rudder remained attached to the aft fuselage. The lower portions of the vertical stabilizer forward and rear spars were deformed aft.

Wings

The left and right outboard wings fractured and separated near wing station[3] (WS) 114 near the outboard edge of the nacelles. The right wing was almost entirely consumed by fire and the left wing had moderate fire damage. The left and right inboard wings did not sustain fire damage. The examination focused on the inboard side of the wing fractures. The left wing forward spar upper cap was deformed down and aft from WS 105 to the fracture location (Figure 7). The forward spar lower cap was deformed downward at the fracture location. The left wing rear spar upper and lower caps were deformed downward at the fracture location. The spar fractures all had a dull, grainy appearance consistent with overstress separation. The inboard portion of the outboard left wing was deformed downward but the fracture points sustained fire damage and could not be examined.

[3] Wing stations are measured in inches outboard of the airplane centerline.

The right wing forward spar upper cap was deformed down and aft from WS 100 to the fracture location (Figure 8). The upper cap was also fractured about WS 100. The forward spar lower cap was deformed upward from WS 102 to the fracture location. The lower cap was deformed downward at the fracture location. The right wing rear spar upper and lower caps were deformed downward at the fracture location. The spar fractures all had a dull, grainy appearance consistent with overstress separation.