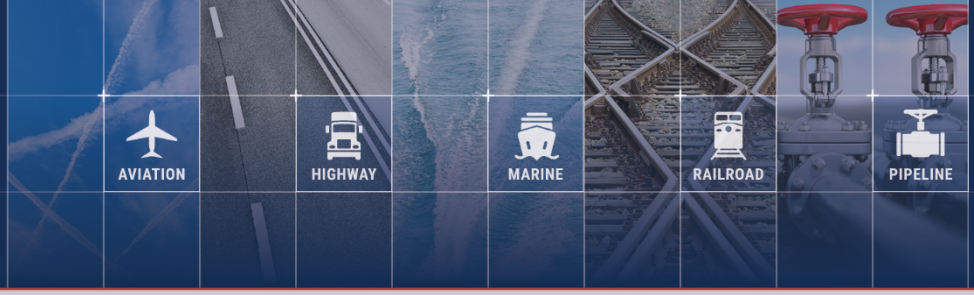

Aviation Investigation Final Report

Location:	Phoenix, Arizona	**Accident Number:**	WPR21LA142
Date & Time:	March 18, 2021, 14:27 Local	**Registration:**	N469KS
Aircraft:	DAVIS DAN B LANCAIR EVOLUTION	**Aircraft Damage:**	Substantial
Defining Event:	Part(s) separation from AC	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that, while climbing through 22,000 ft mean sea level on a cross-country flight, the main cabin door departed the airplane. The pilot immediately diverted and landed uneventfully at a nearby airport. The door was not recovered. The horizontal and vertical stabilizers sustained substantial damage due to impact from the door as it departed the airplane.

The kit manufacturer reported two previous door failures that had prompted the issuance of an inspection advisory to inspect the door for cracks. This inspection was not performed on the accident airplane; however, postaccident examination revealed no damage to the hinges and door latch anchors, all of which were still connected at the frame. Because the door was not recovered and could not be examined, the reason for its separation could not be determined based on the available information.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A malfunction of the main cabin door latching mechanism for reasons that could not be determined based on the available information.

Findings

Not determined	(general) - Unknown/Not determined
Aircraft	Passenger/crew doors - Malfunction

Factual Information

History of Flight

Enroute-climb to cruise	Part(s) separation from AC (Defining event)

On March 18, 2021, about 1427 mountain standard time, an experimental, amateur-built Lancair Evolution, N469KS, was substantially damaged when it was involved in an accident near Phoenix, Arizona. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he began a climb after he departed on an instrument flight rules flight plan from Falcon Field Airport (FFZ), Mesa, Arizona. As the airplane climbed through 22,000 ft mean sea level, about 30 nm west of the departure airport, the cabin door departed the airplane and impacted both the horizontal and vertical stabilizers. The pilot diverted and landed uneventfully. Photos of the airplane taken by the accident pilot showed substantial damage to the left horizontal stabilizer. The cabin door was not recovered.

The airplane was equipped with one 42-lb main cabin door located on the left side of the cockpit that opened and closed by two hinges at the top of the door frame. When closed, the door locked the pressurized cabin through eight latches: three at the lower frame, two on the front door post, and three on the rear door post. Each latch mechanism comprised a steel latch arm and ball attached to an aluminum latch body, which was bolted to the door. The door was closed and locked when each latch arm and ball aligned and connected with its respective socket at the steel latch anchor, which is connected to the door frame. The locking mechanism was operated by a single handle rotated clockwise to lock the door, which latched the anchors through a series of sprockets and chains. Moving the handle in the opposite direction would unlatch the latches. (see figure 1)

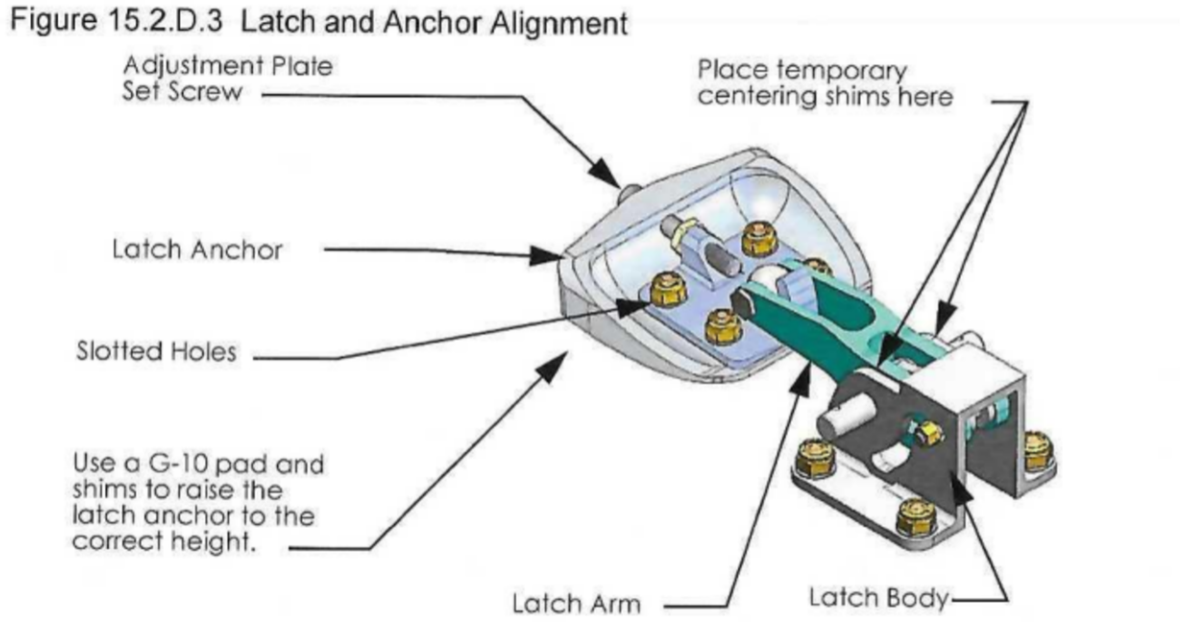

Figure 1: Lancair Evolution Door Latch and Anchor Alignment

According to the kit manufacturer, two potential main door failures had been reported to the company. The first failure occurred in 2010 on another airplane that resulted when a latch was not aligned over center and failed to secure to the latch body. This forced the adjacent latch mechanisms to carry the load, which caused one of the adjacent latches to fail at the aluminum latch body. Another failure occurred in November 2020 and resulted in an explosive decompression during cruise flight as the lower rear latches were not secured. According to the manufacturer, the cause was likely attributed to a failure of the lower rear latch to secure before takeoff. Once the load overstressed the forward latches, they failed in a domino effect that resulted in an explosive decompression. This prompted the manufacturer to issue an inspection advisory that required an inspection of the main door latches for cracks or other physical damage within the next 10 hours of flight. The advisory was issued to all maintenance facilities that regularly serviced their airplanes about three months before the accident airplane received its most recent service. The airplane's maintenance logbooks did not indicate that the airplane had been inspected in accordance with the advisory and the maintenance facility that regularly serviced the airplane reported that they were not aware of the advisory.

An examination of the accident airplane fuselage frame by a Federal Aviation Administration inspector revealed no damage to the hinges or latch anchors.

Although the main door was not recovered, the airplane manufacturer issued a service bulletin on April 20, 2021, that required the latch mechanism to be inspected to ensure that the eight latch balls seated properly within their sockets without any clearance between the ball and socket. The service bulletin also required an inspection of the hinges at the next condition inspection and for the aluminum latch bodies to be replaced with structural stainless steel alloy bases.

Pilot Information

Certificate:	Private	**Age:**	53,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	None
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	February 28, 2020
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	January 14, 2021
Flight Time:	1106 hours (Total, all aircraft), 52 hours (Total, this make and model), 1025 hours (Pilot In Command, all aircraft), 61 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	DAVIS DAN B	**Registration:**	N469KS
Model/Series:	LANCAIR EVOLUTION	**Aircraft Category:**	Airplane
Year of Manufacture:	2015	**Amateur Built:**	
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	EVO-0058
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	December 17, 2020 Condition	**Certified Max Gross Wt.:**	4550 lbs
Time Since Last Inspection:	51 Hrs	**Engines:**	1 Turbo prop
Airframe Total Time:	638 Hrs at time of accident	**Engine Manufacturer:**	P&W CANADA
ELT:	Installed	**Engine Model/Series:**	PT6A-135A
Registered Owner:	CC AIRCRAFT SALES LLC	**Rated Power:**	750 Horsepower
Operator:	CC AIRCRAFT SALES LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KGYR,968 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	14:47 Local	**Direction from Accident Site:**	341°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.03 inches Hg	**Temperature/Dew Point:**	26°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Mesa, AZ (FFZ)	**Type of Flight Plan Filed:**	IFR
Destination:	Oceanside, CA (OKB)	**Type of Clearance:**	IFR
Departure Time:	14:14 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	33.274105,-112.32525

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Scot Boek; Federal Aviation Administration; Scottsdale, AZ Jeff Edwards; AvSafe; McCall, ID Bob Wolstenholme; Lancair Evolution; Colmar , PA
Original Publish Date:	September 21, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=102803