

SAVVY MAINTENANCE / OPINION

Ethics of misdiagnosis

Should you have to pay for work or parts that don't fix the problem?

BY MIKE BUSCH



“MIKE, I HAVE an ethical question for you: How should an aircraft owner determine fair compensation to a mechanic for parts and labor that were unnecessary?” The email was from a 1947 Piper PA-12 Super Cruiser owner—I’ll call him Don—who had just received an invoice from his shop and was wondering whether to pay it.

Don explained that his airplane’s Lycoming O-235-C1 engine had always started easily. That changed after the last annual inspection when his A&P told him that he should be starting the engine with the magneto switch set to Left since only the left magneto was equipped with an impulse coupling for starting. Don had been starting the engine on Both for the past 20 years, and he found the engine almost impossible to start using the procedure his mechanic had prescribed.

Don reported this to his A&P, who proceeded to replace the primer. There was no improvement in starting, so the A&P replaced the left magneto. Still no improvement. The A&P asked Don to check the idle mixture by performing an idle rpm rise test. Don performed the test and reported that there was no rpm rise (indicating an excessively lean idle mixture adjustment).

“Now they want to replace the carburetor,” Don told me. “The bill for replacing the magneto and primer is almost \$1,900. When I asked the mechanic why he replaced them, he replied ‘that’s what it is 99 percent of the time.’ Should I have to pay for that?”

What are you paying for?

I explained to Don that most aircraft maintenance is done on a “time-and-materials”

(T&M) basis in which the aircraft owner is paying for parts and labor, not for a particular result. Now, there are a few exceptions where the owner contracts with a shop for a specific result at a fixed price. For example, most annual inspections are done on a flat-rate basis, strictly for the inspection itself, not for the repair of discrepancies found during the inspection. Another example is major engine overhauls, which are often done on a flat-rate basis but with certain exceptions if the crankcase or crankshaft are found to be unrepairable. For pretty much everything else, work is done on a T&M basis where you pay for labor at an agreed-to hourly rate and you pay for parts either at list price or at the shop’s wholesale cost plus some markup.

I am not an attorney, so I couldn’t give Don legal advice. But I suggested that if he took the position “the labor you expended and the parts you replaced didn’t fix my problem, so I’m not going to pay you,” he’d be on very shaky legal ground, and the shop might be justified in holding his aircraft hostage until he paid their bill. Conceivably, the shop might even go to court to obtain a mechanic’s lien, and in the extreme might sell the aircraft to satisfy the owner’s indebtedness. I therefore urged Don to consult a maintenance-knowledgeable aviation attorney before acting on any thoughts he might have of not paying his shop’s invoice.

Ethics of misdiagnosis

Don’s ethical question was tougher: Is it ethical for a mechanic to bill an aircraft owner for parts and labor that didn’t fix the problem that the owner hired the mechanic to solve? I dodged Don’s question by posing a question of my own.

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“Don, is it unethical for your primary care physician to give you a prescription for some medication and tell you, “Try this and see if it helps”? If it doesn’t help, isn’t it likely your doc will prescribe something else on the same basis?”

This sort of thing happens in medicine all the time, and doctors are rarely accused of unethical conduct when they prescribe drugs to their patients that they hope (but are not sure) will relieve the symptoms.

“If it isn’t unethical for a doctor to do this, why should it be unethical for an aircraft mechanic?” I asked Don rhetorically.

Don wasn’t persuaded by my medical metaphor. He pointed out that the human body is incredibly complex and not fully understood, so he wasn’t prepared to fault a doctor who failed to resolve an ailment on the first try. He contended that his airplane’s Lycoming O-235 engine was simpler by many orders of magnitude, so he wasn’t inclined to cut his A&P nearly as much diagnostic slack as he was his doctor. (Not to mention that his healthcare costs are covered by insurance but his airplane care costs aren’t.)

I countered that physicians undergo extensive training in medical school on how to diagnose maladies accurately by systematically ruling out various possible causes until only one or two remain—a process called “differential diagnosis”—whereas A&Ps receive little or no such training and often rely on hunches and shotgunning (as Don’s ordeal illustrates). Furthermore, medicine includes numerous subspecialties such as radiology, pathology, and hematology that are totally focused on state-of-the-art diagnosis, but there’s no such thing as an FAA mechanic certificate with a “diagnostician” rating.

In my opinion, there should be. In fact, I made precisely this recommendation to the FAA during the 18 months I served on the aviation rulemaking advisory committee subgroup tasked by the FAA with offering guidance on revising and updating the training, testing, and certification of aviation maintenance technicians. Sadly, this recommendation never got any traction with the agency.

Handwork and headwork

Good aircraft maintenance requires a delicate balance of handwork and headwork. I find most A&Ps are quite good at the handwork part. They are typically well-trained and experienced at attacking aircraft with tools, sharp eyes, steady hands, and excellent hand-eye coordination. I often joke that A&Ps are the surgeons of aviation maintenance.

Some mechanics are also good at the headwork part, but these are a whole lot fewer and farther between, at least in my experience. How can you tell whether your A&P is one of these gems whose headwork is as strong as his handwork? It’s not difficult. Simply notice his or her initial response when you put your airplane in the shop and report that it has a problem.

A good diagnostician will gather as much diagnostic data as possible. Does your mechanic ask you to dump your engine monitor data? Or send out your oil filter contents to a lab for scanning electron microscopy? Or pull out a voltmeter or oscilloscope or borescope? Or ask to go up on a test flight with you so he can observe the symptoms firsthand?

A not-so-good diagnostician will grab for a screwdriver, a wrench, and the illustrated parts catalog for your aircraft. If you observe this reaction, you can bet that there’ll be some combination of diagnostic guesswork and exploratory surgery in your aircraft’s future. The result is almost always frustrating and expensive.

I see this a lot. Frankly, it’s what keeps my company in business. We employ some 25 veteran A&P/IAs but we don’t operate a shop, we don’t have any toolboxes, and we never actually see or touch any of our clients’ airplanes or make entries in their logbooks. We are expert diagnosticians and we work as a team to pool our best diagnostic ideas. What we offer our thousands of clients is pure, unadulterated headwork. We leave the handwork part to their regular shops and mechanics, who generally do a good job of it.

If you’d like to hear what pure unadulterated headwork sounds like, check out AOPA’s monthly podcast *Ask the A&Ps* that I host with my colleagues Paul New and Colleen Sterling. You’ll find it on Spotify, Apple Podcasts, or wherever you

prefer to get your podcasts. There's also a video version on AOPA's YouTube channel. Don't worry: Colleen, Paul, and I promise not to attack your aircraft with tools or send you an invoice.

DIY diagnosis

There are a couple of ways for aircraft owners to protect themselves against the frustration and expense of misdiagnosis. Perhaps the most effective way is diagnosing the problem yourself rather than asking your mechanic to do it—or at least taking the diagnosis as far as you can before putting your aircraft in the shop. Most owners believe that diagnosis is their mechanic's job, not theirs, but I think this is a wrongheaded view.

The key to making an accurate pinpoint diagnosis is gathering data. An aircraft owner generally is in a far better position to do this than a mechanic is. Many problems only occur in flight and can't be reproduced when the aircraft is in the maintenance hangar. If your mechanic cannot reproduce the problem, he can't be expected to diagnose it systematically and is reduced to using guesswork and shotgunning—exactly what you don't want him to do.

In addition, aircraft owners invariably know their aircraft far more intimately than their mechanics do. They know the airplane's idiosyncrasies. They know what's normal and what isn't. Frequently, they understand the airplane's systems better. All these things put them in a better position to recognize, isolate, and diagnose problems.

If you don't feel sufficiently knowledgeable to diagnose a particular problem, there's a wealth of diagnostic expertise at your fingertips. Type clubs can be an invaluable source of type-specific information. Manufacturer's product support can also be extremely helpful. And it's amazing what you can learn in a few minutes' worth of Googling.

That's why I urge aircraft owners to take primary responsibility for diagnosing their own aircraft problems, and to rely on their mechanics to fix the problem once they've diagnosed it. If you can tell your mechanic what specific repair you want him to make rather than telling him what problem you want him to

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Avoiding mechanic misdiagnosis

Now, there may be times when you have no choice but to rely on your mechanic to diagnose certain issues because you lack the time, expertise, or inclination to do it yourself. How can you protect yourself against misdiagnosis, guesswork, and shotgunning in such situations? You can do it by asking your mechanic the right questions.

Don's A&P: "Don, I've been looking into your hard starting problem, and I think we should replace your left magneto."

Don: "Oh boy. What's that going to cost?"

A&P: "\$700 for a rebuilt magneto, plus an hour and a half of labor to install and time it."

Now Don asks the threshold question: "What steps did you take to diagnose the problem as a faulty left magneto?"

If the A&P replies with something like, "I tested the coil with my digital

multimeter, and the resistance of the secondary winding measured significantly lower than what the manual calls for, indicating that the coil is shorted internally," then Don can be confident in the mechanic's diagnosis and should authorize the proposed magneto replacement.

On the other hand, if the A&P says something like, "In my experience, hard starting is almost always caused by a bad magneto," then Don knows his mechanic is relying on a hunch and guesswork, and would be wise to insist on better diagnostic evidence before approving the replacement of a costly component.

For example, Don might ask his mechanic, "What tests can we perform on the magneto to determine whether it's bad?" Or perhaps, "Could we try swapping the left and right magneto, attaching the impulse coupling to the other mag, and see if the symptoms change?"

You get the idea. ■

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