

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA24FA104

MATERIALS LABORATORY

Factual Report 24-057

September 9, 2024

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A. ACCIDENT INFORMATION

Location: Clearwater, FL
Date: February 1, 2024
Vehicle: Beech V35B, N6659L
Investigator: Timothy Monville

B. COMPONENTS EXAMINED

Photographs from the on-scene wreckage recovery and photographs from the examination at the wreckage storage facility.

C. EXAMINATION PARTICIPANTS

Group Chair	Joseph Panagiotou National Transportation Safety Board Washington, DC
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D. DETAILS OF THE EXAMINATION

The accident aircraft impacted the roof of a manufactured home and then impacted a second manufactured home hitting it broadside near the foundation. The impact resulted in the latter manufactured home being displaced off its foundation. The main portion of the aircraft's wreckage, which included the engine, came to rest within the home (Figures 1, 2). A post-crash fire ensued which involved both the aircraft and the portions of the home that had collapsed on top of and around the aircraft.

A portion of the right-wing fuel tip tank and a portion of the tail cone were recovered outside of the post-crash fire affected area. Neither of these components exhibited soot streaking or thermal damage that would be indicative of an in-flight fire.

Recovery of the engine from the accident site involved the removal of portions of the home's structure that had collapsed on top of the aircraft's wreckage. A portion of roof sheathing had been laying on top of the engine's left bank of cylinders (Figure 3). This portion of roof sheathing exhibited more charring and thermal damage on the upward facing surface than on the downward facing surface which had been covering part of the engine (Figure 4).

When the engine was hoisted up during the recovery (Figure 5) the left and right-side lower engine cowlings were found to have been pressed against the engine from the impact forces. This caused the cowling to be stuck against and tightly conforming to the engine. On the left side of the engine the cowling exhibited a

sharp demarcation in thermal damage in the vicinity of the third cylinder from the front and extending downward (Figure 6). This thermal damage had the appearance of clean burn¹ and exhibited melting of the aluminum skin. Further forward of this area exhibiting clean burn was an area with a sooted appearance (where the cowling latch is visible). Further forward of the sooted area was cowling skin exhibiting no thermal damage.

At the wreckage storage facility, the lower engine cowling was separated from the engine to examine the lower portion of the engine (Figure 7). The cowling was found to have a layer of soil on the interior surface consistent with the impact forces having driven the forward portion of the aircraft through the manufactured home and into the ground beneath it. With the lower cowling removed and the engine elevated an area exhibiting the appearance of clean burn can be seen around the aft lower portions of the engine (Figure 8).

With the cowling removed and other extraneous embedded debris removed the engine was further examined. The overall appearance of the engine presented impact damage and some degree of thermal damage throughout. The top of the engine, cylinder heads and majority of the crankcase exhibited a sooty appearance without a strong contrast in the relative severity of the damage.

The lower portion of the engine exhibited regions on both the left and right sides with a clean burn appearance. These regions appeared to extend from mid-way along the oil sump and aft. The area where the clean burn region begins is coincident with the location of the fuel metering valve which sits below the engine oil sump cover (Figure 9). With the oil sump cover removed the gasket between the sump cover and the crankcase could be examined. The gasket exhibited thermal degradation and charring along the rear portion of its periphery (Figure 10).

Investigators conducting the wreckage examination discovered that the b-nuts of the fuel supply system hoses were all tight at their respective fittings except for the b-nut at the outlet of the fuel metering valve. That b-nut was determined to be approximately 1.25 flats² loose.

¹ Clean burn is a qualitative description of an area of intense thermal damage that lacks soot usually surrounded or bordered by lesser thermal damage and soot.

² The hexagonal b-nut has 6 flat sides used to engage with a wrench.

Submitted by:

Joseph Panagiotou
Fire Protection Engineer



Figure 1. Aircraft wreckage location. Red dashed circle denotes the location of the engine.



Figure 2. Aircraft wreckage location. Red dashed circle denotes the location of the engine. Red dashed line runs parallel to the rim joist of the manufactured home showing its displacement with respect to the brick foundation.



Figure 3. Aircraft engine as found among the building debris. A portion of sheathing is covering the left bank cylinders. The dashed red line denotes the engine's centerline.



Figure 4. Aircraft engine after some of the building debris was removed. The underside of the sheathing that had been on top of the right side of the engine is visible in the top right of the photo. Engine centerline denoted by dashed red line.



Figure 5. Aircraft engine being hoisted up during wreckage recovery. Lower engine cowlings are pressed against the engine.



Figure 6. View of the left side of the engine and lower cowling. There is a sharp demarcation between the areas exhibiting clean burn, sooting and undamaged cowl.



Figure 7. Forward/underside view of the engine with the cowling separated. The interior surface of the cowling contained dirt.



Figure 8. Underside of the engine looking from the front. An area of clean burn encompasses the aft portion of the oil sump cover, exhaust components on both sides and the throttle body and metering valve in the center.



Figure 9. Close up view of the throttle body and metering valve below the oil sump cover.



Figure 10. Underside of the crankcase with the oil sump cover removed. Sealing gasket thermally damaged and or consumed along the aft left and right areas.