



NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety

Wreckage Examination Group Field Notes

July 19, 2022

A. ACCIDENT WPR22FA172

Location: Sausalito, California
Date: May 6, 2022
Time: 1210 PDT
Operator: Private
Aircraft: Vans RV-10
Registration: N54MG

B. PARTICIPANTS or GROUP NAME:

Stephen Stein National Transportation Safety Board Federal Way, Washington
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Scott Johnson National Transportation Safety Board Federal Way, Washington

C. SUMMARY

On May 6, 2022, about 1210 Pacific daylight time, an experimental amateur built Vans RV-10, N54MG, was substantially damaged when it was involved in an accident near Sausalito, California. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to preliminary track data obtained from a commercially available third-party source, the airplane departed Sacramento Executive Airport, Sacramento, California about 1129 and transitioned into a climb on a southwest heading. The airplane leveled off about 5,500 ft mean sea level (msl) approximately 6 minutes later. The airplane turned south about 12 minutes later and subsequently entered a descent as it flew along San Pablo Bay towards San Francisco Bay. Preliminary air traffic control (ATC) audio recordings from the Federal Aviation Administration revealed that the pilot made radio contact with ATC at 1152 and requested a “Bay Tour” while enroute to his destination of Half Moon Bay, California. The controller instructed the pilot to remain northwest of the Bay Bridge and to remain clear of Class B airspace. He then advised the pilot to notify him when they had obtained local weather for his destination airport. The airplane descended to about 1,300 ft msl after it had reached San Francisco Bay and then began a climb a few seconds later.

At 1158 the airplane started a 360° right turn around Alcatraz Island and then resumed a southerly heading for about 1 minute before making a left turn to the north, over Treasure Island. At 1202 the airplane turned southwest after it climbed to about 2,400 ft msl and then began a descent. The airplane approached the north tower of the Golden Gate Bridge about 1205 at which time the pilot contacted ATC to request the transition route to his destination airport and the controller instructed him to remain outside of Class B airspace. The pilot then made another request for the transition route and the controller issued the same instructions. During the next 5 minutes, the airplane made a series of turns at various altitudes below 2,100 ft msl near the north end of the Golden Gate Bridge. The track ceased at 1209:41, about 1,700 ft south of the accident site at approximately 850 ft msl.

Two witnesses were located about 0.6 nm east of the accident site around the time of the accident. They both reported that visibility was low and the fog layer was thick; one witness stated that she could not see the top of the north tower of the Golden Gate Bridge. According to the Golden Gate Bridge Highway and Transportation District, the Golden Gate Bridge towers extend 746 ft above the water. The north tower of the Golden Gate Bridge was located about 0.8 nm southeast of the accident site.



Figure 1: Airplane's route of flight

The airplane wreckage was discovered by United States Park Rangers at 1403 on the southwest side of a hill in the Marin Headlands at a field elevation of about 800 ft msl.

The airplane came to rest in a nose down attitude on an eastern heading. All major structural components of the airplane were accounted for at the accident site. The first point of impact (FPI) was marked by a depression about 15 ft southwest of the main wreckage. A debris path comprised of engine cowlings and plexiglass fragments, was traced from the FPI to the main wreckage.



Figure 2: View of accident site with first point of impact and right aileron

D. DETAILS OF THE INVESTIGATION

The airplane was recovered to Plain Parts in Pleasant Grove, California where an examination was completed on July 19, 2022.

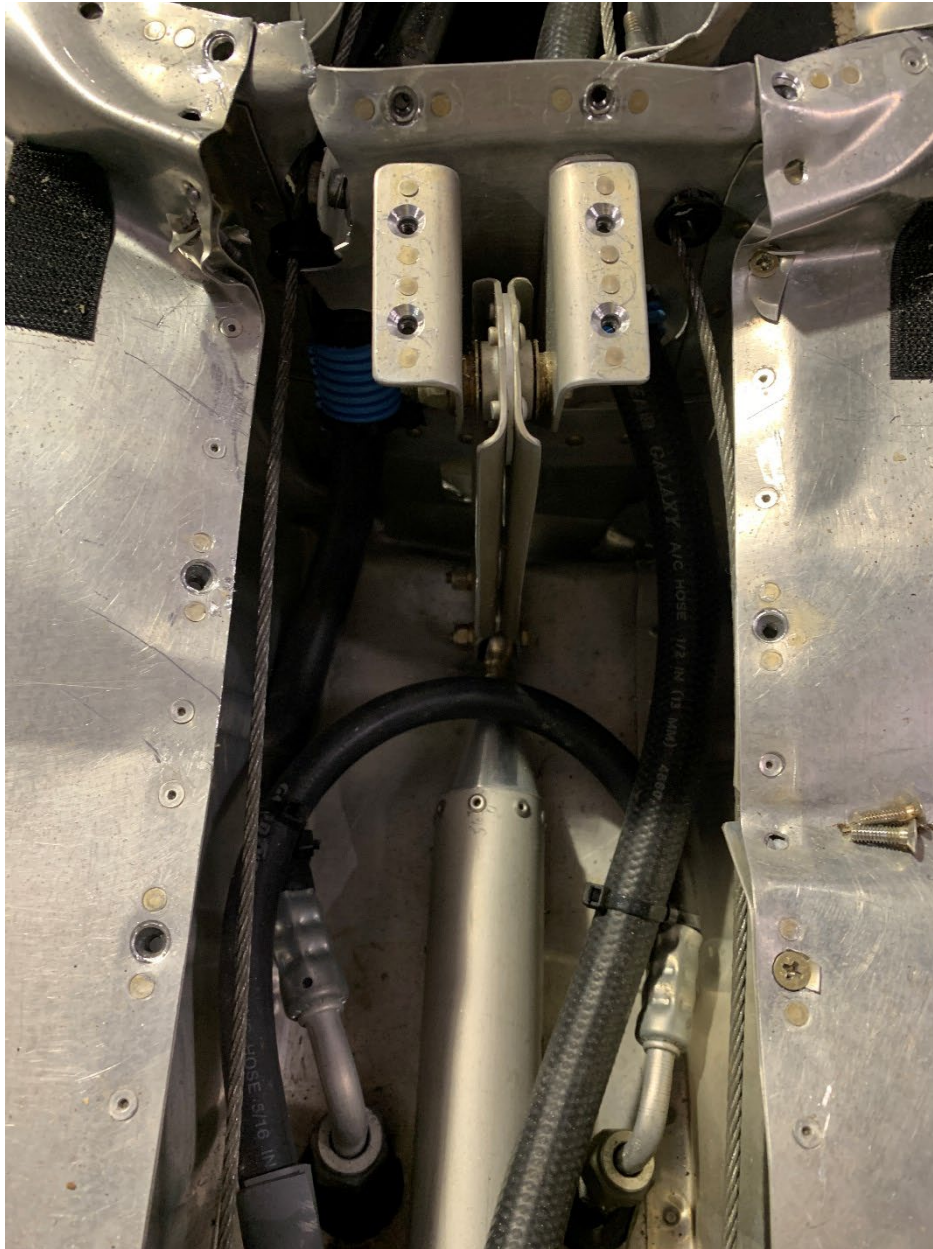


Photograph 1: Accident airplane and engine prior to examination

D.1 Airframe Examination

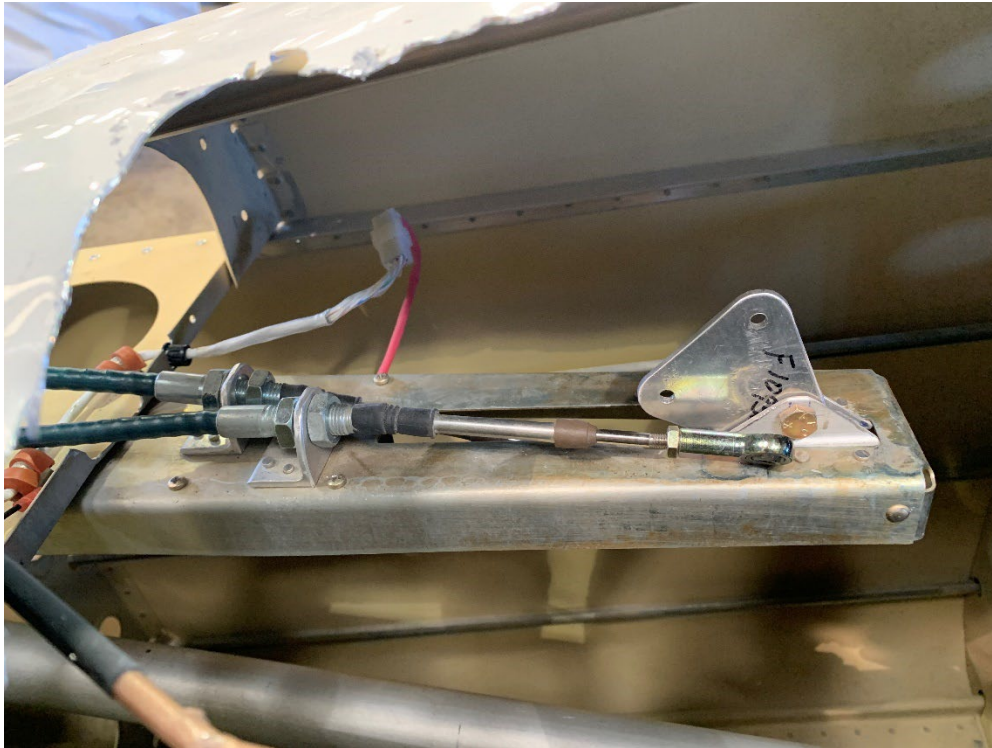
D.1.1 Flight Controls

The elevator control sticks remained attached to the control column. Continuity was traced from the control assembly to the aft elevator pushrod (F-1091), which had been disconnected from the left and right elevator horns by recovery personnel. Full travel of the elevator control could not be achieved as the airframe skin below the elevator idler arm and forward elevator push rod was deformed. Both rudder pedals remained attached to their tubes, which had separated from their airframe mounting positions. The left and right rudder control cables were continuous from the rudder cable links at the right seat, left pedal and left seat, right pedal to the empennage. Both cables had been disconnected from the rudder horns by recovery personnel.



Photograph 2: Elevator push rod and idler arm

The elevator trim servo was attached to the trim mount bracket, located in the aft fuselage. The trim servo link subassembly was connected at the servo and the trim bellcrank. However, both trim cables were disconnected from the trim bellcrank by recovery personnel. The trim cables were also cut by recovery personnel. The left trim cable was continuous to the left elevator trim tab and the right trim cable had been disconnected from the right trim tab by recovery personnel. The trim servo actuated to its fully extended and retracted positions when tested with battery power.



Photograph 3: Elevator trim servo assembly

The flap system was continuous from the flap motor to the right and left flap horns through the flap crank and torque tubes. The flap motor rod retracted and extended when tested with battery power. The rod lengths were not measured.

D.1.2 Fuel System

The left wing was removed by recovery personnel and the right wing had been partially separated during the accident. The left wing supply line and fuel vent line had been disconnected by recovery personnel. The left wing fuel strainer was free of debris. Both the right wing fuel supply line and fuel vent line were fractured. The right wing fuel strainer was free of debris.

Continuity of the airframe fuel system was confirmed from the wings to the fuel pressure transducer forward of the engine firewall. The airframe fuel filter screen was free of contamination and the fuel pump functioned when tested with battery power.

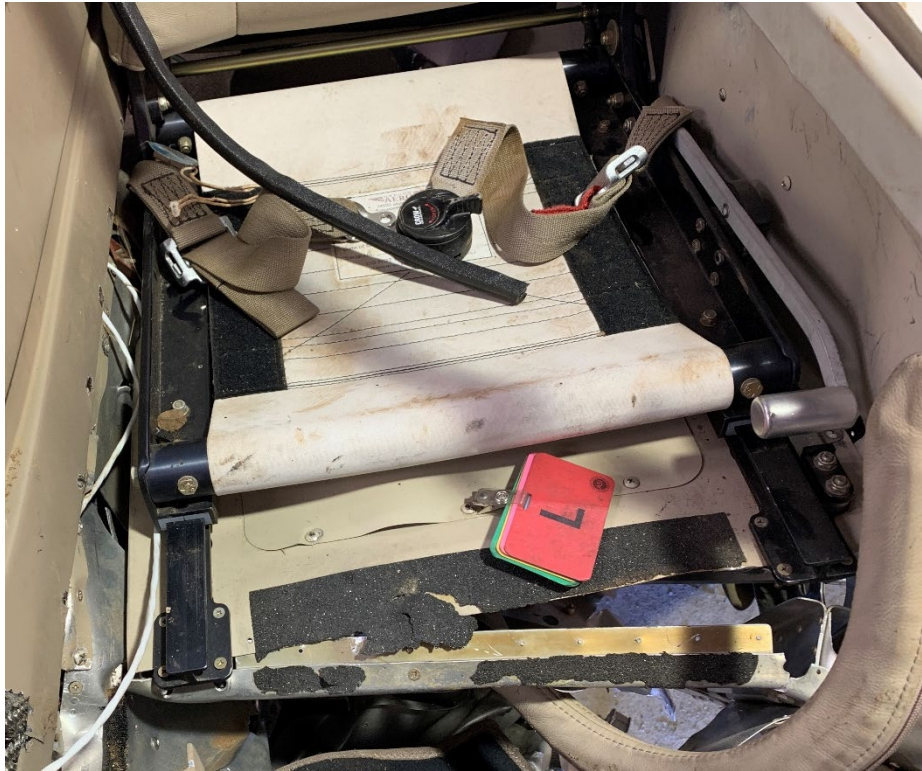


Photograph 4: Airframe fuel filter element

D.1.3 Seats and Restraints

Seat no. 1 (pilot seat)

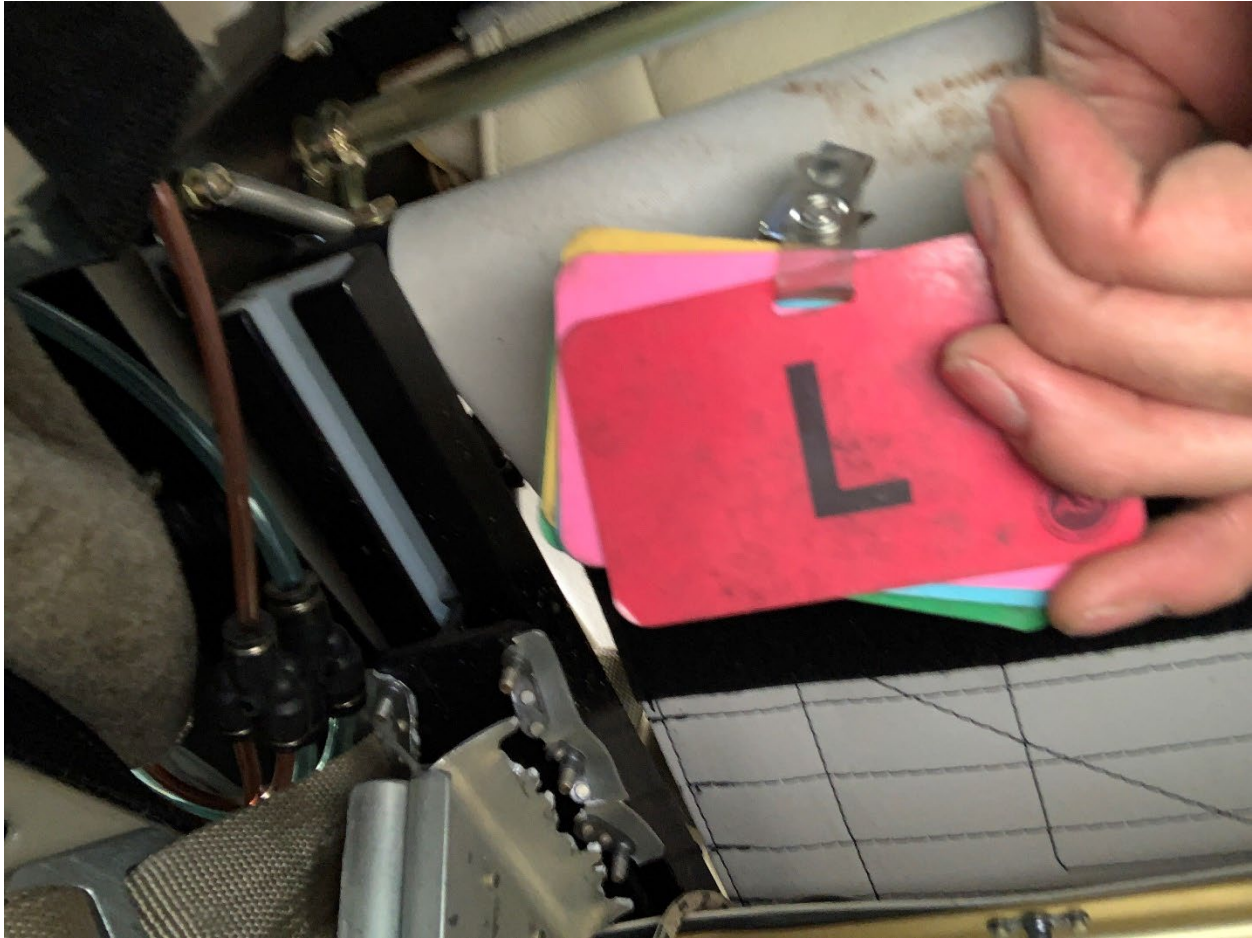
The seat remained attached to both the inboard and left seat rails, which were still attached to the airframe. The shoulder harness was attached to the cabin cover and the right and left lap belts were attached to the airframe at both anchors. The rotary buckle functioned normally when tested with each of the four points of the restraint system.



Photograph 5: Left seat, seat rails

Seat no. 2 (passenger)

The seat remained attached to both the right and inboard rails. The right rail remained attached to the airframe and the inboard rail was partially separated from multiple rivets at the bracket. The shoulder harness was attached to the cabin cover and the right lap belt was attached to the airframe its anchor. The right lap belt anchor was also attached to the airframe, but right lap belt had been cut by recovery personnel. The rotary buckle functioned normally when tested with each of the four points of the restraint system.



Photograph 6: Right seat, aft seat rail and fractured bracket

D.2 Engine

The airplane was equipped with a Lycoming Engines YIO-540-D4A5, a 250 hp, horizontally opposed, air cooled, fuel injection, normally aspirated, reciprocating engine. The engine sustained minimal damage with exception of the oil filter adapter, which had separated from the accessory case. Additionally, the no. 5 push rod was damaged from impact with the engine mount and exhaust system deformation was observed. Two of the three electric magnetos were separated from their mounts at the engine firewall.



Photograph 7: Engine prior to examination

Mechanical continuity was established throughout the rotating group, valve train and accessory section as the crankshaft was manually rotated at the propeller by hand. Thumb compression was achieved at all six cylinders and the valves displayed normal lift when the crankshaft was rotated. Examination of the cylinders combustion chamber interior components using a lighted borescope revealed normal piston face and valve signatures, and no indications of catastrophic engine failure. The valves were intact and did not display any eyebrow marks on the piston tops.

Ignition timing could not be established as the engine was equipped with an electronic ignition system. The ignition harness wires had varying degrees of impact damage, but were secure at each spark plug. The spark plugs were NGK BR8EIX fine wire plugs and all displayed coloration consistent with normal wear. The electrodes were undamaged.



Photograph 8: Top spark plugs

The fuel servo was attached to the mounting pad of the plenum. The throttle and mixture control rod ends remained secure at their respective control arms, and the throttle rod end had separated from the control rod consistent with overload separation. The fuel injection servo and induction system were examined and observed to be free of obstruction. The fuel pump secure at the engine mounting pad and the fuel lines were secure at their respective B nuts. Removal of the fuel pump showed that the diaphragm was intact and pliable with no visible contamination observed. Some residual fuel was observed within the fuel pump. The fuel flow divider was secure at its mount with all fuel injector lines secure at their respective B nuts. The fuel flow divider diaphragm was intact and pliable with no visible signs of contamination. All six fuel injector nozzles were removed and were found unobstructed.

The induction air filter did not display any debris.

The two bladed constant speed propeller remained attached at the crankshaft flange. Both blades remained attached to the hub. Fiberglass spinner was fractured. Blade A exhibited chordwise striations, leading edge gouges and nicks, trailing edge S bending and torsional twisting. The propeller governor was attached at its mounting pad and the pitch control rod was still attached at the control arm.

The oil suction screen was free of debris.