

# National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA23FA078

## **AIRFRAME EXAMINATION**

April 5, 2023

## TABLE OF CONTENTS

|                                        |    |
|----------------------------------------|----|
| A. ACCIDENT.....                       | 3  |
| B. AIRFRAME EXAMINATION.....           | 3  |
| C. SUMMARY .....                       | 3  |
| D. DETAILS OF THE EXAMINATION.....     | 4  |
| 1.0 AIRFRAME EXAMINATION.....          | 4  |
| 1.1 Fuselage.....                      | 4  |
| 1.2 Empennage .....                    | 6  |
| 1.3 Aircraft Rotor Head Assembly ..... | 9  |
| 1.4 Landing Gear .....                 | 13 |
| 1.5 Survivability.....                 | 14 |
| 1.6 Engine & Propeller.....            | 17 |

## **A. ACCIDENT**

Location: Beverly, MA  
Date: December 4, 2022  
Time: 1135 EST  
1635 UTC  
Gyroplane: N401GR, Rotorsport UK, Cavalon

## **B. AIRFRAME EXAMINATION**

|                       |                                                                          |
|-----------------------|--------------------------------------------------------------------------|
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## **C. SUMMARY**

On December 4, 2022, about 1135 eastern standard time, a Rotorsport UK LTD Cavalon, N401GR, was substantially damaged when it was involved in an accident at Beverly Regional Airport (BVY) Beverly, Massachusetts. The sport pilot was fatally injured. The gyroplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

During initial climb, the security video showed the gyroplane climb to an altitude of about 40 feet above the ground where it leveled off briefly, then resumed a shallow climb while remaining in a significant left yaw. As the gyroplane continued to climb, it began to roll to the right.

The gyroplane completed one full 360° roll as it descended and impacted the runway on its right front side before skidding about 200 ft into the grass off the right side of the runway.

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## **D. DETAILS OF THE EXAMINATION**

### **1.0 Airframe Examination**

#### **1.1 Fuselage**

The fuselage remained intact and exhibited impact damage. The right door frame remained attached to the fuselage at one hinge and the bottom portion of the frame was impact separated, the glass of the right door was impact separated. The left door remained attached to the fuselage at one hinge. There was no evidence of a fire.



**Photo 1: View of the fuselage from the front.**



**Photo 2: View of the right door.**



**Photo 3: View of the left door.**

## **1.2 Empennage**

The empennage remained attached to the fuselage. The horizontal stabilizer remained intact and attached at all attachment points. The three vertical stabilizers remained intact and attached at all attachment points. Control continuity was confirmed from the rudder flight control surface to the pedals in the cockpit. The rudder trim tab was intact, at the accident site it was bent about 30° to the right and did not exhibit any impact damage or distortion.



**Photo 4: View of the empennage connected to the fuselage.**



**Photo 5: View of the horizontal and vertical stabilizers.**



**Photo 6: View of the rudder trim tab at the accident site.**

### **1.3 Aircraft Rotor Head Assembly**

The rotor head was impact separated from the rotor mast, was disassembled from the rotor blades, and placed on top of the rotor mast and attached with zip ties for examination. Pitch control continuity was confirmed from the flight controls in the cockpit to the rotor mast and head through an overload separation of the rotor head pitch pushrod and pitch control cable. Roll control continuity was confirmed from the flight control in the cockpit to the rotor mast and head through an overload separation at the rotor head connection point.



**Photo 7: View of the rotor head attached to the mast with zip ties for examination.**



**Photo 8: View of the mast head assembly.**



**Photo 9: Roll control rotor head attachment point.**

## 1.4 Landing Gear

The nose landing gear collapsed and was crushed upwards into the cockpit. The right main landing gear was impact crushed/twisted aft and remained attached to the fuselage. The left main landing gear remained intact.



**Photo 10: Left main landing gear.**



**Photo 11: Twisting of left main landing gear.**

### **1.5 Survivability**

The left seat remained intact and was equipped with a four-point harness which remained attached at all attachment points. The right seat was intact, and the headrest attachment was impact separated from the aft fuselage structure, it was equipped with a four-point harness. The harness remained attached at all attachment points and was cut by fire rescue crews for recovery of the pilot. Both seatbelt buckles worked with no anomalies noted.



**Photo 12: Left seat with harness**



**Photo 13: Right seat and harness**



**Photo 14: Right seat harness**

## **1.6 Engine & Propeller**

The engine remained intact and was operating at nearly full power for about 2 minutes after impact, until fire rescue personnel were able to shut down the engine; the engine nor the components did not reveal any pre impact anomalies that would have precipitated a loss engine power or performance. The 4 bladed wood & composite propeller in the pusher configuration was splintered and bent back opposite of the direction of rotation on the outer 6-inches of all 4 blades in a uniform pattern. The blades remained attached to the hub.



**Photo 15 Engine and Propeller**

Submitted by:

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