



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

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|--------------------------------|--------------------------------------|-------------------------|-------------|
| Location: | Yorktown Heights, New York | Accident Number: | ERA23LA285 |
| Date & Time: | June 29, 2023, 12:22 Local | Registration: | N44HH |
| Aircraft: | Diamond DA40 | Aircraft Damage: | Substantial |
| Defining Event: | Loss of engine power (partial) | Injuries: | 1 Minor |
| Flight Conducted Under: | Part 91: General aviation - Personal | | |

Analysis

The pilot intended to fly his airplane to an airport for an annual inspection. During the flight, while climbing to cruise altitude, the engine began to lose power. The pilot subsequently attempted a forced landing to a school field. During the forced landing, the airplane was in a steep right bank when the wingtip struck the ground, resulting in substantial damage to the empennage. The postaccident examination of the engine revealed that the diesel engine's turbocharger induction housing was fractured in half and exhibited signs of an existing fracture surface. Further metallurgical examination revealed that the turbocharger housing separated consistent with fatigue cracking. The fatigue cracking emanated from the outer surface of the housing and proceeded circumferentially. Steps on the fracture surface indicated that fatigue cracking on multiple planes had coalesced into one main fatigue crack. The remainder of the fracture surface had macro features consistent with overstress. Based on this information, it is likely that failure of the turbocharger housing resulted in a reduced quantity of intake air being available to the engine and resulted in the partial loss of engine power described by the pilot.

Probable Cause and Findings

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

A fatigue failure of the turbocharger housing, which resulted in a partial loss of engine power.

Findings

Aircraft

Turbocharger - Fatigue/wear/corrosion

Factual Information

History of Flight

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|-------------------|---|
| Takeoff | Loss of engine power (partial) (Defining event) |
| Emergency descent | Off-field or emergency landing |
| Landing | Collision with terr/obj (non-CFIT) |

On June 29, 2023, at 1222 eastern daylight time, a Diamond DA 40 NG, N44HH, was substantially damaged when it was involved in an accident near Yorktown Heights, New York. The pilot sustained minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, who was also the owner of the airplane, he intended to fly to Orange County Airport (MGJ), Montgomery, New York, for an annual inspection. He departed Westchester County Airport (HPN), White Plains, New York, and while climbing to cruise altitude, about 2,000 ft mean sea level (msl), the engine began to lose power. The indicated power displayed as lower than normal at 75% and the climb rate was diminishing. The pilot reported the power loss to the air traffic controller. The engine power then dropped to 68% and the airplane began to descend. The pilot looked for a field to conduct a forced landing and was “crabbing” towards West Point as the airplane descended to 1200 ft msl. He moved the throttle in an attempt to regain engine power; however, only the propeller pitch changed. The pilot subsequently attempted a forced landing to a school field. The airplane was in a steep right bank when the wingtip struck the ground. The airplane yawed right and impacted the ground with the left forward side of the nose and slid to a stop. During the accident sequence the airplane sustained substantial damage to the empennage.

The airplane was equipped with a 168-hp Austro Engine E4 diesel engine. The engine was examined at a salvage facility; the engine’s turbocharger induction housing was fractured in half and exhibited signs of an existing fracture surface. The propeller blades were all fractured near the hub. The glow plugs were removed and the propeller was rotated by hand; air pressure was heard exiting the glow plug holes. The engine rotated smoothly and did not exhibit evidence of any preimpact mechanical anomalies.

The turbocharger was sent to the National Transportation Safety Board Materials Laboratory for further examination. The examination revealed that the turbocharger housing separated consistent with fatigue cracking. The fatigue cracking emanated from the outer surface of the housing and proceeded circumferentially. Steps on the fracture surface indicated fatigue cracking on multiple planes had coalesced into one main fatigue crack. The remainder of the

fracture surface had macro features consistent with overstress (for further information, see the Materials Laboratory Factual Report in the public docket for this investigation).

According to the pilot, and the airplane's maintenance records, at the time of the airplane's most recent annual inspection in June 2022, the airframe and engine had accumulated 740 total hours of operation since the airplane was manufactured in 2017. The maintenance log entry describing the annual inspection of the engine noted, "Visually inspected turbo charger and lubricated as required." No other maintenance had been performed on the turbocharger since it was new. Review of the engine's maintenance manual noted that every 100 and 300 hours the turbocharger should be inspected for oil leakage, mechanical wear and damage at the compressor blades, significant wear and grooves at the air intake, and damage concerning the functionality of the turbocharger and sealing. A review of Federal Aviation Administration service difficulty reports did not reveal a history of any other similar turbocharger failures.

Pilot Information

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|----------------------------------|---|--|------------------|
| Certificate: | Private | Age: | 66, Male |
| Airplane Rating(s): | Single-engine land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | 3-point |
| Instrument Rating(s): | None | Second Pilot Present: | No |
| Instructor Rating(s): | None | Toxicology Performed: | |
| Medical Certification: | Class 3 With waivers/limitations | Last FAA Medical Exam: | January 6, 2022 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | October 22, 2021 |
| Flight Time: | 2206 hours (Total, all aircraft), 2206 hours (Pilot In Command, all aircraft), 8 hours (Last 30 days, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|---|---------------------------------------|-----------------|
| Aircraft Make: | Diamond | Registration: | N44HH |
| Model/Series: | DA40 NG | Aircraft Category: | Airplane |
| Year of Manufacture: | 2017 | Amateur Built: | |
| Airworthiness Certificate: | Normal | Serial Number: | 40.NC001 |
| Landing Gear Type: | Tricycle | Seats: | 4 |
| Date/Type of Last Inspection: | June 11, 2022 Annual | Certified Max Gross Wt.: | 2888 lbs |
| Time Since Last Inspection: | | Engines: | 1 Reciprocating |
| Airframe Total Time: | 740 Hrs as of last inspection | Engine Manufacturer: | Austro Engines |
| ELT: | C126 installed, activated, did not aid in locating accident | Engine Model/Series: | E4 |
| Registered Owner: | On file | Rated Power: | 168 Horsepower |
| Operator: | On file | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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|---|----------------------------------|---|----------------------|
| Conditions at Accident Site: | Visual (VMC) | Condition of Light: | Day |
| Observation Facility, Elevation: | HPN,370 ft msl | Distance from Accident Site: | |
| Observation Time: | 16:22 Local | Direction from Accident Site: | |
| Lowest Cloud Condition: | Few / 3200 ft AGL | Visibility | 10 miles |
| Lowest Ceiling: | Broken / 6000 ft AGL | Visibility (RVR): | |
| Wind Speed/Gusts: | 7 knots / | Turbulence Type Forecast/Actual: | None / None |
| Wind Direction: | 310° | Turbulence Severity Forecast/Actual: | N/A / N/A |
| Altimeter Setting: | 30.02 inches Hg | Temperature/Dew Point: | 24°C / 16°C |
| Precipitation and Obscuration: | No Obscuration; No Precipitation | | |
| Departure Point: | White Plains, NY (HPN) | Type of Flight Plan Filed: | VFR |
| Destination: | Montgomery, NY (MGJ) | Type of Clearance: | VFR flight following |
| Departure Time: | 12:15 Local | Type of Airspace: | Class D |

Wreckage and Impact Information

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|----------------------------|---------|-----------------------------|---------------------------|
| Crew Injuries: | 1 Minor | Aircraft Damage: | Substantial |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 1 Minor | Latitude, Longitude: | 41.269255,-73.776554(est) |

Administrative Information

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|--|---|
| Investigator In Charge (IIC): | Boggs, Daniel |
| Additional Participating Persons: | Lawrence Lopez; FAA/FSDO; Farmingdale, NY Paul Arakawa; Diamond Aircraft; Phoenix, AZ Ewan Tasker; Transportation Safety Board of Canada; Richmond Hill |
| Original Publish Date: | July 5, 2024 |
| Last Revision Date: | |
| Investigation Class: | Class 3 |
| Note: | The NTSB did not travel to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=192514 |

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).