



**NATIONAL TRANSPORTATION SAFETY BOARD**  
Office of Aviation Safety

**STRUCTURES GROUP CHAIRMAN'S FACTUAL REPORT**

May 17, 2021

**A. ACCIDENT**

**CEN21FA215**

Location: Englewood, Colorado  
Date: May 12, 2021  
Time: 1023 Mountain Daylight Time (MDT)  
Operator A: Key Lime Air, Flight 970  
Aircraft A: Swearingen (Fairchild) SA226-TC, N280KL  
Operator B: Private  
Aircraft B: Cirrus Design SR22, N416DJ

**B. STRUCTURES GROUP**

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

Member: Joshua Pritchard  
Federal Aviation Administration  
Denver, Colorado

Member: Darwin Thomason  
Key Lime Air  
Englewood, Colorado

**C. SUMMARY**

On May 12, 2021, about 1023 Mountain Daylight Time (MDT), Key Lime Air flight 970, a Swearingen (Fairchild) SA226-TC, N280KL, and a Cirrus Design SR22, N416DJ, collided in flight during approach to Centennial Airport (APA), Englewood, CO. The SA226-TC landed safely at APA and the SR22 pilot deployed the Cirrus Airframe Parachute System and came to rest on the grounds of Cherry Creek State Park. Both aircraft were substantially damaged during the accident.

## **D. DETAILS OF THE INVESTIGATION**

The SR22 was recovered from the state park to a hangar at APA where it was examined. The SR22 nose landing gear (NLG) was separated from the airplane and recovered in the debris field north of the SR22 along with the NLG fairing, the right main landing gear (RMLG) fairing, several small pieces of composite wheel fairings, and the parachute cover. The SA226-TC was examined at the Key Lime Air hangar at APA. A piece of cargo liner, a section of the cargo door, some small pieces of fuselage structure, and a piece of side window from the SA226-TC were found in the debris field north of the SR22.

### **1.0 Aircraft Examination and Damage (SA226-TC)**

The Key Lime SA226-TC suffered damage to the aft fuselage and vertical stabilizer. All fuselage damage locations are referenced to the fuselage station (FS) and stringer (S) locations. The FS datum is located 28.94 inches aft of the nose of the airplane with all locations measured in inches aft of the datum. Fuselage stringer S-1 is located at the upper centerline and S-15 at the lower centerline. The stringers are numbered from S-2 to S-14 down the left and right sides of the fuselage. Stringer locations with a half number (i.e. S-2.5) indicate a location between the nearest stringer locations (i.e. between S-2 and S-3). All vertical stabilizer damage locations are referenced to the vertical stabilizer station (VSS) location. The VSS datum is located 125.5 inches below the bottom of the rudder with all locations measured in inches above the datum.

There were 4 distinct parallel slash marks or cuts in the upper fuselage structure, Figure 1. Each of the slashes had inward deformation of the structure on the right side and outward deformation of the structure on the left side. Slash 1 was about 26 inches long and extended from about FS 370 and S-5.5R to about FS 377 and S-1.5R. The slash was oriented about 74° right of the longitudinal axis. The right 12 inches had inward deformation and the left 14 inches had outward deformation. Slash 2 was about 41 inches long and extended from about FS 362 and S-5R to about FS 372 and S-3L. The slash was oriented about 77° right of the longitudinal axis. The right 24 inches had inward deformation and the left 17 inches had outward deformation. Slash 3 was about 37 inches long and extended from about FS 359 and S-4R to about FS 366 and S-4L. The slash was oriented about 73° right of the longitudinal axis. The right 25 inches had inward deformation and the left 12 inches had outward deformation. Slash 4 was about 27 inches long and extended from about FS 356 and S-2R to about FS 362 and S-4L. The slash was oriented about 72° right of the longitudinal axis. The right 15 inches had inward deformation and the left 12 inches had outward deformation. Matching cuts were identified in the cargo liner panels installed in this area.



Figure 1-SA226-TC parallel slash marks in upper fuselage.

The right fuselage skin and stringers were fractured circumferentially about FS 392 from S-8R to S-4L at the forward end and about FS 449 from S-10R to S-2L at the aft end and longitudinally from S-4L near FS 392 to S-2L near FS 449 at the upper end, Figure 2. This section of skin structure was deformed inward (or left) above the floor at S-10R. There was an area of black rubber transfer marks and gouging of the skin between FS 390 and FS 399 and between S-5R and S-7R. There was another area of black rubber transfer marks, gouging and scratching between FS 442 and FS 452 and between S-6R and S-8.5R. The fuselage skin and stringers were crushed inward between about FS 449 and FS 473 and from S-3R to S-10R. There was mechanical damage and deformation along the skin fracture at FS 449 from S-3R to S-2L.



Figure 2-SA226-TC right fuselage damage.

The left fuselage skin and stringers were fractured circumferentially about FS 362 from S-2L to S-10L at the forward end and about FS 438 from S-2L to S-10L at the aft end and longitudinally about S-2L at the upper end, Figure 3. This section of skin structure was deformed outward (or left) above the floor at S-10L. A section of the upper forward corner of the cargo door about 18 inches long by about 18 inches tall was separated from the cargo door and recovered in the debris field. There was a semi-circular impact impression along the cargo door hinge. A smaller piece of fuselage structure with the fuselage side of the cargo door hinge in this area was also separated and recovered in the debris field. A section of the cargo door skin from about FS 438 to FS 452 and above about 23 inches above the lower door sill was folded outward (or left). The lower fuselage skin was buckled between about FS 407 and FS 491 and between S-11R and S-11L.



Figure 3-SA226-TC left fuselage damage.

There was an area of damage to the right side of the composite dorsal fin between about FS 488 and FS 491. There was scratching of the paint on the fuselage skin below the area of damage. The leading edge of the vertical stabilizer was partially fractured, crushed, and deformed to the left between VSS 161 and VSS 174. There was a black, oily residue on the leading edge in the damaged area.

The nose NLG aft wheel fairing from the SR22 airplane was found inside the SR226-TC cabin after the accident.

The airplane had accrued 29,525.0 total hours and 37,895 total cycles at the time of the accident. The airplane had an A/B check completed on March 9, 2021 at a time of 29,488.8 hours.

## 2.0 Aircraft Examination and Damage (SR22)

The SR22 airplane was mostly intact after the accident, Figure 4. The empennage was fractured from the fuselage at the aft end of the parachute housing aft of the cabin. The empennage remained attached to the fuselage by the control cables and wires. The wires were cut and the cables were disassembled at the turnbuckles for recovery. The lower 18 inches of the metallic rudder was crushed and deformed to the right and there were black rubber transfer marks on the left side. There was a black oily residue

on the lower end of the rudder and inside the lower rudder cap.



*Figure 4-SR22 airplane after accident.*

The 3 propeller blades remained attached to the hub and one was bent forward. All 3 blades had leading edge chunking and gouging and chordwise scratching. The left wing and forward fuselage were intact and mostly undamaged.

The left main landing gear (LMLG) remained attached to the left wing but the strut was fractured. The LMLG fairing was mostly intact and remained partially attached. There was minor damage to the lower surface of the left wing above the LMLG and impact damage to the LMLG fairing consistent with a hard landing.

The right main landing gear (RMLG) remained partially attached to the right wing but the strut was fractured. The RMLG fairing was separated and recovered in several pieces in the debris field. The nose and inboard (left) side of the RMLG fairing were fractured and separated into multiple pieces.

The NLG strut was fractured from the engine mount at the upper end and recovered in the debris field with the wheel attached. There was green paint transfer on the NLG strut. The NLG strut fairing was fractured into multiple pieces and separated from the NLG. There was green paint transfer on the NLG strut fairing. The NLG aft wheel fairing was fractured into two pieces with the left side exhibiting more damage. The NLG forward wheel fairing was highly fragmented.

The right wing metallic leading edge had impact damage, aftward crushing, gouging, and significant green paint transfer from the outboard end to the outboard end of the stall wedge, Figure 5. The paint transfer and gouging were all in a spanwise direction. The housing for the stall warning vane was separated from the right wing leading edge and found in the debris field with green paint transfer. There was an area of black rubber transfer marks just aft of the leading edge near the  $\frac{3}{4}$  span location. The right wing lower skin had green paint transfer marks, abrasion, and gouging of the composite skin on the forward half over most of its length. There were two distinct directions association with the damage, one oriented spanwise and one oriented about  $20^\circ$  from spanwise. The right flap outboard hinge fitting was fractured.



*Figure 5-SR22 right wing leading edge.*

The hour meter in the cockpit indicated the airplane had accrued 985.5 total hours at the time of the accident. The airplane had an annual inspection completed on December 7, 2020, at a time of 886.9 hours.

The SD cards installed in the Garmin primary flight display and multi-function display were removed and sent the NTSB Recorders Laboratory.