

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594



July 24, 2020

MATERIALS LABORATORY FIRE FACTUAL REPORT

A. ACCIDENT INFORMATION

Place : Fort Lauderdale, Florida
Date : December 1, 2018
Vehicle : Cessna 335
NTSB No. : ERA19FA060
Investigator : Timothy Monville
AS-ERA

B. ACCIDENT SUMMARY

On December 1, 2018, about 1327 eastern standard time, a Cessna 335, N79HP, impacted the ground and a building during a forced landing shortly after takeoff from Fort Lauderdale Executive Airport, Fort Lauderdale, Florida. The commercial pilot and pilot-rated passenger were fatally injured and 1 occupant of the building sustained minor injury. The airplane was destroyed by postcrash fire. The airplane was being operated under the provisions of title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time and VFR flight following was obtained for the flight that originated about 3 minutes earlier. The flight was destined for Hilliard Airpark (01J), Hilliard, Florida.

C. DETAILS OF THE EXAMINATION

1. Video of event

A maintenance facility employee took a video of the airplane during departure and he claimed to see white smoke trailing the left engine. Investigators collected security camera video feed of the parking lot where the accident aircraft impacted prior to sliding into the building where it came to rest. The video showed sprays of a white mist just prior to impact with the building. There was no evidence of fire on the aircraft at this point such as visible flame or any change in the intensity or color of the mist. Once the aircraft impacted the building, a large fireball and intense post-impact fire were observed.

2. Wreckage examination

Left Engine

The left engine exhibited significant fire-related/thermal damage. One propeller blade was melted. The cylinder covers for Cylinders #1, #3 and #5 were melted with large area of material missing as shown in Figure 1. The cylinder covers for Cylinders #2, #4, and #6 were melted in areas and the remaining material was thinned, brittle and heavily sooted as shown in Figure 2. There was oil staining on the exhaust manifold on the left side for cylinders #2, #4, and #6 as shown in Figure 3. There was also some thermal discoloration on the exhaust tube.

On the aft end of the engine, the oil cooler was sooted and one corner had melted. The engine-driven fuel pump and oil pump covers were melted. Aluminum lines in this location were melted. All the fire sleeving in this area was thermally damaged leaving only the glass mat of the fire sleeve in place. No loose b-nuts were found on the remaining lines. The fuel injector lines to the cylinders were intact and undamaged. No loose connections were found. The oil fill cap was missing.

During teardown of the left engine at the engine manufacturer's facility, the lubrication system was pressure tested to look for leakage in the system. Pressurized air was introduced to the lubrication system which included the governor faying surface, governor head, oil pump, oil filter adapter, oil cooler, and oil filter. A soap-water solution was sprayed onto the outer surfaces of the lubrication system^[1] Small bubbles were noted at the pressure relief plug of the propeller governor. No leakage was noted at the governor pad faying surface or propeller governor gasket. The oil pump, oil filter adapter, and oil filter exhibited extensive leakage; however, the components had sustained mechanical and extensive heat damage.

The left propeller governor and propeller were then shipped to the propeller manufacturer for further examination. The examination and teardown of the left propeller governor found thermal damage to the governor, but the leakage found during the engine teardown could not be duplicated. The propeller governor was pressure tested to 300 psig, which is within the pressure relief range of 290-310 psig for the propeller.

Left Engine Nacelle

The left engine nacelle sustained thermal and mechanical damage as shown in Figures 4 and 5. The remaining paint aft of the firewall was thermally discolored. The upper nacelle skin aft of the firewall was dimpled and buckled by heat exposure. The firewall had thermal discoloration on the top half of both sides. The lower half of both sides was heavily sooted. The firewall was also buckled by impact. The cold side of the turbocharger was melted with large sections of material missing as shown in Figure 6. The turbocharge intake was not attached and presumed destroyed by fire. Most of the

^[1] . Bubbling of the soap-water solution was an indicator of air leakage.

fuel and oil lines were missing. The remaining aluminum lines were melted. There was oil staining on the left side of the lower cowling, while the right side of the lower cowling was dry.

Right Engine

The right engine had little thermal related damage except for some light sooting on the cylinder covers and other engine hardware as shown in Figures 7 and 8. The aft end was mostly intact and exhibited only mechanical impact-related damage. The rubber skirt was intact and exhibited no thermal related damage.

Right Engine Nacelle

The right nacelle sustained thermal and mechanical damage as shown in Figures 9 and 10. The skin of the upper surface aft of the firewall was melted with the majority missing. There was no paint remaining. The cowlings were not attached to the nacelle. The firewall had thermal discoloration on the top half of both sides. The lower half of both sides was heavily sooted. The firewall was also buckled by impact. The oil and fuel lines were present and exhibited some mechanical damage.

Fuselage

The fuselage sustained heavy thermal damage as shown in Figures 11 and 12. Only a small portion of the skin remained on the left side aft of the cockpit. Some of the stringers and other support structure remained on the lower half of the cockpit and cabin area.

Empennage and wings

Sections of the wings and empennage were recovered from the scene. The recovered sections exhibited mechanical damage as well as thermal damage such as discolored, bubbled, and missing paint, and melted skin and structure.

Nancy B. McAtee
Fire and Explosion Specialist



Figure 1. Left Engine-Cylinders #1, #3 and #5.



Figure 2. Left Engine-Cylinders #2, #4 and #6.



Figure 3. Close-up of oil staining (highlighted by yellow circle) left engine exhaust duct (#2, #4 and #6 cylinders' side).



Figure 4. Left engine nacelle.



Figure 5. Left engine lower nacelle and cowling.



Figure 6. Left engine turbocharger.



Figure 7. Right engine cylinders #1, #3 and #5.

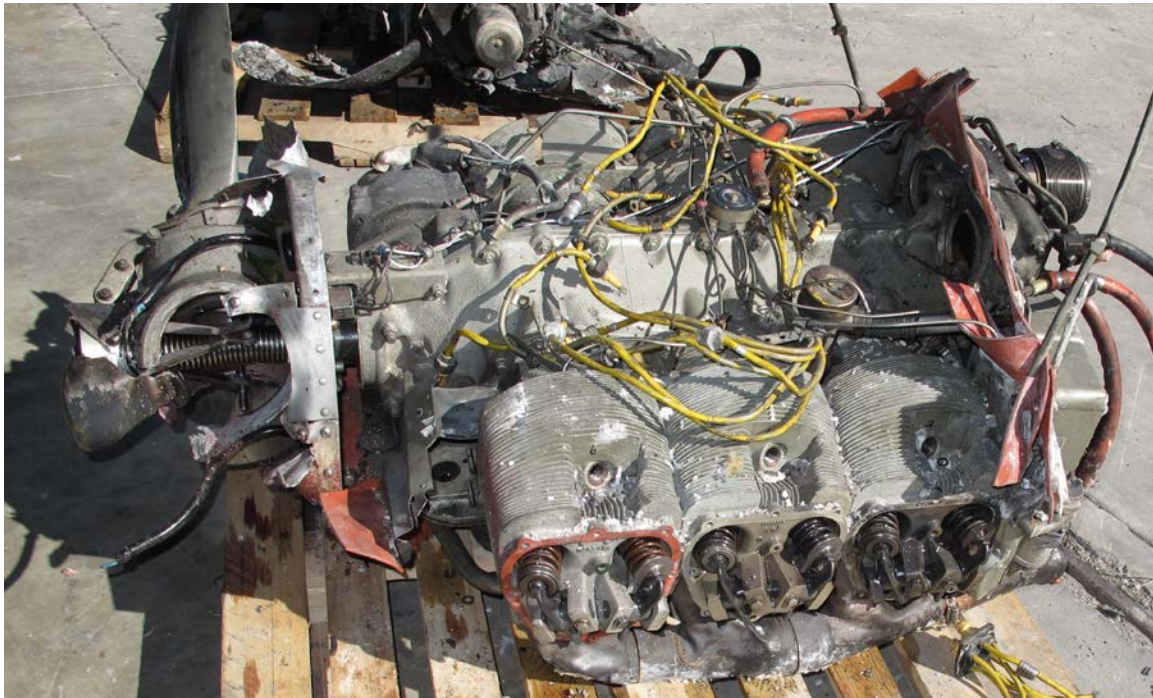


Figure 8. Right engine cylinders #2, #4 and #6.



Figure 9. Upper surface of right engine nacelle.



Figure 10. Right nacelle, firewall and turbocharger.



Figure 11. Cockpit and cabin structure (facing forward).



Figure 12. Cockpit and cabin (right side).