NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Washington, D.C. 20594

December 22, 2015

STRUCTURES STUDY
21 imbedded photographs

John Clark

ACCIDENT

Location:	Wichita, KS
Date:	September25, 2015
Time:	1550 central daylight time
Aircraft:	Cessna 310Q, N301JA

SUMMARY

On September 25, 2015, about 1550 central daylight time, a Cessna T310Q airplane, N301JA, was destroyed after declaring an emergency and subsequent impact with the ground in Wichita, Kansas. The commercial multi-engine instrument rated private pilot was fatally injured. The airplane was registered to Celestial Knights, LLC and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight and an instrument flight plan had been filed. The flight originated at Wichita Dwight D Eisenhower National Airport (KICT), Wichita, Kansas and was enroute for Centennial Airport (KAPA), Denver, Colorado.

The initial examination disclosed that the elevator trim tab pushrod was disconnected from the trim servo rod-end bearing. The attaching bolt, castellated nut and cotter pin were not found. Witness marks on the pushrod, clevis (at the forward end of the pushrod), rod end bearing at the trim servo, and elevator spar indicate that the pushrod was moving both fore and aft relative to the rod end bearing. Witness marks on the aft side of the elevator spar are consistent with the clevis being positioned behind the spar. Measurements show that the elevator trim tab would be deflected 39 degrees trailing edge up (TEU) when the clevis has moved aft of the spar. Simple measurements on another C310 show that the elevator trim tab would be about 12 degrees TEU with the actuator fully extended. The TEU tab positon pushes down on the elevator trailing edge, thus producing a large airplane nose down (AND) pitching moment.

DETAIL OF EXAMINATION

The right elevator remained partially attached to the stabilizer. The elevator was separated chordwise outboard of the elevator trim tab. The elevator trim actuator remained attached to its attachment point on the horizontal stabilizer. The elevator trim actuator extended about 5/8 inch, which correlates about a 35-degree trailing edge down (TED) or airplane nose up (ANU) trim down setting. The trim tab remained attached to the elevator at its hinge. The elevator trim push-pull tube was found attached to the trim tab but was not attached to the trim tab actuator.

The right-hand elevator, trim tab and trim actuator were removed from the scene and taken to Textron Aviation's laboratory for further examination. A portion of upper skin of the elevator was removed to examine witness marks in the leading edge spar of the elevator. Witness marks matching the forward push-pull tube end were consistent with the clevis hitting against the aft side of the front elevator spar after separation from the actuator. Additionally, the edge of tube guide hole exhibited signs of impact on the interior face, consistent with rubbing from the hardware on connecting bolt. The forward end of the trim tab push-pull tube, in the bottom of the clevis fork, had impact marks consistent with contact with the rod end bearing attached to the trim actuator.

Damage to the separated clevis and bearing was consistent with the bolt not being present.

Photos:

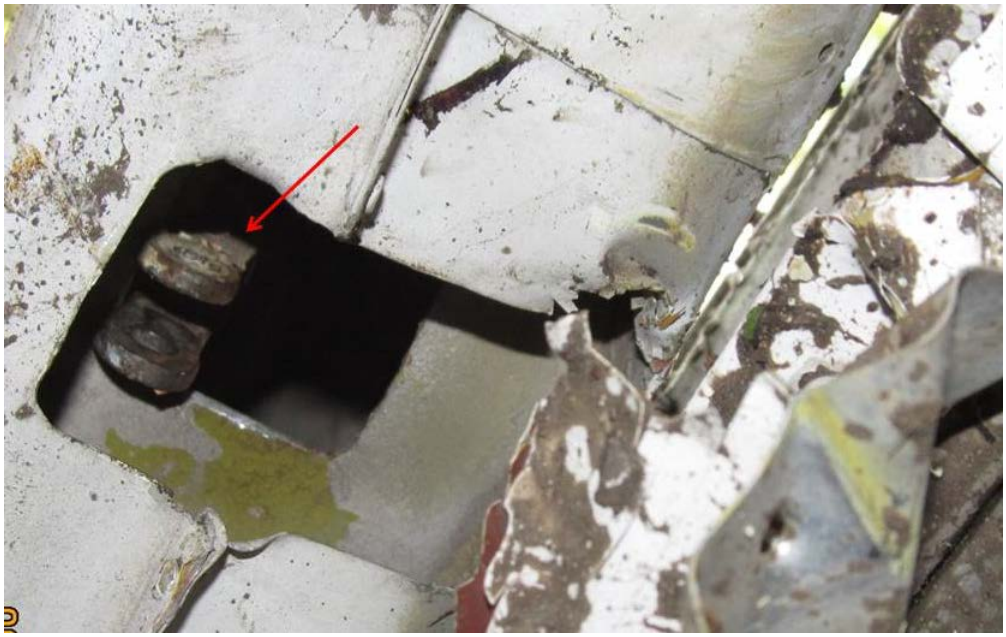

Photo 1 – Forward end of trim tab rod. The bolt was missing and not found. (see arrow)

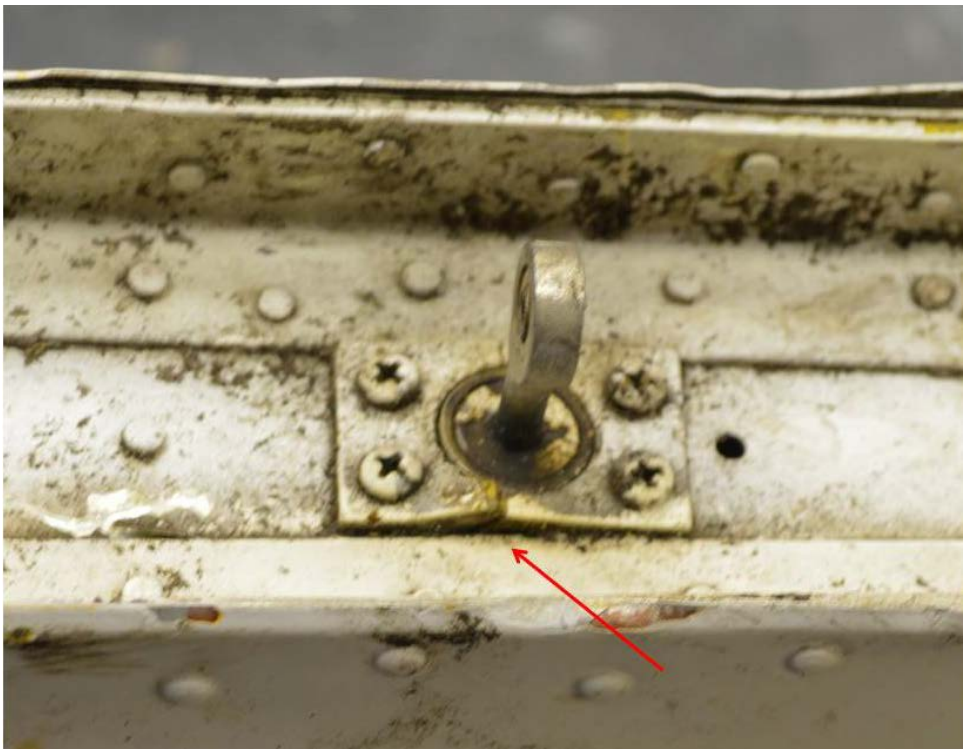

Photo 2 - The rod end bearing. The bolt was missing and the actuator was fully retracted to the ANU trim position. The only damage noted to the actuator attach hardware was the cracked doubler (see arrow).

Photo 3 - Trim tab actuator. The actuator had been impacted from the front (see arrow).

Photo 4 - Forward end of the pushrod. There was no apparent damage to the bolt hole (side one).

Photo 5 - Forward end of the pushrod. There was no apparent damage to the bolt hole (side two).

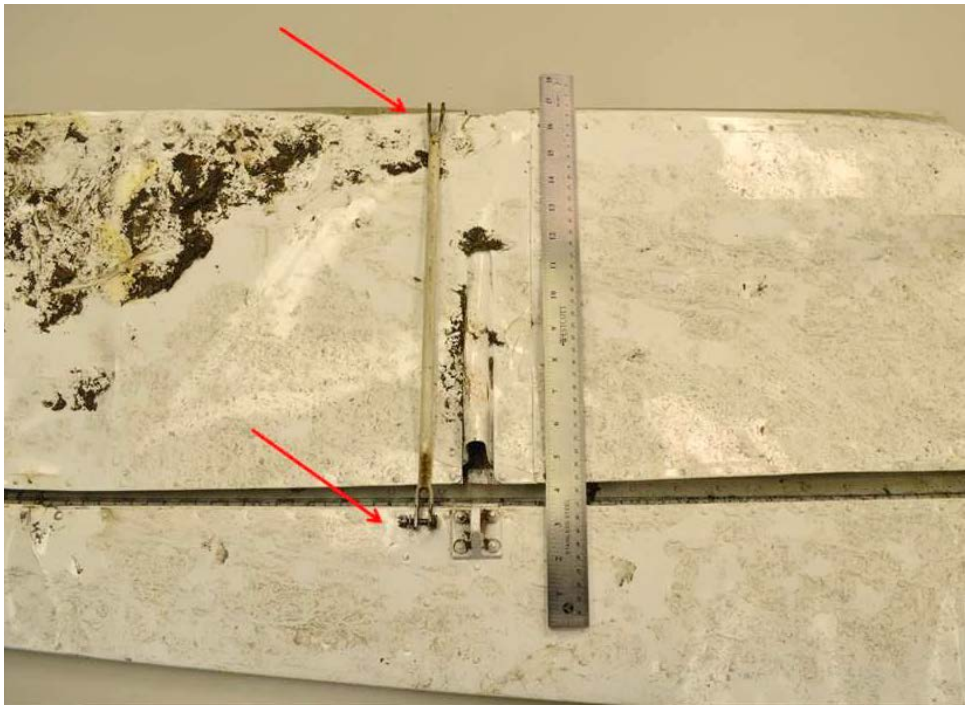

Photo 6 – General pushrod and tab alignment with the pushrod placed outside of the elevator and tunnel. The tab is at the bottom of the photograph.

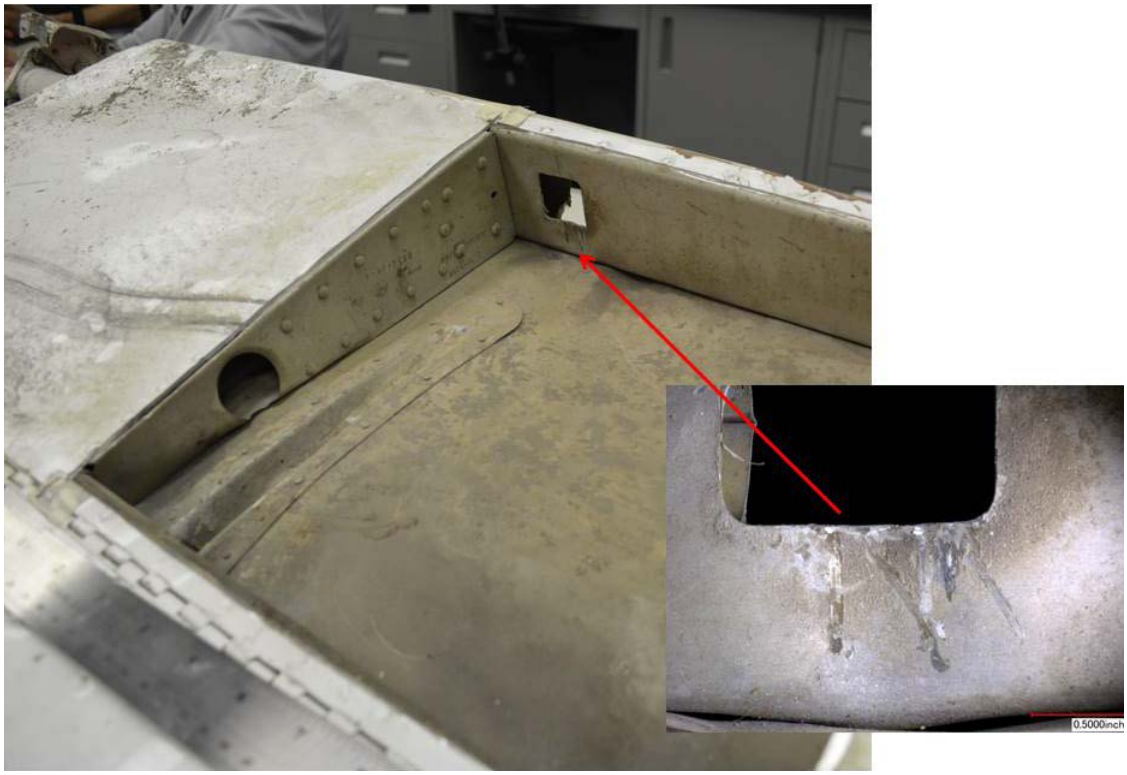

Photo 7 – Scrape marks on the aft side of the elevator spar that match the forward end fork. The inset photo provides a detailed view of the scrape marks.

Photo 8 – The clevis fork is placed behind the elevator spar. The tab is deflected up to pull the fork aft, well past the limits of normal travel.

Photo 9 - Fork touching the aft side of the elevator spar.

Photo 10 - Detailed view of scrape marks on aft side of elevator spar. View looking forward.

Photo 11 - Detailed view of damage at the top of the pushrod access hole. View looking forward.

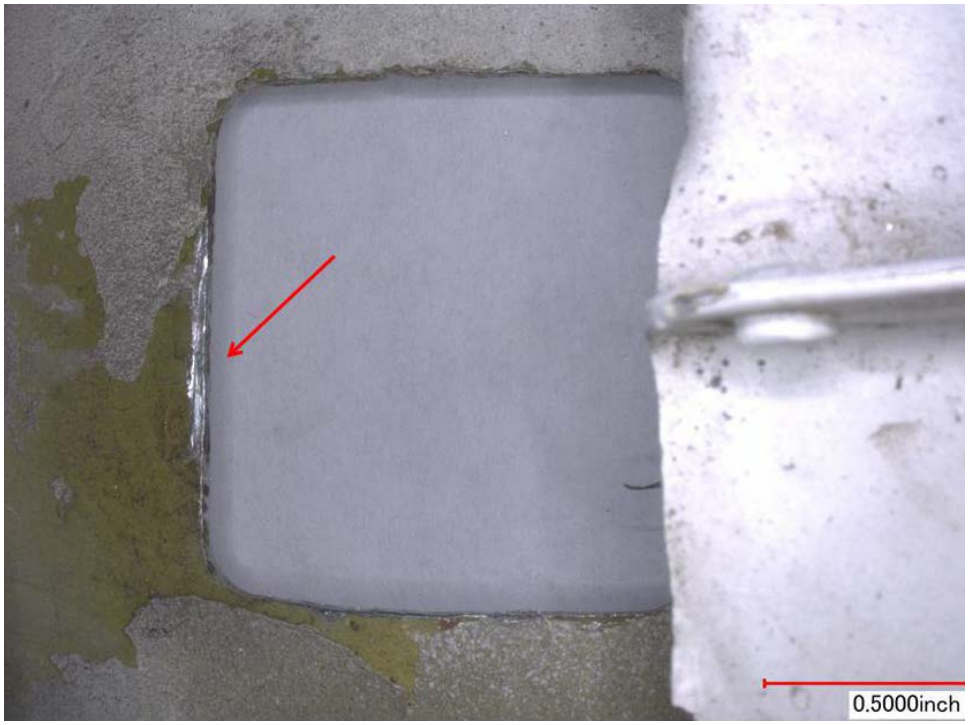

Photo 12 - Damage at the edge of the pushrod access hole. The damage is on the forward side of the elevator spar, outboard edge.

Photo 13 - Detailed view of damage show in Photo 12.

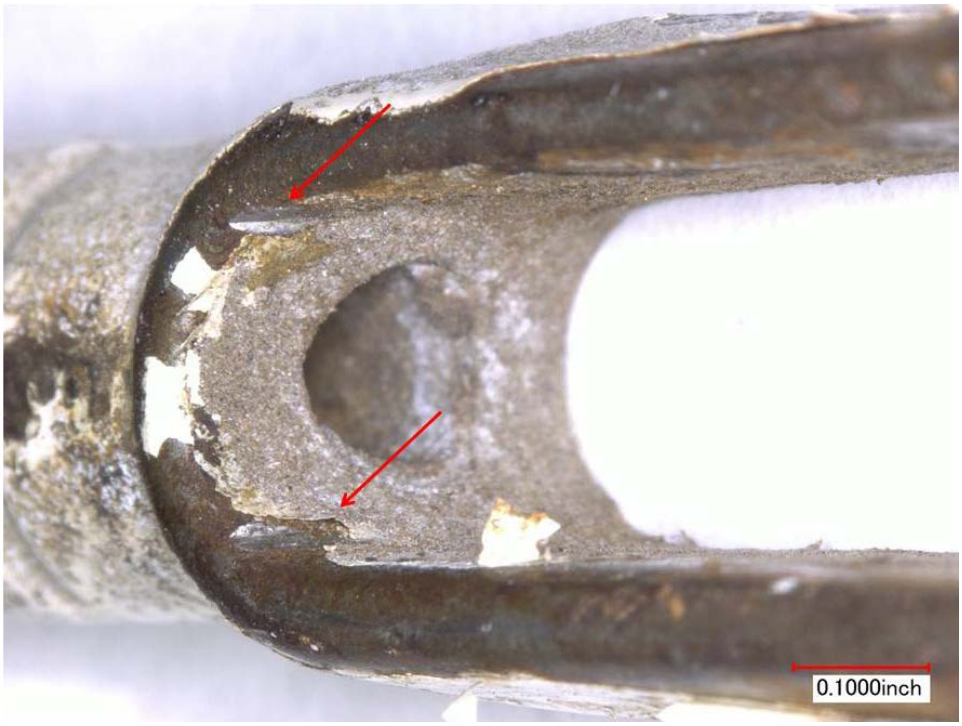

Photo 14 - Damage marks to the inside portion of the clevis. The width of the marks is consistent with the width of the rod-end bearing.

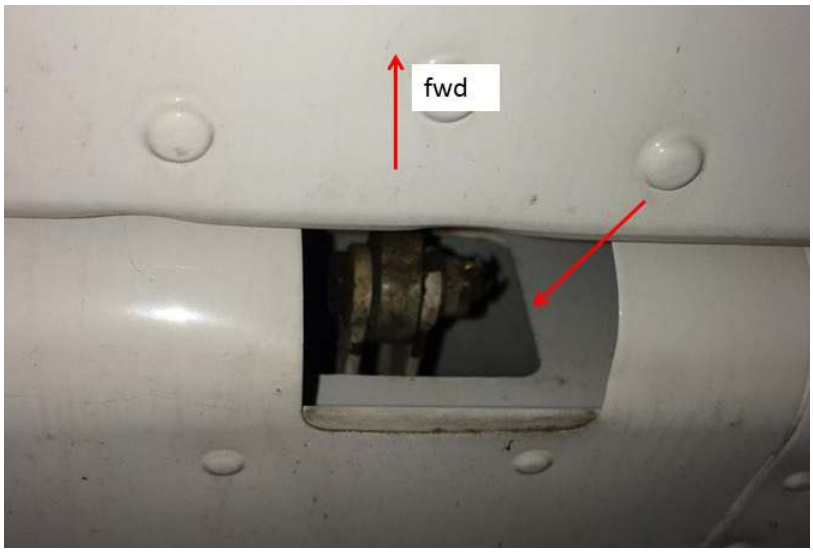

Photo 15 - Another C310. View looking up and aft. The trim actuator was fully extended (AND trim). The bolt through the rod-end bearing and fork is near the elevator spar.

Photo 16 - Another C310. The tab TEU or actuator AND trim positon, about 12 degrees.

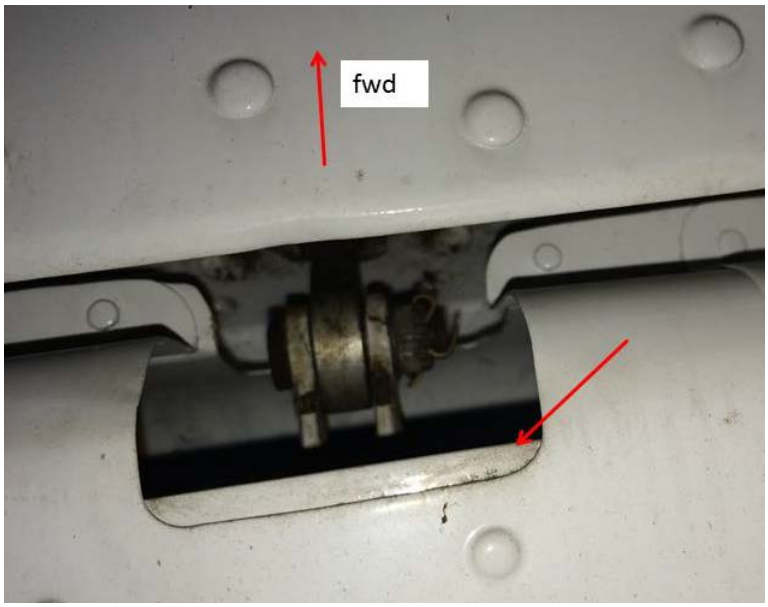

Photo 17 - - Another C310. View looking down. The trim actuator was fully retracted (ANU trim). The bolt through the rod-end bearing and fork is near the leading edge of the elevator D-tube.

Photo 18 – Slope of elevator

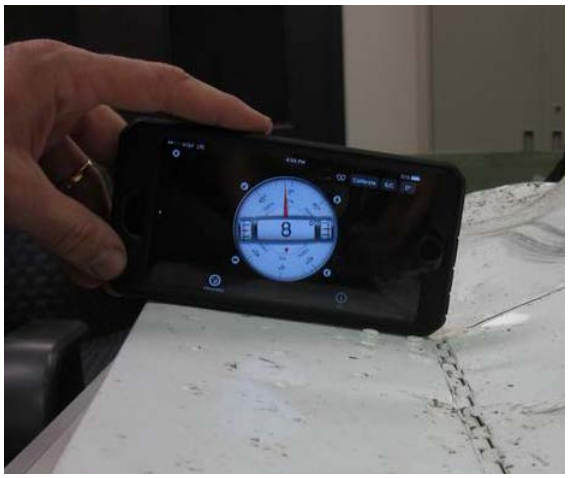

Photo 19 - Slope of tab. The tab deflection is about 30 degrees TEU. The pushrod was touching the bent portion of the elevator spar.

Photo 20- Slope of elevator. The pushrod was positioned as if the elevator spar had not been bent. The white paper replicates an unbent spar.

Photo 21 – Slope of tab. The tab deflection is about 39 degrees.

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