



Aviation Investigation Final Report

Location:	Darlington, Indiana	Accident Number:	CEN21FA252
Date & Time:	June 6, 2021, 10:20 Local	Registration:	N853L
Aircraft:	DIAMOND AIRCRAFT IND INC DA 40 NG	Aircraft Damage:	Destroyed
Defining Event:	Aerodynamic stall/spin	Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor and student pilot were conducting a training flight. automatic dependent surveillance – broadcast (ADS-B) and onboard data revealed heading, engine power, and altitude changes consistent with maneuvering. Just before the accident, the airplane entered a power-off stall from an altitude of about 4,000 ft mean sea level (msl). The right wing dropped, the pitch attitude decreased, and the airplane entered a descent consistent with a spin.

Ground scars and the orientation of the wreckage were consistent with an impact with terrain in a slight right-wing-low, nose-down attitude. The wreckage was highly fragmented with scattered debris that extended for about 75 yards. There were no mechanical malfunctions or anomalies that would have precluded normal operation of the airplane. Review of engine data indicated nominal engine performance before the accident.

The airplane was not approved for spin maneuvers; however, the airplane's flight manual provided a recovery procedure in the event of an unintentional spin.

The circumstances of the accident are consistent with an inadvertent spin and loss of control while practicing an aerodynamic stall. Because the airplane was not approved for intentional spins, it is unlikely that the flight instructor had ever experienced a spin in the accident airplane make/model and was therefore likely unfamiliar with its spin and recovery characteristics.

Probable Cause and Findings

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

A loss of control while practicing an aerodynamic stall, which resulted in a spin and impact with terrain.

Findings

Personnel issues	Total experience - Flight crew
Personnel issues	Aircraft control - Flight crew

Factual Information

History of Flight

Maneuvering

Aerodynamic stall/spin (Defining event)

On June 6, 2021, about 1020 eastern daylight time, a Diamond Aircraft DA 40 NG airplane, N853L, was destroyed when it was involved in an accident near Darlington, Indiana. The pilot and flight instructor were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 141 instructional flight.

A review of automatic dependent surveillance – broadcast (ADS-B) data revealed that the airplane departed and flew northwest about 4,000 ft mean sea level (msl). At the time of the accident, the flight was not in radio contact with air traffic control. A witness heard the airplane, looked up, and saw it in a “nose down, left spin” before it disappeared behind a tree line. He added that it sounded like the propeller was at a high rpm before impact.

Ground scars and the orientation of the wreckage were consistent with an impact in a slight right-wing-low, nose-down attitude. The main wreckage was oriented on a heading of about 037°. The wreckage was highly fragmented with scattered debris that extended about 75 yards. All major components of the airplane were accounted for at the accident site. A slight odor of fuel was present, along with fuel blight on vegetation along the debris path. Control continuity was established for all flight controls; separations were consistent with overload or impact damage.


A data card was removed from the flight display and the engine’s electronic engine control unit (EECU), which was damaged in the accident, was also secured for later examination. The EECU was shipped to the engine manufacturer for data download. The exam noted no preimpact abnormalities that would affect engine operation. The engine was running normally and appeared to respond to the power lever requests.

A review of the airplane’s Garmin G1000 data revealed several turns and engine power and altitude changes, consistent with airplane maneuvering. The data revealed that the airplane was about 4,000 ft msl when engine power was reduced; as the airspeed decreased, the airplane’s pitch attitude increased. The airplane’s pitch then decreased to a nose-down attitude, and the airplane made a right, spiraling turn consistent with a stall and spin entry.

The flight instructor was a graduate of the flight school’s training academy and had earned her flight certificate on March 30, 2021. She had about 329 total hours of flight experience and 44 hours as a flight instructor.

The student pilot had about 16 total hours of flight experience.

The airplane was not approved for spins. The aircraft flight manual noted the following procedure for recovery from an unintentional spin (see figure).

DA 40 NG AFM  Emergency Procedures

3.8 RECOVERY FROM AN UNINTENTIONAL SPIN

CAUTION

Steps 1 to 4 must be carried out **immediately** and **simultaneously**.

1. POWER lever IDLE
2. Ailerons neutral
3. Rudder full deflection against direction of spin
4. Elevator (control stick) fully forward

When Rotation Has Stopped:

5. Flaps UP
6. Rudder neutral
7. Elevator (control stick) pull carefully
8. Return the airplane from a descending into a normal flight attitude. Do not exceed the 'never exceed speed', $V_{NE} = 172$ KIAS.

END OF CHECKLIST

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Figure. Flight manual excerpt

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	28
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	
Instructor Rating(s):	Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	November 20, 2020
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	329 hours (Total, all aircraft), 312.2 hours (Total, this make and model), 251.9 hours (Pilot In Command, all aircraft), 79.3 hours (Last 90 days, all aircraft), 51.6 hours (Last 30 days, all aircraft), 1.7 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	None	Age:	21
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	April 8, 2021
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	16 hours (Total, all aircraft), 16 hours (Total, this make and model), 16 hours (Last 90 days, all aircraft), 16 hours (Last 30 days, all aircraft), 1.7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	DIAMOND AIRCRAFT IND INC	Registration:	N853L
Model/Series:	DA 40 NG	Aircraft Category:	Airplane
Year of Manufacture:	2019	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	40.NC055
Landing Gear Type:	Tricycle	Seats:	5
Date/Type of Last Inspection:	May 25, 2021 Annual	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	1432.5 Hrs as of last inspection	Engine Manufacturer:	Austro
ELT:	C126 installed, activated, did not aid in locating accident	Engine Model/Series:	E4-A
Registered Owner:	Lift Aircraft LLC	Rated Power:	
Operator:	Lift Training Academy	Operating Certificate(s) Held:	Pilot school (141)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KCFJ	Distance from Accident Site:	
Observation Time:	10:15 Local	Direction from Accident Site:	
Lowest Cloud Condition:	Scattered / 4500 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	180°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.05 inches Hg	Temperature/Dew Point:	25°C / 17°C
Precipitation and Obscuration:			
Departure Point:	Indianapolis, IN (KIND)	Type of Flight Plan Filed:	None
Destination:	Indianapolis, IN (KIND)	Type of Clearance:	VFR
Departure Time:		Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	40.114244,-86.75415(est)

Administrative Information

Investigator In Charge (IIC):	Hatch, Craig
Additional Participating Persons:	Cory Irwin; FAA FSDO; Indianapolis, IN Terry Dill; FAA FSDO; Indianapolis, IN Edward Bagden; Lift Training Academy; Indianapolis, IN Paul Arakawa; Diamond Aircraft; London Helen Tsai; TSB Bernhard Kobylík; Austrian Federal Safety Investigative authority
Original Publish Date:	August 12, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=103216

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