

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN23FA359

AIRFRAME EXAMINATION

April 30, 2025

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A. ACCIDENT

Location: Virden, IL
Date: August 12, 2023
Time: 0848 central daylight time
1347 UTC
Airplane: Van's RV-14A

B. AIRFRAME EXAMINATION

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C. SUMMARY

Examination of N6161, a Van's RV-14A, at the storage facility.

D. DETAILS OF THE EXAMINATION

1.0 Flight Controls

1.1 Ailerons

Both control stick bases remained attached to the airplane. The left aileron control hex rod was fractured at the rod end of the control stick attachment point. The control was continuous through the push-pull tube assemblies to the aileron bellcrank. The left bellcrank to aileron pushrod was fractured at the aileron bellcrank end and remained attached to the left aileron outboard bracket. The aft rod to the aileron surface was fractured at both ends.

The right aileron was fractured from the aft end of the aft aileron control rod. The aileron controls were intact from the aft rod, through the bellcrank, towards the inboard bellcrank. The hex rod was fractured and remained attached to the control sticks.

1.2 Elevator

Elevator was continuous from the flight control stick back towards the idler arm. Both the forward and mid elevator pushrods were fractured at the idler arm connection. The mid elevator pushrod was fractured at the elevator bellcrank. The aft elevator pushrod remained attached from the bellcrank to a recovery cut in the empennage. The elevator controls were continuous from the recovery cut to the elevators.

The wreckage was moved inverted and the bottom of the airplane paneling opened to confirm continuity of the elevator control rod from the control stick back to the idler arm. Controls appear to be continuous prior to impact.

When cutting and manipulating the lower fuselage skin open, a AA battery with a best by date of March 2034 fell out (see figure 1). There was a semi-circular dent on one side of the battery (see figure 2) and a small dent on the other side near the same diameter as a rivet (see figure 3).



Figure 1. AA battery



Figure 2. AA battery compared to mid-elevator push rod



Figure 3. AA battery compared to rivet

The area where the battery was found would have been sealed during assembly of the airplane. It could not be determined when the battery would have been introduced to that area.

1.3 Rudder

The rudder controls were continuous from the cockpit rudder pedal through to the rudder surface.

1.4 Elevator and Rudder Trim

The elevator trim tab appeared to be set a couple degree noses down. The builder used the Van's provided Ray Allen trim servo. The trim push rod arm appeared to be the stock provided arm. The measurement was 1.008 inches from servo body to the land. The builder used the Vans provided wiring harness with the tailcone kit. The wires were traced and ran to the Garmin trim servo per Vans WA-00125. The wiring bundle ended at the forward cockpit.

The rudder tab was displaced to the left; however, the rudder had been partially torn from the vertical stabilizer.

2.0 Canopy Examination

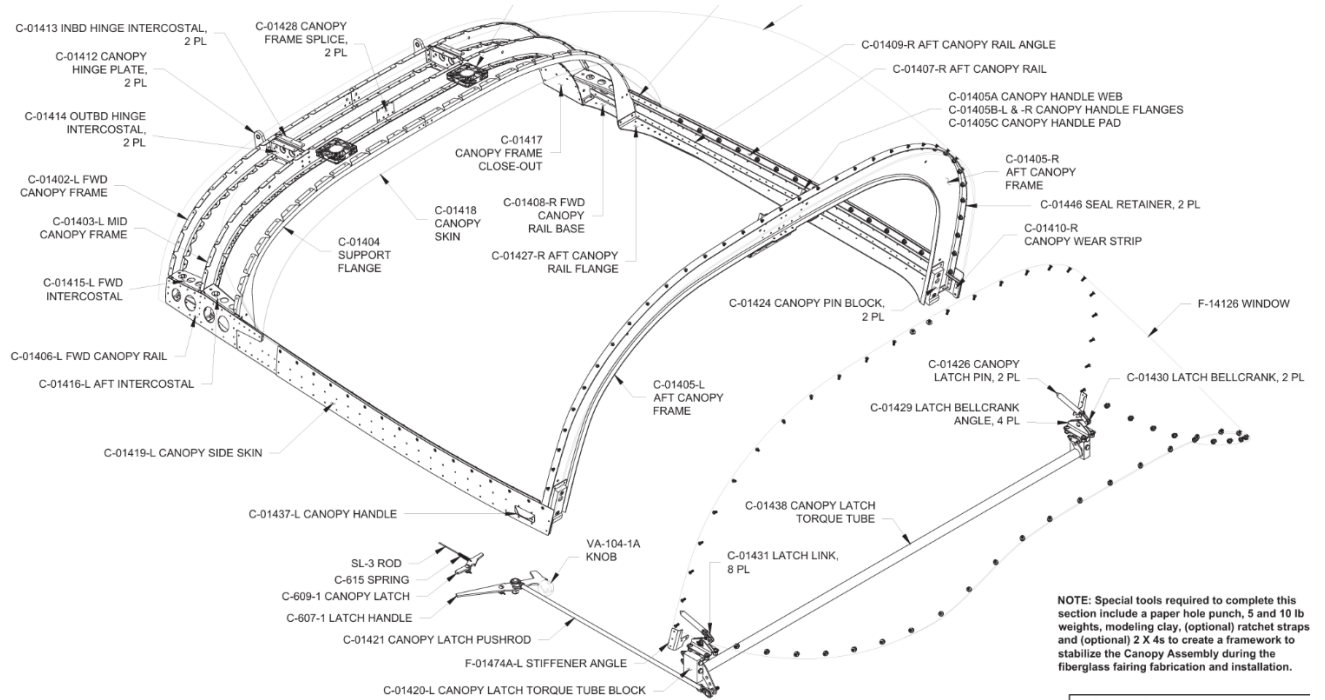


Figure 4. Canopy part names (Van's Aircraft manual excerpt)

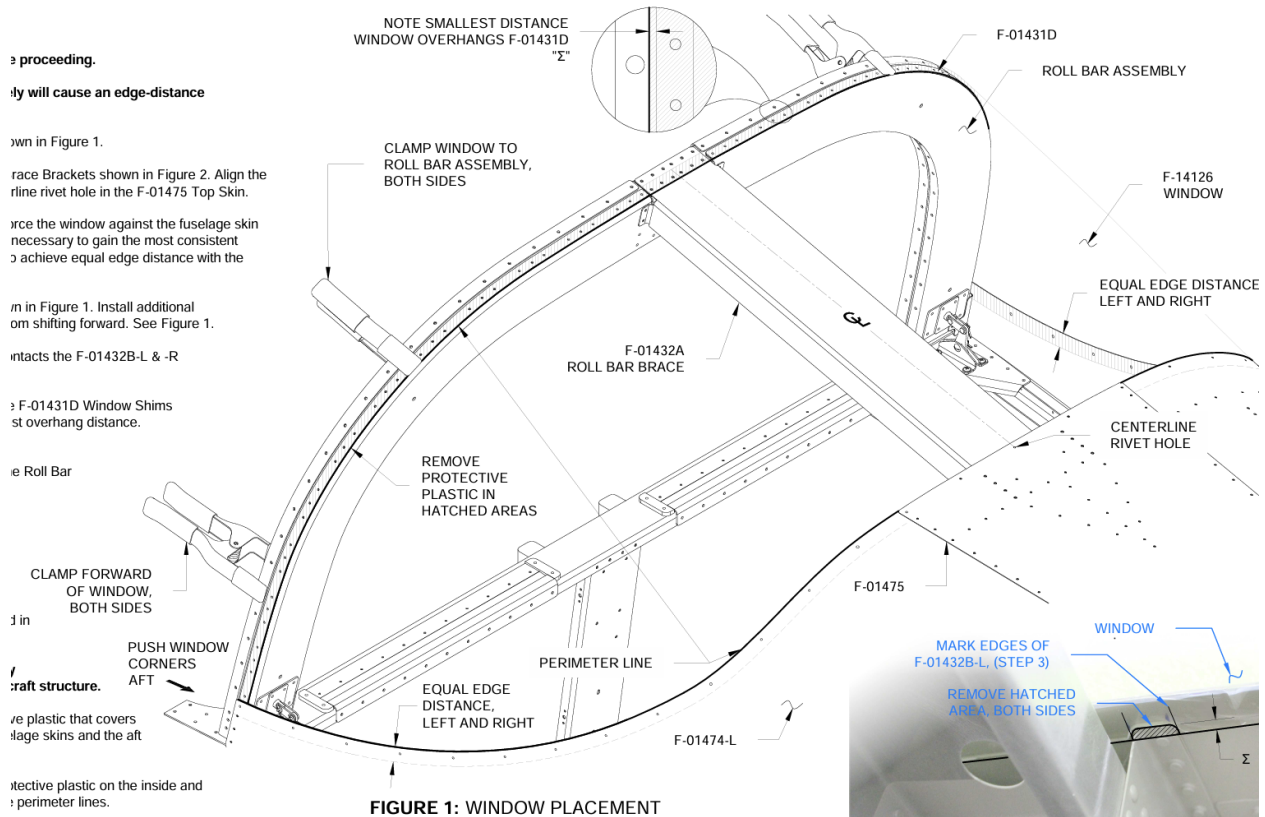


Figure 5. Roll bar part names (Van's Aircraft manual excerpt)

The airplane was equipped with a tip-up style canopy. Examination of the airplane's canopy found that it was impact damaged and fractured in multiple locations. The roll bar was separated from the primary structure. The canopy hinge plates remained attached to the forward canopy frame. The canopy release pins were inserted into the canopy hinge plate.



Figure 6. Canopy components

The canopy release handle remained attached to the jettison system and the release pins were engaged in a non-jettison position. The canopy release handle remained attached to the jettison system. The builder shortened the jettison t-handle, and due to impact forces, was located behind the instrument panel; it is likely due to handle sitting on top of the radio stacks during impact.

The canopy hinge plate hinge (p/n C-01412) was buckled laterally beneath the forward top skin (p/n F-01471). The canopy latch pushrod was found fractured. Both the left and right latch bellcranks were deformed and jammed. The canopy latch torque tube was fractured, and the latches were found partially disengaged.

The canopy latch micro switch remained attached to the frame (see section 2.4). The canopy frame was buckled outward on both sides. The canopy acrylic had shattered during impact and fragments were found scattered around the accident site.

2.1 Canopy Guide Plates & Guide Pins

Both guide plates were p/n C-01451 and installed on either side of the canopy deck. The left guide plate had minor scuffing consistent with normal wear. The right guide plate had scoring around its circumference.

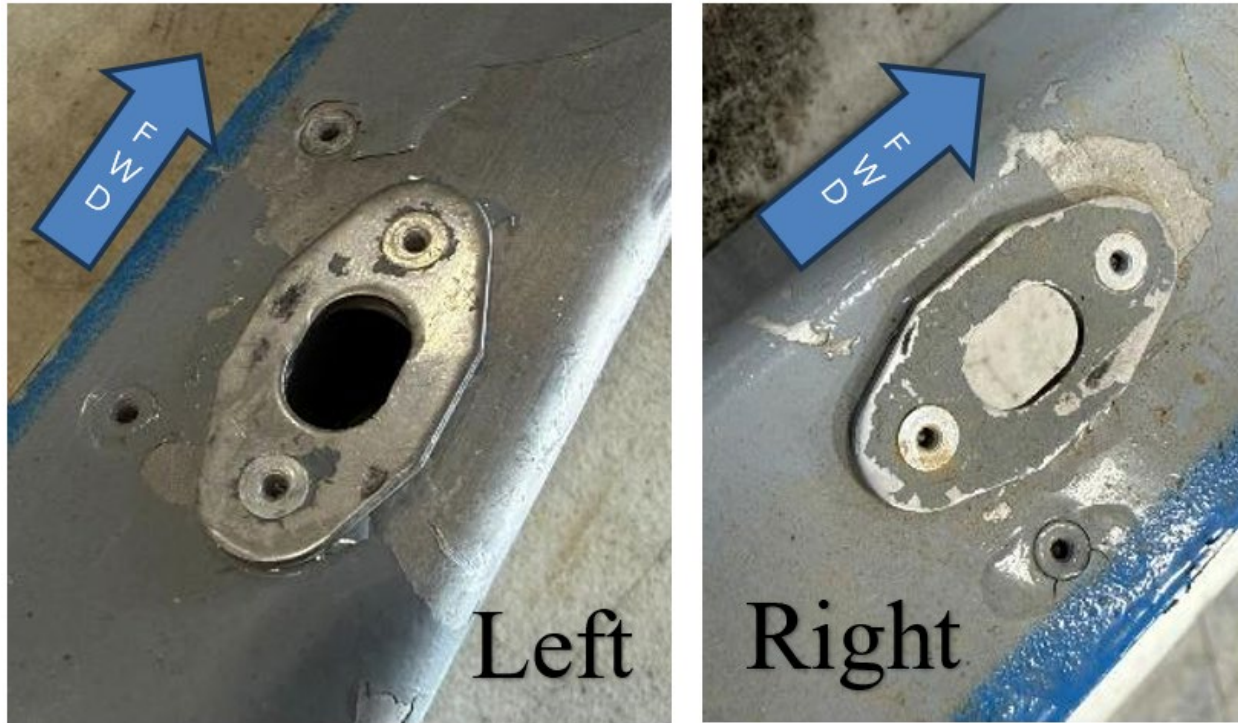


Figure 7. Guide plates

Both guide pins were p/n C-01453 and installed on either side of the tip-up canopy. The guide pins seat into the guide plates when the canopy is closed. The left pin guide had minor scuffing consistent with normal wear. The guide pin had scoring around its circumference.



Figure 8. Guide pins (photos provided by Van's Aircraft)

2.2 Pin Blocks

Both pin blocks were p/n C-01424 and installed on the facing aft on the aft canopy frame. Both canopy latch pins seat through holes on the pin blocks.

The back of the left side pin block was covered in earthen debris. Once cleaned it revealed a score mark near the 5 o'clock position with about one-inch-long gouge trailing below it. Additionally, a vertical gouge mark started about mid-block downwards towards the 6 o'clock position. The bottom of the pin block had divots consistent with the canopy having rested previously on the latch pin.

The back of the right side pin block had a score mark near the 7 o'clock position, with about one-inch-long gouge trailing below it. The bottom of the pin block had divots consistent with the canopy having rested previously on the latch pin.

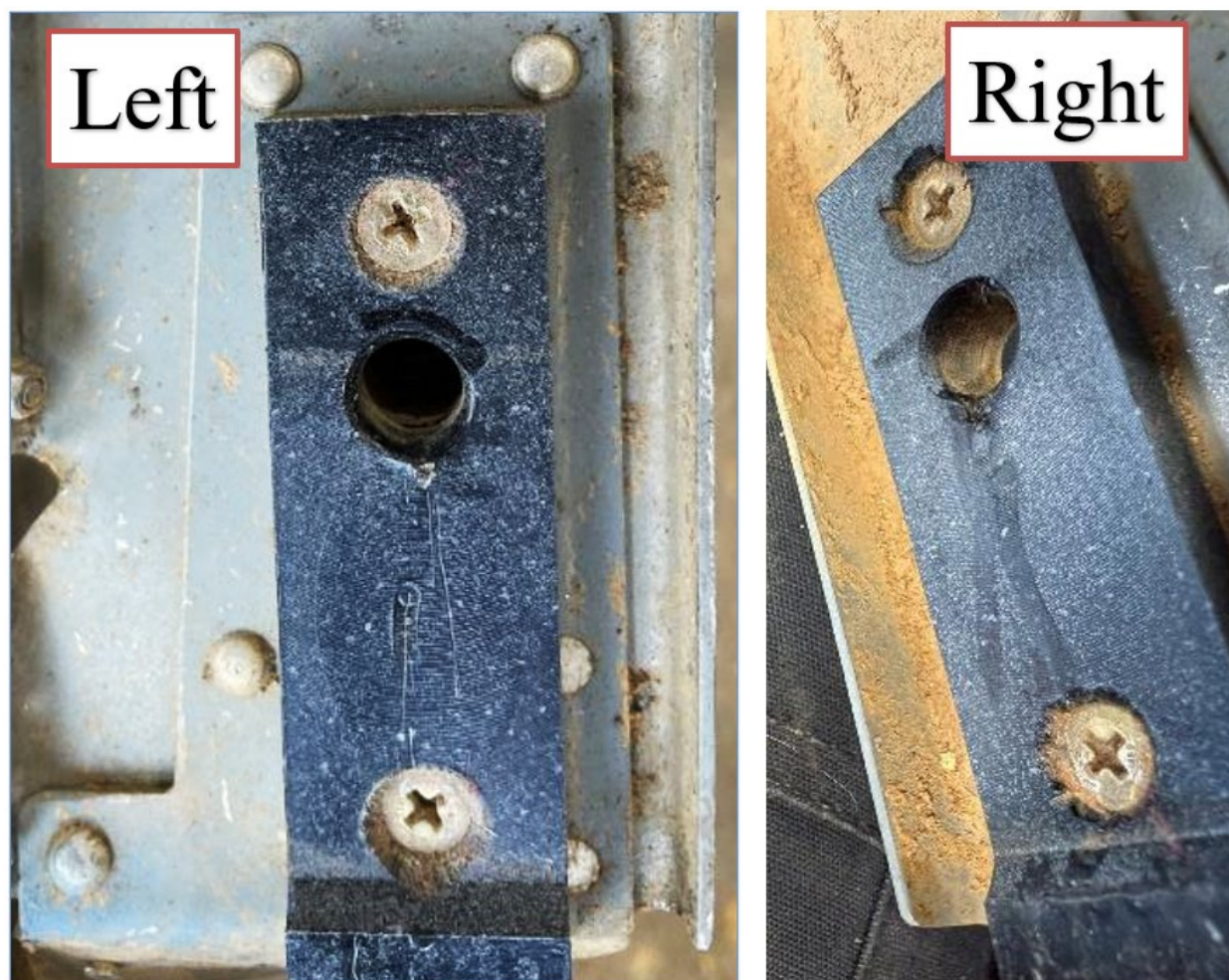


Figure 9. Pin blocks (right photo provided by Van's Aircraft)

2.3 Canopy Latch Handle

The Van's provided knob (VA-104-01A) was mounted to the latch handle (p/n C-607-1) and installed on the left side of the cockpit. The latch handle was found in the closed position, and the canopy latch had shifted forward. Preimpact positions could not be determined.



Figure 10. Canopy latch handle and canopy latch

2.4 Canopy Latch Micro Switch

Per Van's build instructions, only one cockpit canopy micro switch (p/n ES-00306) is installed on the left side of the canopy frame (see figure 9).

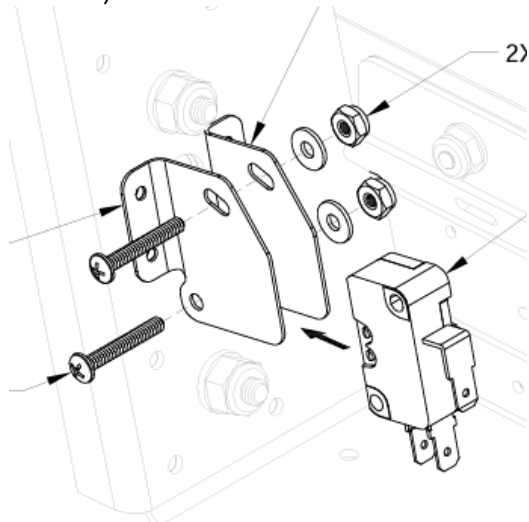


Figure 11. Canopy latch micro switch (Van's manual excerpt)

After micro switch installation, the builder should set the micro switch's position in an assembled bracket so that left canopy pin only begins to depresses the micro switch's plunger when the pin is fully seated and the canopy is closed. A check of the micro switch's functionality showed that the switch operated within tolerances. The canopy latch micro switch was found in the aft-most position setting. This setting could allow for the micro switch to signal that the canopy is closed when additional canopy pin travel is needed for the canopy to be fully closed.



Figure 12. Canopy latch micro switch (photo by Van's Aircraft)

Submitted by:

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