



**NATIONAL TRANSPORTATION SAFETY BOARD**  
Office of Aviation Safety

**Engine Examination**

**A. ACCIDENT      ERA22LA169**

Location:            Smithfield, NC  
Date:                March 25, 2022  
Aircraft:            Diamond DA-40-NG  
Engine:             Austro E4-A sn E4-A-05084  
Registration:       N471BL

**B. ENGINE EXAMINATION PARTICIPANTS:**

IIC:                 Peter Wentz  
National Transportation Safety Board  
Ashburn, Virginia

Participant:        Dan Boggs  
National Transportation Safety Board  
Ashburn, Virginia

Participant:        Ralph Hicks  
National Transportation Safety Board  
Ashburn, Virginia

Participant:        Mike Allen  
Federal Aviation Administration  
Greensboro, North Carolina

Participant:        Adam Walters  
Blue Line Aviation  
Smithfield, NC

Participant: Neil Grant  
Diamond Aircraft Industries Canada  
London, Ontario ▪ Canada

**C. ENGINE EXAMINATION LOCATION:**

Atlanta Air Salvage  
Griffin, GA  
June 1, 2022

**D. ACCIDENT SUMMARY**

On March 25, 2022, about 1613 eastern daylight time, a Diamond DA-40NG, N471BL, was substantially damaged when it was involved in an accident near Smithfield, North Carolina. The flight instructor and student pilot were seriously injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 instructional flight.

According to the certificated flight instructor (CFI) and student pilot, they conducted a preflight inspection of the airplane with no anomalies noted before departing Johnston Regional Airport (JNX), Smithfield, North Carolina, on an instructional flight. Preliminary radar data tracked the airplane departing runway 21 and climbing to an altitude of about 650 ft, while making a left turn. The CFI stated, "I heard a weird noise come from the engine. I saw my RPM gauge drop." The student pilot stated, "I noticed the sound but saw no annunciations [in the cockpit] indicating a malfunction." Shortly after hearing the sound the CFI instructed the student pilot to turn back to the airport and while in the turn the engine lost total power. The CFI unsuccessfully attempted to restart the engine while the airplane descended; however, the airplane impacted trees about ¾ mile from the departure end of the runway.

A post-accident examination of the wreckage by a Federal Aviation Administration inspector revealed substantial damage to the fuselage, tail section, and both wings. Additionally, the engine was examined, and a metal substance was noted in one of the cylinder valves.

**E. EXAMINATION SUMMARY**

The participants convened at Atlanta Air Recovery on June 1, 2022. The airframe with engine attached were laying on the floor of the warehouse (photo 1).



*Photo 1 - Engine pre-examination*

The engine was removed from the airframe and secured to a metal table for examination.



*Photo 2 - Accident engine pre-examination*

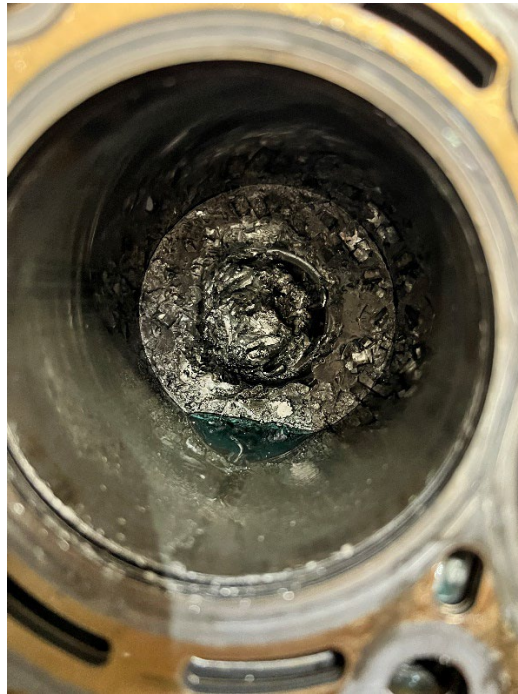
Upon examination, the engine could not be fully rotated. The timing of the engine was verified through timing marks on the front pulley and the camshaft gears. The examination revealed that



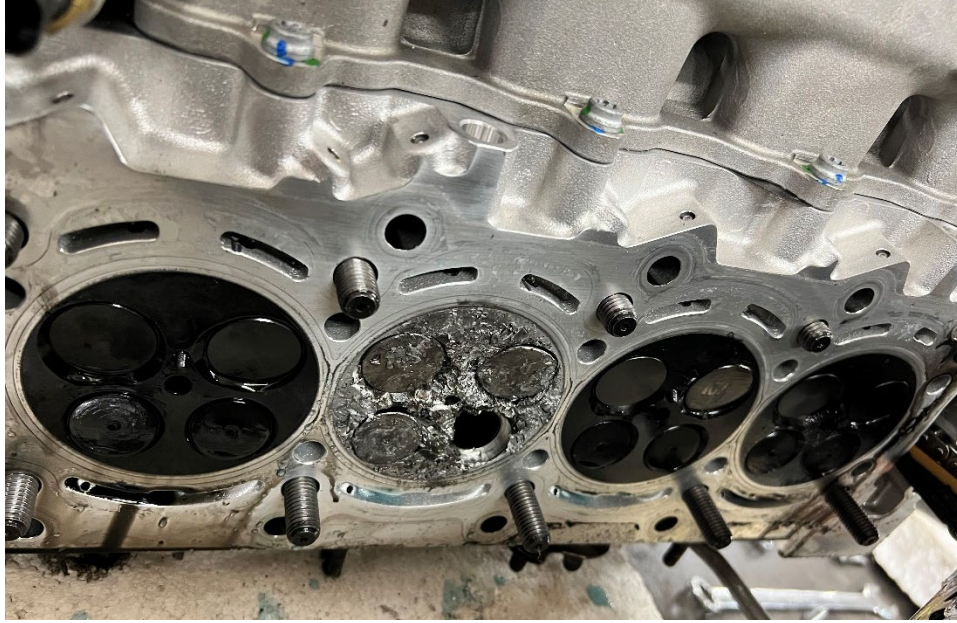
the engine was not timed correctly, and the misaligned gears resulted in the piston striking the valve. The valve had fractured off and had fallen into the cylinder, causing extensive damage to the piston.



*Photo 3- View of opened engine block and cylinder heads*



*Photo 4 – View of damaged piston*

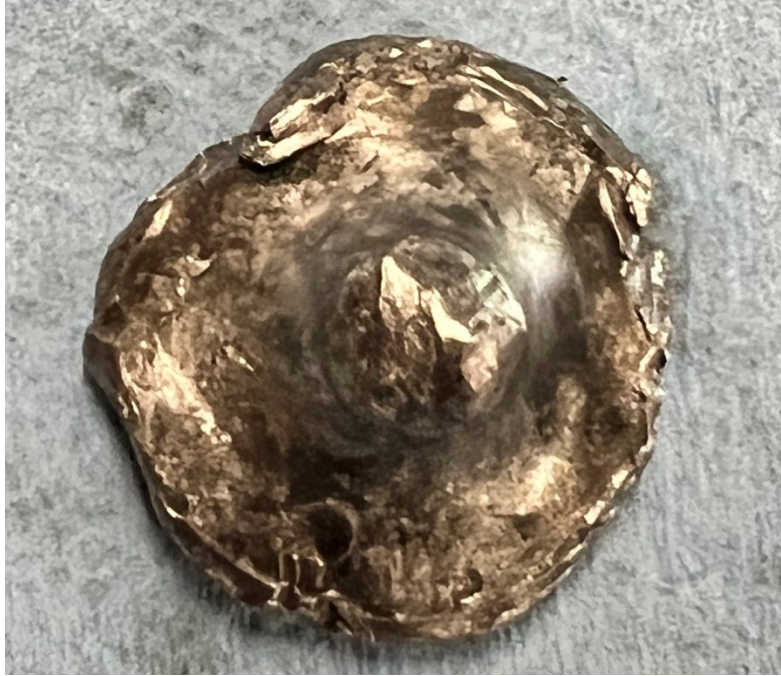


*Photo 5 – View of damaged valves*



*Photo 6 – View of timing marks on front pulley*





*Photo 7 – View of fractured valve*