



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 19, 2022

Group Chairman's Factual Report

STRUCTURES

CEN21FA198

A. ACCIDENT

Location: Danville, Arkansas
Date: April 23, 2021
Time: 1701 central daylight time (CDT)
2201 coordinated universal time (UTC)
Airplane: Piper PA-36-310P, N461DK

B. STRUCTURES GROUP

Group Chairman Clinton R. Crookshanks
National Transportation Safety Board
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C. DETAILS OF THE INVESTIGATION

The group examined the recovered wreckage and the on-scene photos April 18-19, 2022, at the Dawson Aircraft, Inc., facility in Clinton, Arkansas.

D. FACTUAL INFORMATION

1.0 Wreckage Examination

The airplane broke up in flight and the outboard right wing and the right horizontal stabilizer and elevator separated during the accident sequence. The separated items were not recovered (Figure 1). The remainder of the airplane came to rest in wooded tree covered terrain with significant damage. The group focused the examination on the left wing, right wing, and empennage.

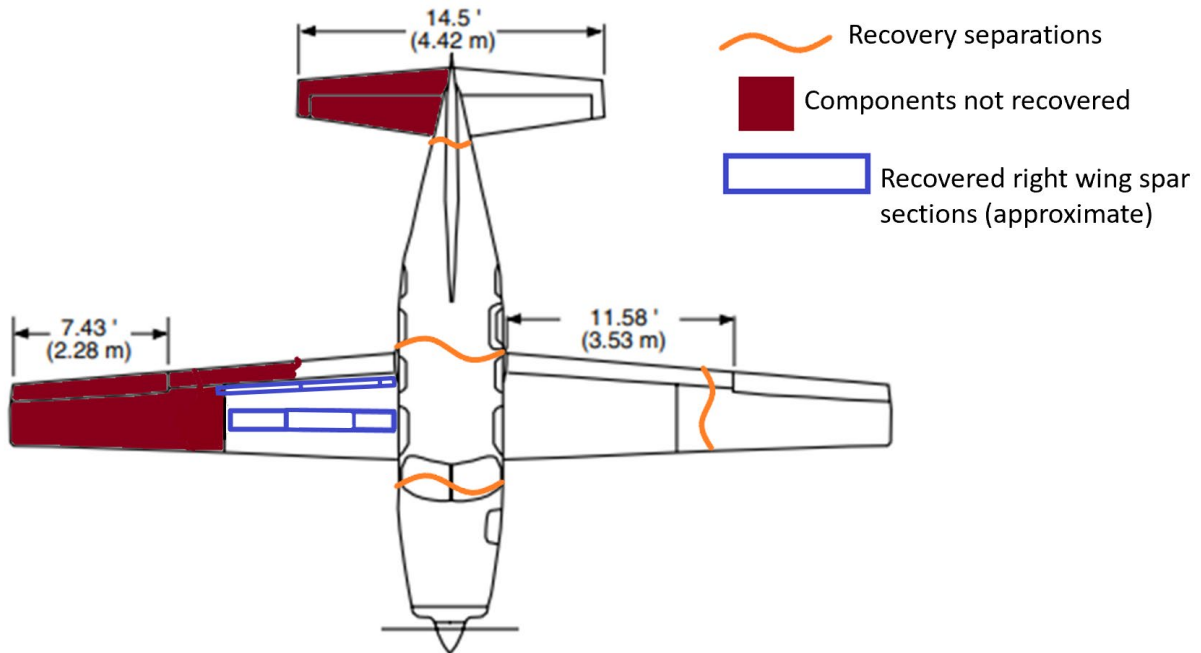


Figure 1 - N461DK wreckage schematic

1.1 Left Wing

The left wing was mostly intact and remained attached to the fuselage on scene. The aileron was intact and attached and the flap was mostly intact and attached. The wing and flap were cut near wing station (WS) 134 to facilitate recovery. The outboard portion of the flap remained attached to the cut off section of wing. The inboard portion of the flap was separated into two pieces between WS 80 and WS 93 during recovery. A small portion of the left flap remained attached to the roller mechanism near WS 93. The left wingtip separated and was recovered at the main wreckage site. There was pronounced downward deformation of the wing evident near WS 118 with buckling damage to the leading edge and lower skin between WS 115 and WS 130 (Figure 2). The STC installed spoiler was intact, installed, and in the down position. The left aileron remained attached to the wing and was resting against a tree on scene. There was impact damage to the upper surface and the aileron was deflected downward on scene with over travel damage to the lower skin at both hinges noted during the examination. The forward spar upper cap rivets were popped through the upper skin between WS 204 and WS 240 and the WS 240 rib rivets were popped through the upper skin between the forward and aft spars. The airplane had an additional fuel filler opening and cap installed in the outboard fuel bay per STC SA00859AT to allow the carriage of 10 additional gallons of fuel in each wing.



Figure 2 - Left wing downward deformation near WS 118 and cut near WS 134

1.2 Right Wing

The airplane impacted the ground on the right side and the right wing was highly fragmented between the root at WS 29 and the splice at WS 107. Leading edge, forward spar, interspar, rear spar, and flap structure in this area was identified in the recovered wreckage with significant deformation and fracturing. There was tree debris and dirt embedded in the recovered inboard right wing wreckage. A section of the inboard portion of the right flap about 5 feet long was identified. The right main landing gear trunnion rib with attached upper trunnion assembly was identified. Portions of upper skin, lower skin, wing ribs, aft spar, and the right spoiler were identified. The outboard right wing separated near the splice joint at WS 107. The forward spar upper spar cap splice fitting fractured near WS 109 and exhibited slight upward deformation at the fracture location. The forward spar lower spar cap fractured near WS 116 at the outboard end of the splice fitting and the section between WS 107 and 116 was folded inboard upon itself (Figure 3).



Figure 3 - Right wing forward spar separation location (looking forward)

The right wing aft spar separated near WS 111 at the outboard end of a butterfly doubler installed on the aft face of the spar web (Figure 4). There was no discernable deformation of the lower spar cap and buckling deformation of the upper spar cap adjacent to the fracture location.



Figure 4 - Right wing aft spar separation location (looking forward)

1.3 Empennage

The empennage remained partially attached to the aft fuselage on scene and was resting against a tree with a corresponding impact impression. The vertical stabilizer and rudder were laying on their right side and the left horizontal stabilizer was laying on its upper surface on top of the rudder. The left elevator was deflected about 90° trailing edge down with the counterweight horn supporting it.

1.3.1 Vertical Stabilizer and Rudder

The vertical stabilizer remained partially attached to the empennage by the forward spar on scene. The forward spar attach bracket was cut for recovery and the forward spar attach bolt remained intact and installed. The aft spar was fractured just above the upper attach points. The 4 aft spar attach bolts remained intact and installed through the bulkhead and a portion of the rear spar. The deformation of the lower end of the vertical stabilizer and the rear spar at the fracture location were consistent with the stabilizer deforming to the left. The rudder remained partially attached to the vertical stabilizer. The lower bell crank was fractured, the center hinge was separated, and the upper hinge was intact. The center hinge fractured from the rudder and the hinge bolt was intact and installed.

1.3.2 Horizontal Stabilizer and Elevator

The right horizontal stabilizer and the right half of the elevator separated and were not recovered. The forward spar attach bolt was pulled through the empennage structure. The horizontal stabilizer aft spar was fractured about 4.5 inches right of the centerline through the attach point holes. The right upper and lower attach bolts were intact and installed in the empennage bulkhead. The right upper attach hole in the aft spar was pulled out in an upward direction and the right lower attach hole was pulled out up and to the right. The left lower attach bolt was intact and remained installed in the aft spar. The bolt was pulled out of the bulkhead to the left. The left upper attach bolt was intact and installed through the aft spar and bulkhead. The left side of the horizontal stabilizer was rotated up about 70° around the left upper attach bolt and jammed in place (Figure 5). There was an arced witness mark in the bulkhead paint from the right upper attach point down and left. At the aft spar fracture location, the horizontal stabilizer aft spar lower cap had little discernable deformation while the upper cap was buckled downward. The elevator bell crank was intact and connected to the push-pull tube. All of the rivets in the bellcrank were intact with little deformation and were pulled from the elevator. The two trim tab links were intact and attached to the trim tab and the bell crank. The trim tab rods forward of the bell crank were fractured. The left side of the trim tab remained attached to the left elevator and was fractured about 1 inch right of the centerline. About 3 feet of the trim tab hinge pin extended out from the right side of the trim tab that remained.



Figure 5 - Horizontal stabilizer attach point (looking forward)

The left side of the horizontal stabilizer and elevator were mostly intact. There was some buckling deformation to the aft spar lower cap between 4-6 inches left of the centerline and no apparent damage to the upper spar cap. The left horizontal stabilizer and elevator were deformed slightly downward about 50 inches left of the centerline. There was buckling damage to the upper stabilizer skin between 40 and 50 inches left of the centerline and the aft spar upper cap was buckled upward about 51 inches left of the centerline. There was buckling damage to the lower stabilizer skin between 51 and 60 inches left of the centerline and the aft spar lower cap was buckled downward about 51 inches left of the centerline. There was damage and witness marks from tree impact on the upper surface of the left horizontal stabilizer and elevator between 42 and 60 inches left of the centerline. The left counterweight horn was deformed upward. There was deformation and tearing of the elevator lower skin at the three hinge locations consistent with elevator overtravel trailing edge down. There was a rectangular puncture with inward curling on the lower elevator skin about 34 to 35 inches left of the centerline. The left horizontal stabilizer upper skin was buckled between 3 and 6 inches left of the centerline where it impacted the fuselage skin.

1.4 General

There was no evidence of corrosion or pre-existing fractures on any of the fracture surfaces examined.

Submitted by:

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