



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

May 17, 2018

ENGINE EXAMINATION

CEN18LA127

A. ACCIDENT EXAM

Location: Tubreaux Aviation (KDTN)
Date: May 17, 2018
Aircraft/Case: CEN18LA127
NTSB IIC: Pam Sullivan

B. ENGINE EXAMINATION PARTICIPANTS:

Craig Hatch
Air Safety Investigator
National Transportation Safety Board
4760 Oakland St., Suite 500
Denver, CO 80239

Chip Bonner
Tubreaux Aviation

C. SUMMARY

The pilot reported that while in cruise flight, the engine began to vibrate. Shortly afterwards, the pilot heard a "bang" and a piece of the engine penetrated the engine cowling. The propeller stopped spinning and engine oil covered the outside of the canopy.

The engine was separated from the airframe and shipped to Tubreaux Aviation, for an examination. The engine is a modified version of the six-cylinder Lycoming AEIO-540 engine.

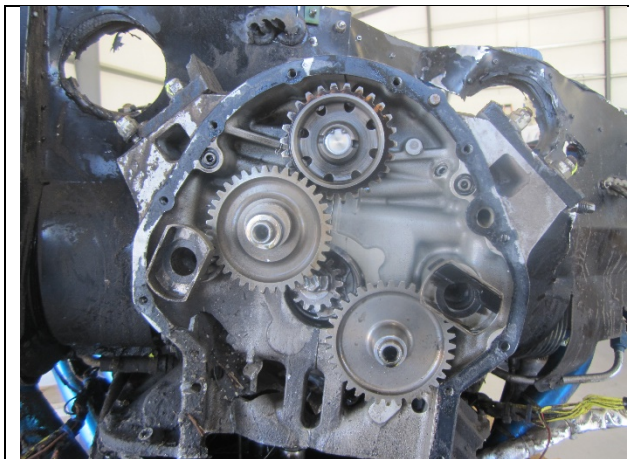
D. DETAILS OF THE INVESTIGATION

1.1 Exam Photos

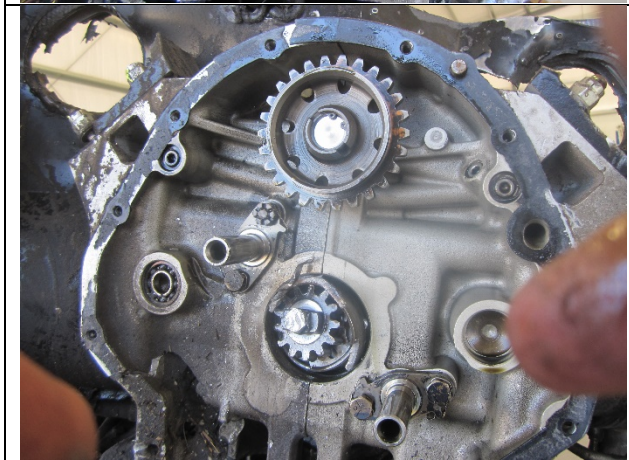
	Overall condition of the engine. A hole, just above the #5 cylinder is noted. The camshaft is visible thru the hole, and is broken. The crankshaft is also visible, and a broken counterweight is noted. The accessory section is broken and angled to one side. The aft top section of the oil sump is broken and remains with the accessory section. Only residual engine oil remains.
	
	Accessory section, the left magneto separated from the engine. The accessories; magnetos, oil pump, etc were free to rotate



The oil screen was clear of contaminants; the absence of metal particles was noted.



Accessory gears, except crankshaft gear, were in place, and lacked preimpact damage.



Damage to crankshaft gear and bearing is noted.



Top cylinder valve train, both left and right sides appeared normal.



Oil pump was disassembled, and was absent signs of any metal passage.



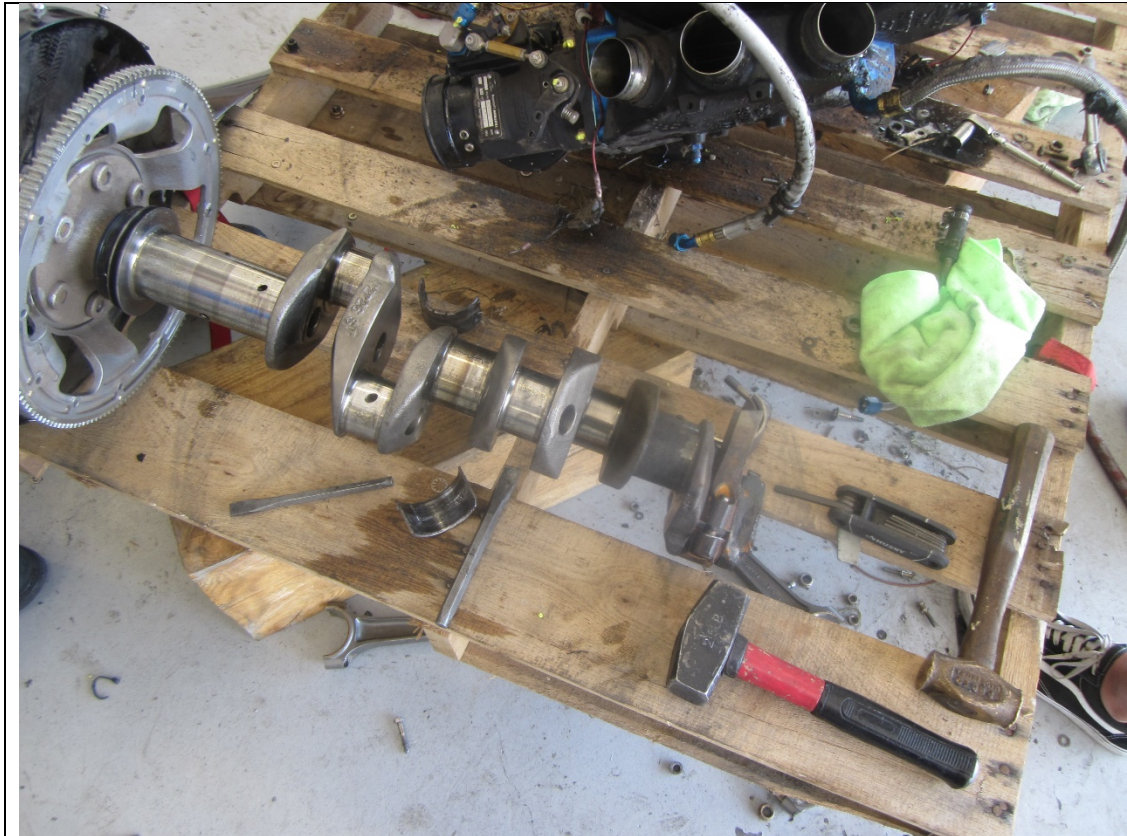
Top of cylinders displayed normal combustion signatures.



The crankshaft was broken into two pieces. Aft section shown



The forward piece of the crankshaft. The crank is broken just aft of the #5 cylinder.



The crankshaft was removed from the case: the #5 connecting rod was cut to facilitate removal from the engine case.



Journal bearing,,,, M10 is stamped on bearing



Aft section of crankshaft. One counterweight is missing.



Broken crankshaft



Close up view of crankshaft break. Rings are noted in the fracture surface

The crankshaft was retained for potential material lab analysis.