

OPINION |

Where's the smoking gun?

When aircraft problems occur, we don't always get an explanation

BY MIKE BUSCH



AN A&P may clean the spark plugs and perform other tasks in an attempt to resolve a problem such as partial power loss—but confirmation of the root cause may be elusive.

I RECEIVE THOUSANDS OF EMAILS from aircraft owners each year, but this one was unusual. It was nearly 3,000 words long. The 7,500-hour CFI who wrote it clearly needed to vent about something that scared him three months earlier and that he'd obviously still not gotten over.

The writer was a member of a glider club and, on the day in question, was instructing a student in a two-place sailplane that departed under tow behind a Piper Cherokee 235 towplane. Shortly after takeoff, as both aircraft were about 100 feet agl, the Lycoming O-540 engine in the towplane sustained a partial power loss and the aircraft quit climbing. The CFI radioed to the towplane pilot, who suggested he consider releasing the towline.

However, the CFI determined he was too low for the glider to execute a

successful one-eighty back to the airport, and elected to remain on tow. The tow pilot also opted not to release the towline. The towplane flew a very low-altitude pattern with the glider in tow, and ultimately the glider released on a close-in base leg to the opposite-direction runway and both aircraft landed without incident. It was scary.

SEARCHING FOR WHY

A senior A&P with 30 years of experience was summoned to look at the engine. He performed some ground runs and everything appeared normal. The Cherokee took off on a test flight, this time without glider in tow, and once again sustained a partial power loss. Without the weight and drag of the glider, it was able to come back around and land without drama.

The A&P removed all the spark plugs and cleaned them. He borescoped the cylinders, expecting to find a failed valve or other combustion chamber problem, but everything appeared normal. The mechanic swapped out one of the two magnetos and installed a spare mag (for reasons unclear to the CFI). The ignition harnesses were inspected with no defects noted. At this point, the engine was recowled and a full-power runup was performed. Then the Cherokee made three flights and the engine performed flawlessly.

By now, word of the scary flight had reached most of the members of the sailplane club. The club's maintenance officer sent an email to all the club members advising them that the Cherokee's engine problem had been resolved and that the towplane was once again ready for their use.

The CFI strongly disagreed. He was alarmed that neither the A&P nor the club's maintenance officer—or anyone else—could explain to him what had caused the Lycoming engine's partial power loss, or what had been done to ensure the problem would not recur. Based on his engineering background and 7,500 hours of flight time, the CFI was convinced the engine had sustained some sort of cylinder issue, and was unsatisfied with the A&P's conclusion that no cylinder problems were evident. The CFI felt it was irresponsible to return the towplane to service without a more definitive diagnosis.

The CFI sent his own email to all the club members, stating that since the reason for the Cherokee's power-loss incidents had not been determined, it was his opinion that anyone flying the towplane or being towed behind it was acting as a test pilot. The CFI's email wound up generating a lot of hard feelings. The glider club's

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maintenance officer resigned. The owner of the Cherokee decided to stop allowing his airplane to be used by the club. Other club members criticized the CFI for having the audacity to disagree with the experienced A&P who had signed the logbook entry approving the aircraft for return to service.

The CFI posed several questions to me: In the case of a life-threatening malfunction, is it OK to return the aircraft to service without an understanding of the malfunction? Is it OK to question the judgment of a senior A&P? And how do you deal with an A&P who doesn't know what he did to fix the problem—and doesn't seem to care?

WE DON'T ALWAYS HAVE A SMOKING GUN

In aircraft maintenance, aircraft problems frequently are resolved without a full understanding of the cause. Had the A&P been tasked with performing an annual inspection on the Cherokee, his obligation would have been to make a formal determination that the aircraft was airworthy. But this wasn't an annual inspection, so the A&P's signature in the Cherokee's maintenance logbook was not a statement of airworthiness, and signified only that whatever work he did on the aircraft (replacing the mag, cleaning the plugs, borescoping the cylinders) was done in a satisfactory manner.

Even in the case of an annual inspection, a mechanic has no obligation to

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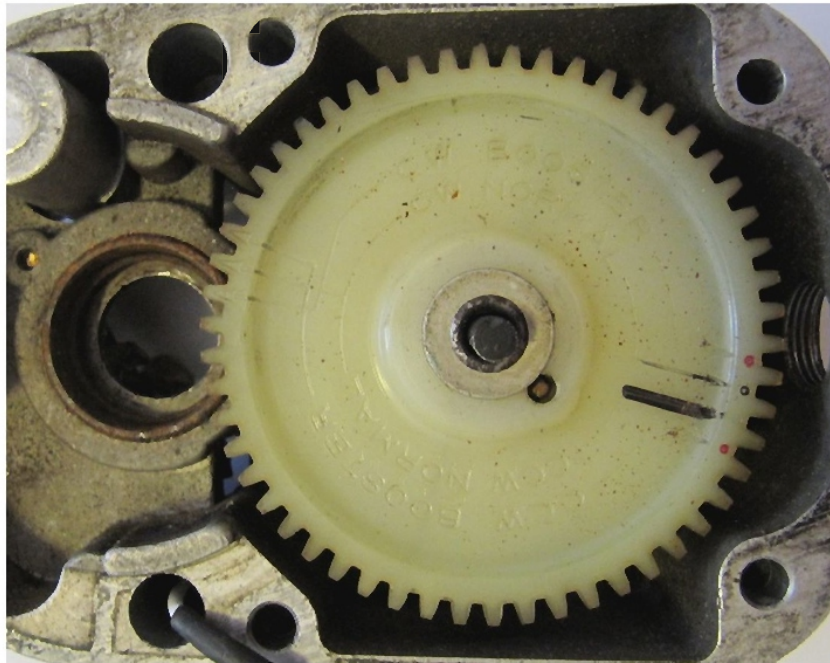
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AOP



WHEN THE ENGINE QUIT on the right magneto during a runup, the author traced the problem to the magneto itself—but what was the cause?

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generate or document any diagnoses of aircraft malfunctions. Maintenance records are never supposed to document discrepancies; they only document the work performed on the aircraft. Mechanics are required by regulation to document what they did, not what they found to be wrong.

In this case, the A&P borescoped the cylinders (and found nothing amiss), cleaned the spark plugs (which he found to be dirty), and replaced one magneto (for reasons not disclosed). After verifying that the engine was now working normally, he appropriately approved the aircraft for return to service. Subsequent history of the engine continuing to operate normally thereafter seems to validate the A&P's judgment.

LET'S GET PERSONAL

Weeks after I responded to the CFT's email, something equally frustrating (albeit less scary) happened to me. I had spent the week on the Outer Banks of North Carolina, and was about to depart Dare County Regional Airport headed for Raleigh-Durham International Airport, an hour's flying time away, to visit friends and get a flight review and instrument proficiency check. The weather was IMC that morning, so I'd filed an IFR flight plan. I taxied out to Runway 5 in my trusty Cessna 310 and performed my usual preflight runup. Much to my shock, when I turned off the left engine's left mag, the engine quit cold. Subsequent switch flipping established that the left engine's right magneto was dead, and the other three mags seemed to be fine.

Discouraged, I taxied back to the ramp. It was Sunday—these things always happen on weekends and holidays—and I couldn't find anyone to assist me. Using the "survival tool kit" I always carry in the airplane's left wing locker, I uncowed the left engine and inspected all the wiring connected to the right mag, but could find nothing wrong. I disconnected the P-lead from the mag—rendering it "hot"—and then retried my runup, but with the same results as before: When I turned off the left mag, the engine quit. This made it clear that the problem was not with the aircraft wiring or mag switch, but something inside the right magneto itself.

I removed the dead magneto from the engine and removed the cover to reveal the mag's breaker points and cam. The points looked perfect and they opened and closed normally as I rotated the mag's drive shaft. I used the small multimeter from my toolkit to verify that the condenser and the coil's primary winding were good. I removed the distributor cap and inspected the coil and carbon brush; both looked fine. I ohmed out the coil's secondary winding, and it was OK.

Thoroughly discouraged at not finding anything wrong with the magneto, I put it back together and hung it back on the engine. Just for laughs, I climbed into the cockpit and started the engine. I switched off the left mag, fully expecting the engine to quit. But it didn't. The engine now ran just fine on the right mag only.

I recowled the engine, refilled my IFR flight plan, taxied to Runway 5 once again, did an ultra-thorough runup, and launched for Raleigh-Durham. I did an in-flight mag check, and everything was fine. Over the next several weeks, I flew from North Carolina to Florida to Tennessee to Texas to California, and the magneto continued to perform flawlessly.

It's frustrating when stuff like this happens. Whenever something goes wrong with our aircraft, we always want an explanation. But we don't always get one. **AOA**

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