

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR22FA023

WRECKAGE AND EXAMINATION REPORT

December 21, 2022

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. PARTICIPANTS.....	3
C. SUMMARY	3
D. DETAILS OF THE EXAMINATION.....	3
1.0 ACCIDENT SITE	3
2.0 AIRFRAME EXAMINATION.....	4
2.1 Fuselage.....	4
2.2 Empennage	4
2.3 Wings.....	5
2.4 Landing Gear.....	5
2.5 Cockpit.....	5
2.6 Survivability.....	5
2.7 Fuel/Fuel System.....	5
2.8 Other Systems	5
3.0 PROPELLER EXAMINATION	5
4.0 ENGINE EXAMINATION	6
5.0 Accessory Examination.....	7

A. ACCIDENT

Location: Snoqualmie, Washington
Date: October 28, 2021
Time: 0911 LTZ
1611 UTC
Airplane: 1993 Mooney M20M

B. WRECKAGE AND EXAMINATION REPORT

IIC	Michael Hicks National Transportation Safety Board Federal Way, Washington
Group Member	Scott Peterson Federal Aviation Administration Seattle, Washington
Group Member	Troy Helgeson Lycoming Engines, An Operating Division of Avco

C. SUMMARY

Post-accident examination of the airplane revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation. The accident airplane impacted terrain with high energy and thermal damage was sustained to the engine and airframe.

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane wreckage was in densely wooded, mountainous terrain and distributed within a 21 ft by 15 ft accident site. The initial impact point consisted of two trees, and about 20 ft above the base of the trees. The northwest most point of the wreckage consisted of the engine, and propeller sections, which sustained thermal damage. The vertical and horizontal stabilizer, rudder and elevator sections were identified and formed the southwestern border of the wreckage.

2.0 Airframe Examination

2.1 Fuselage

The fuselage was consumed by the post-impact fire.

2.2 Empennage

The left horizontal stabilizer and elevator impacted the ground and sustained thermal damage. The rudder was sandwiched between the vertical stabilizer and the left horizontal stabilizer. Resting underneath the vertical stabilizer and the rudder was the inboard right elevator, and on top of it rested the right horizontal stabilizer. The TKS system affixed to the leading edges of the vertical and horizontal stabilizer were present and sustained gross impact damage and deformation to their surfaces. Rudder and elevator continuity were not observed because of impact and thermal damage.



Figure 1: Post-accident view of the empennage

2.3 Wings

The left and right wings were fragmented and sustained thermal damage. Segments of the left wing flap and aileron were present, fragmented and sustained thermal damage. Segments of the right wing flap and aileron were present, fragmented and sustained thermal damage. Flap and aileron continuity were not observed because of the impact and thermal damage sustained. The TKS system affixed to the left and right leading edges sustained impact damage, deformation, and thermal damage.

2.4 Landing Gear

The left main, right main and the nose landing gear were present and sustained impact damage, deformation, and thermal damage. The left main, right main, and the nose landing gear wheels were present.

2.5 Cockpit

The cockpit and cabin were consumed by the post-impact fire.

2.6 Survivability

The seat belts were consumed by the post-impact fire.

2.7 Fuel/Fuel System

The fuel flow divider was partially consumed by the post-impact fire. The fuel servo was consumed by post-impact fire. The fuel screens were consumed by the post-impact fire. The injector nozzles were destroyed. The fuel pump was consumed by post-impact fire.

2.8 Other Systems

The windshield spray-bar that provided de-ice protection was not visibly identifiable.

3.0 Propeller Examination

Manufacturer: McCauley
Model Number: B3D32C417

Three metallic propeller blades were liberated from the propeller hub. Two of the blades were bent forward and deformed. One blade was bent aft and deformed. The propeller governor was consumed by the post-impact fire. The

slinger ring that also provided de-ice protection was not visibly identifiable. The propeller blades were equipped with de-icing boots.



Figure 2: Post-accident view of the propeller blades

4.0 ENGINE EXAMINATION

Manufacture: Lycoming
Model Number: TIO-540-AF1B
Serial Number: L-9472-61A
Data Plate: Not Present

The engine was partially consumed and deformed by post-impact fire. The oil sump was consumed by post-impact fire. The accessory case was also partially consumed by post-impact fire and deformed. None of the accessories were available for the exam and were presumed destroyed by post-impact fire or not identifiable. The remaining top spark plugs were removed and cylinders 3,4,5, and 6 were borescope inspected, with no identifiable anomalies other than thermal damage was noted. Cylinders 1, and 2 were impact damaged with their cylinder heads separated. The cylinder heads were partially consumed and deformed by fire. The crankshaft was not rotatable due to thermal damage. Engine drive train continuity was confirmed visually, and borescope inspected.



Figure 3: Post-accident view of the engine

5.0 ACCESSORY INFORMATION

The right and left magneto were consumed by post-impact fire. The ignition harness was destroyed. The starter, the alternator, and the vacuum pump were destroyed. The lubrication system, to include the oil suction screen, the oil filter, and the oil sump were destroyed. The manufacture installed turbo charger sustained thermal damage, deformation and did not rotate. The density controller, differential controller, and the variable absolute controller were destroyed. The slope controller, the manifold pressure relief valve, and the exhaust bypass valve were destroyed.



Figure 4: Post-accident view of the turbo charger

Spark Plugs

Manufacturer: Champion

Type: RHB37E

SI 1042 Approved

Spark Plug Condition (per Champion Aviation Check-A-Plug Card AV-27)

1 Top Destroyed	1 Bottom Destroyed
2 Top Destroyed	2 Bottom Destroyed
3 Top Worn Out/Normal	3 Bottom Impact Damaged
4 Top Worn Out/Normal	4 Bottom Impact Damaged
5 Top Worn Out/Severe	5 Bottom Impact Damaged
6 Top Worn Out/Severe	6 Bottom Impact Damaged



Figure 5: View of the intact spark plugs

Submitted by:

Michael Hicks
Air Safety Investigator