NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Washington, D.C. 20594

May 22, 2014

STRUCTURES STUDY
30 imbedded photographs

John Clark

ACCIDENT

Location: Johnstown, NY
Date: May 24, 2013
Time: 2110 GMT,
Aircraft: Piper PA34-200T, N31743
NTSB: ERA13FA253
IIC: A Diaz

SUMMARY

On May 24, 2013, at 2110 GMT, a Piper PA34-200T airplane broke up inflight following a rapid loss of altitude and resulting increase in airspeed. The airplane was destroyed upon ground contact. The pilot and two passengers were killed in the accident and there were no reported ground injuries.

Instrument meteorological conditions prevailed along the route of flight. The airplane flew generally to the northwest at 8,300 feet mean sea level (MSL) at 130 knots calibrated airspeed (KCAS)[1]. The airplane was expected to turn to the west, but instead turned to the north. Within about one minute the airplane entered a 400-degree descending turn to the left. The airplane descended about 3,700 feet in 36 seconds, accelerated to about 240 KCAS or 255 KTAS and broke up.

All fractures exhibited characteristics consistent with static overload. No evidence of fatigue characteristics were found. The left wing fractures and compression damage were consistent with upward loading on the wing.

The right wing fractures and compression damage were predominately consistent with upward loading on the wing. There was substantial compression damage of the

[1] The conditions were established using recorded radar data and airplane performance data. The data are presented in the Radar Performance Study.

upper wing skins consistent similar to the damage to the upper portion of the fuselage, consistent with water impact. There was compression damage on the lower spar caps of rear spar. The damage could be consistent with either downward aerodynamic loading of the wing or downward hydrodynamic loading of the wing due to the inverted impact with the water.

The left horizontal stabilator bending, fracture and compression damage were consistent with downward loading.

The right horizontal stabilator bending, fracture and compression damage were consistent with both upward and downward loading.

STRUCTURAL SEPARATION

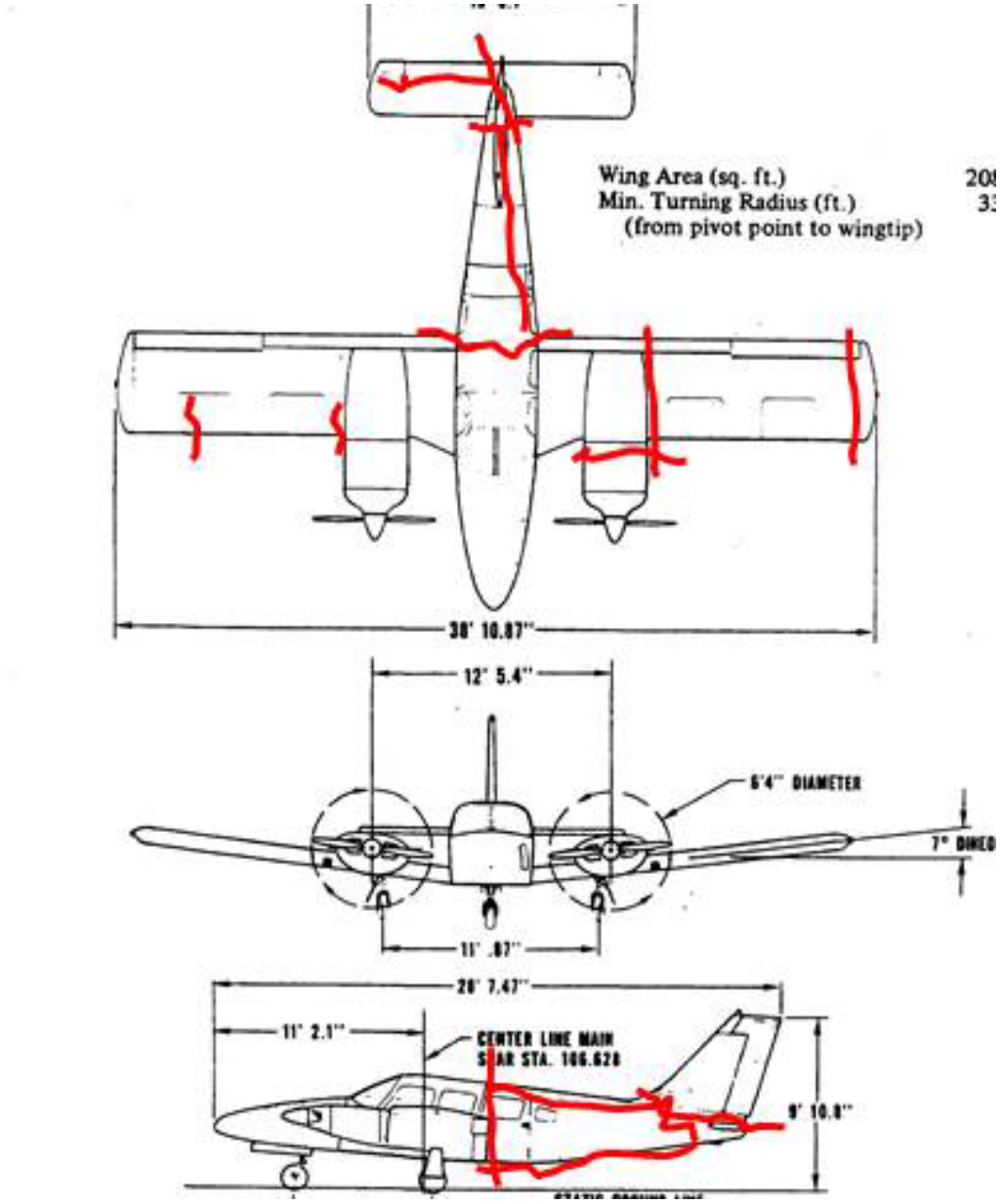

Figure 1 - Three view drawing with major break points noted.

Fuselage and Inboard Section of Wings

Photo 1 - The front and rear lower spar caps of the left wing are bent in an upward direction. The fuselage and right wing (still attached) impacted the water inverted.

Photo 2 - Top, aft skin of fuselage.

Left Wing

Photo 3 - Upper side of left wing.

Photo 4 - Lower side of left wing.

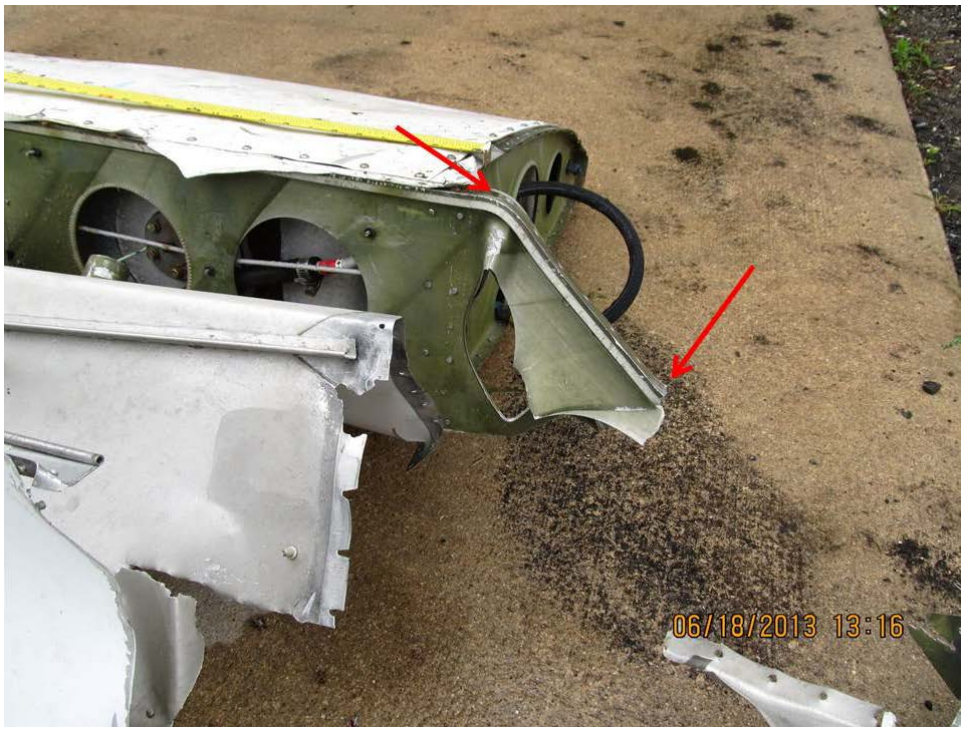

Photo 5 - The upper spar cap is bent downward. The downward bend and the reflex bend at the end of the upper spar cap are consistent with compression buckling of the top spar cap.

Photo 6 - Reflex bend of upper spar cap.

Photo 7 - The lower spar cap exhibits characteristics of tension overload.

Photo 8 - The section of the rear spar is buckled at the top.

Photo 9 - A large portion of the rear spar is relatively free from distortion.

Photo 10 – Top cap of rear spar buckled in compression.

Photo 11 - Left wing tip.

Photo 12 – An arrow highlight the compression wrinkles on the top skin of the left wingtip. The other arrow highlights the tension tears at the rivet holes on the bottom skin.

Right Wing

Photo 13 - The right wing is inverted. The arrows pointing to the aft spar highlight points of compression damage to the bottom of the aft spar (r) and the top of the aft spar (l).

Photo 14 - Outboard portion of right wing. The left arrow shows an area of compression damage to the upper service of the right wing. The series of arrows highlight a diagonal wrinkle across the top of the right wing. The wing skins on each side of the tank are compressed downward. The tank wing skin is compressed downward around the stringers.

Photo 15 - One arrow highlights compression damage on the upper cap of the rear spar. The other arrow highlights a major wrinkle across the top of the right wing.

Photo 16 - The arrows highlight compression damage on the upper surface of the right wing. The diagonal wrinkle is also visible.

Photo 17 - The outboard section of the rear spar has compression damage on the top and bottom rear spar cap.

Photo 18 - Diagonal wrinkles and compression damage to the top of the right wing.

Photo 19 - Compression damage to top and bottom rear spar caps.

Photo 20 - Compression damage to lower cap of rear spar.

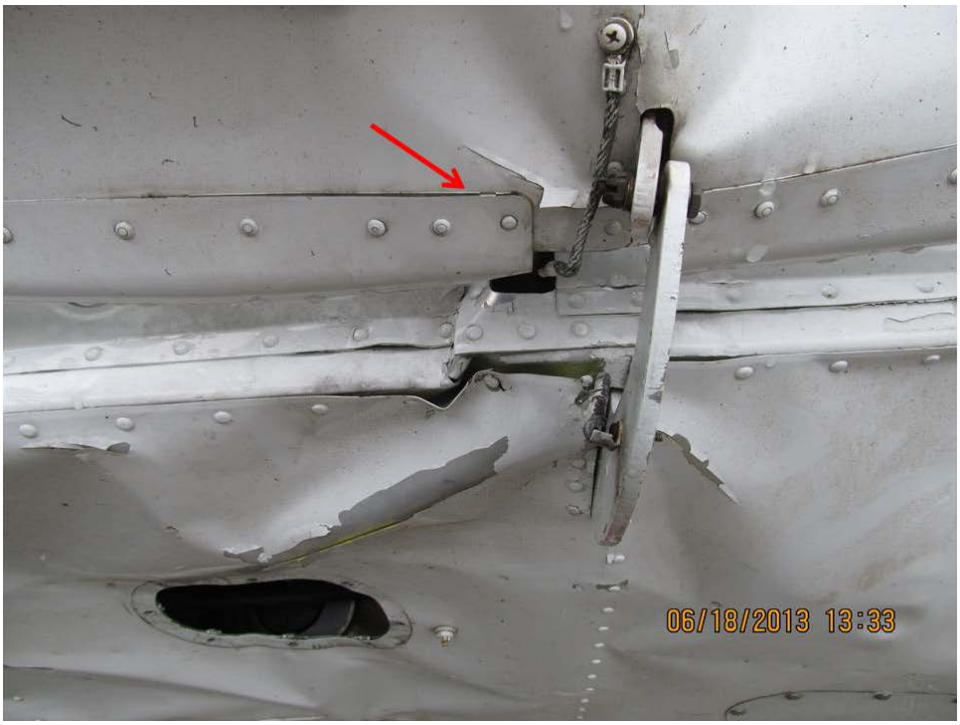

Photo 21 - Compression damage at lower cap of rear spar.

Photo 22 - Compression damage of upper cap of rear spar.

Left Horizontal Stabilator

Photo 23 - The left stabilator exhibits a downward bend.

Photo 24 - Another view of the left stabilator displaying the downward bend.

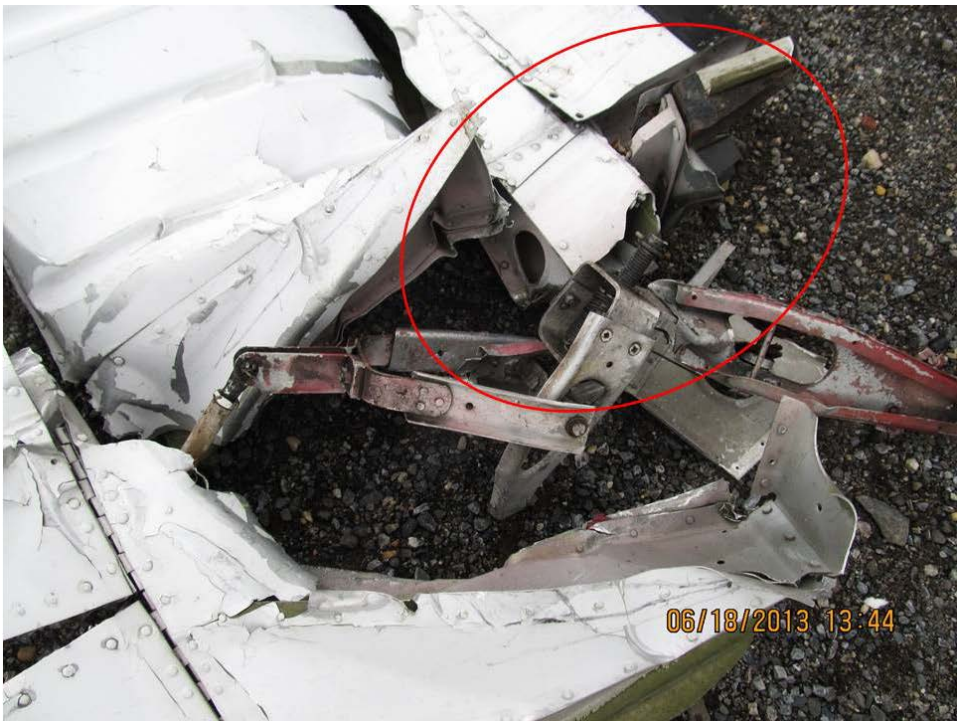

Photo 25 - The highlighted area shows the main spar of the stabilator.

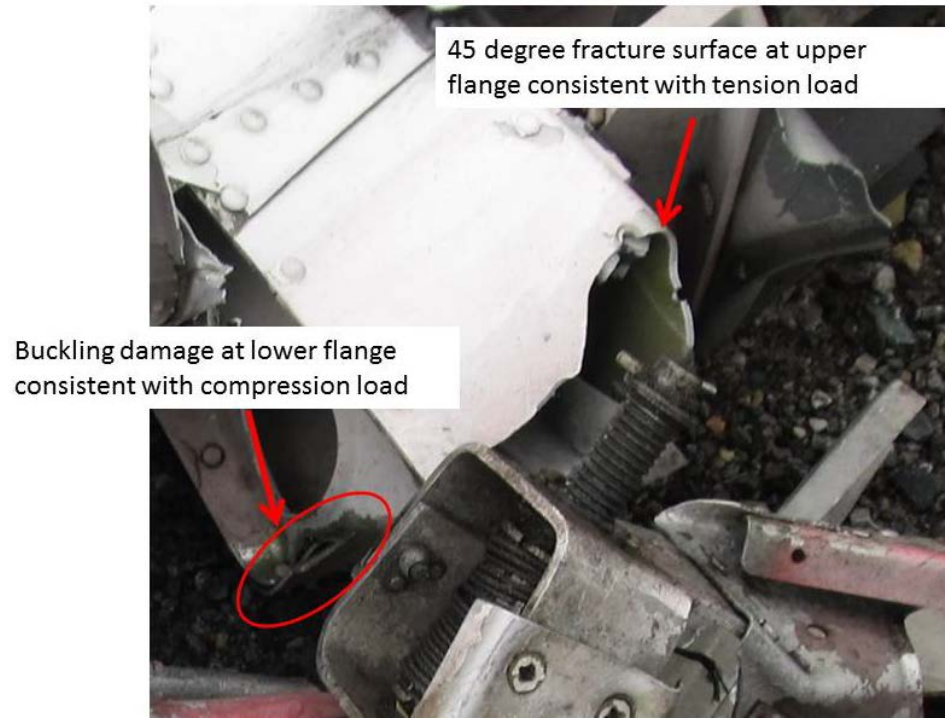

Photo 26 - The upper portions of the stabilator spar exhibit 45 degree fracture surfaces. The lower surfaces are buckled.

Right Horizontal Stabilator

Photo 27 - The right stabilator displays diagonal wrinkles and down bending of the main spar.

Photo 28 - The lower spar surface of the right stabilator spar exhibits 45 degree surfaces consistent with tension overload.

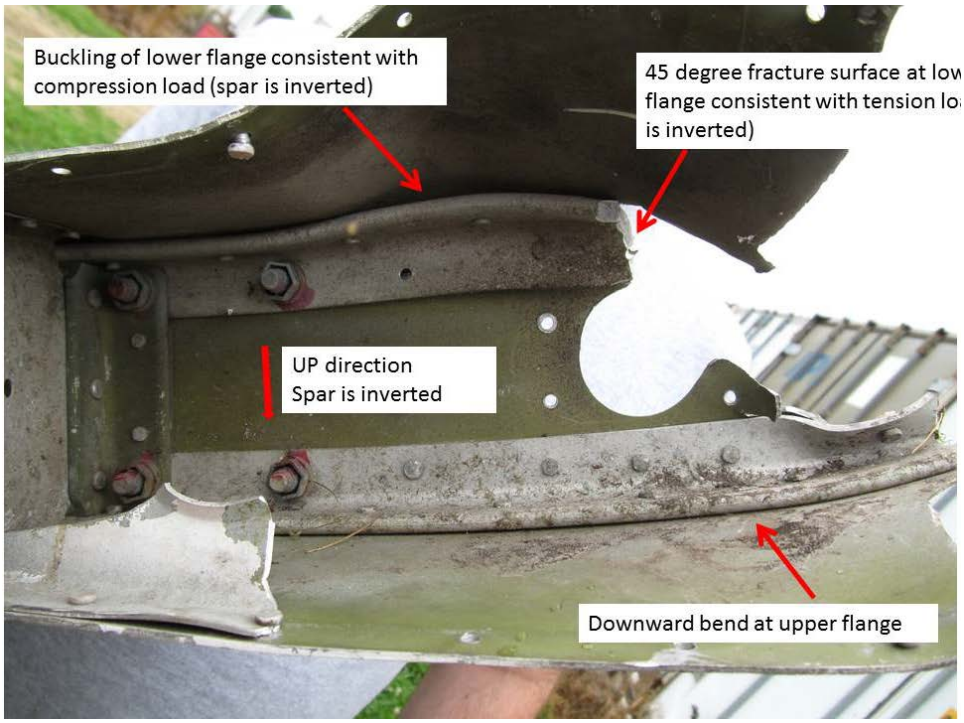

Photo 29 – Structure is inverted. The lower spar of the right stabilator (upper part of photo) exhibits compression buckling and a 45 degree fracture surface. The upper spar cap exhibits a bend consistent with downward motion of the stabilator.

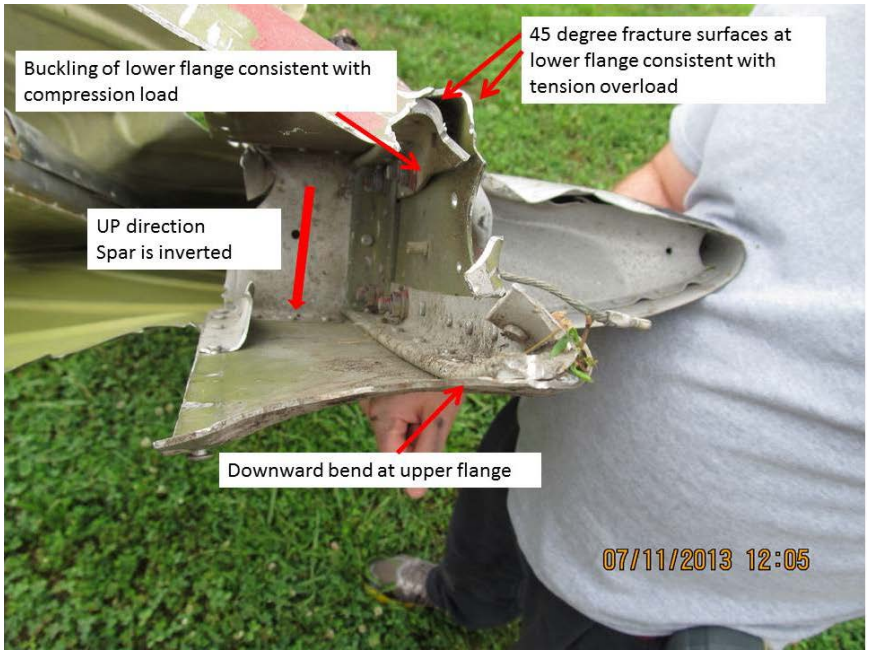

Photo 30 - Same as previous photo.

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