



## MIKE BUSCH

HANDS ON / SAVVY AVIATOR



The pilot loaded up the aircraft with his girlfriend and two young children and headed over water to Friday Harbor for a \$100 hamburger on the first flight after an engine teardown and installation of a new propeller.

# Return to Service

You're a test pilot—act accordingly

BY MIKE BUSCH

**A CLIENT OF MINE** had been searching for months for a Bonanza A36 to buy. He'd narrowed his search to two promising candidates. One of them had recently suffered a "forgot to remove the tow bar" prop strike. This necessitated an engine teardown inspection and prop overhaul, both paid for by insurance. The seller was appropriately upbeat in his communications with my client:

*All internal engine airworthiness directives (ADs) were completed. The starter adapter was overhauled. All new crank shaft bearings, connecting rod bearings, and some other bearings (all replaced as a normal course of teardown). Twelve new hydraulic lifters (these were found to have excessive wear and were recommended to be replaced). New three-bladed prop. Newly overhauled hub with all new hub seals. New de-ice boots. Engine completely cleaned internally (all residue and sludge deposits removed). Lots of new parts, pins, gaskets, bolts, etc. No damage of any type was found related to the tow bar incident. As I stated above this plane is in great shape and now a completely known commodity. This plane won't require a pre-buy, because more information than one could ever dream of getting in a pre-buy is already available.*

Less than a week later, my client received this downbeat follow-up from the seller:

*I wanted to let you know the Bonanza is off the market—permanently. On the test flight after the new prop, teardown, etc., the prop had an overspeed situation and the engine blew up while my partner was on the way to San Juan. No one was injured in the accident. It is kind of sad; she was such a nice aircraft!*

### ACCIDENT FLIGHT

The local newspaper carried an interesting story and some dramatic photos of the crash scene on Lopez Island just east of the intended destination of the San Juan Islands.

According to the newspaper account and the National Transportation Safety Board (NTSB) preliminary report, the 50-year-old owner of the 1996 Bonanza A36 loaded his 43-year-old girlfriend and her two young sons into the airplane and took off from Paine Field in Everett, Washington, for the 30-minute-over-water flight to Friday Harbor.

The Bonanza overflew Whidbey Island Naval Air Station airspace at 5,000 feet and began to descend over water as the craft headed toward the San Juan Islands. Shortly thereafter, the pilot observed rpm increasing. He pulled back the prop control, but

rpm continued to rise. He then throttled back in an attempt to control the propeller overspeed, but he heard a loud bang from the engine followed by smoke in the cockpit and loss of engine power.

The pilot was now over Lopez Island and attempted to reach a small airstrip but quickly determined he wouldn't make it. He initiated a forced landing on a nearby road, had to pull up at the last minute to avoid a vehicle, then landed on the road. The left wing struck a wooden fence post, resulting in substantial structural damage and twisting and buckling of the empennage.

The pilot and passengers were treated for scrapes and bruises by the Lopez Island Fire Department. The sheriff was quoted by the newspaper as saying, "The aircraft's fortunate landing was due in great part to the pilot's composure and skill."

**WHAT WAS THE PILOT THINKING?**

What possessed this pilot to conduct his initial post-maintenance test flight (immediately following an extensive engine teardown and propeller overhaul) on an overwater flight with a cabin full of passengers, including children? Could he possibly have been oblivious to the extremely high risk associated with such a flight?

Unfortunately, the FARs aren't particularly helpful:

*§ 91.407(b) No person may carry any person (other than crewmembers) in an aircraft that has been maintained, rebuilt, or altered in a manner that may have appreciably changed its flight characteristics or substantially affected its operation in flight until an appropriately rated pilot with at least a private pilot certificate flies the aircraft, makes an operational check of the maintenance performed or alteration made, and logs the flight in the aircraft records.*

This regulation requires a post-maintenance test flight to be made (without passengers) and logged after any maintenance to the aircraft "that may have appreciably changed its flight characteristics or



The pilot and his three passengers walked away with only scrapes and bruises, but the Bonanza was a total loss.



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**MIKE BUSCH**



*The Mooney owner elected to fly 160 nautical miles from the Bahamas to Florida with an engine producing only 50 percent power, an uncontrollable propeller, and a landing gear that wouldn't fully retract. Amazingly, he made it.*

substantially affected its operation in flight.” But the reg leaves quite a bit to the imagination. Exactly what kind of maintenance meets this definition? Who makes the call whether or not a post-maintenance test flight is required? The regulation doesn't say.

In a perfect world, a conscientious mechanic would have counseled the owner to perform a test flight without passengers and near the airport, but that didn't happen. Or if it did, the mechanic's advice was ignored. I can find nothing in the FARs to suggest that the mechanic had any regulatory obligation to offer such counsel. Because §91.407(b) is located in Part 91 Subpart E (which speaks to owners) rather than in Part 43 (which speaks to mechanics), it's pretty clear that the FAA looks to the owner, not the mechanic, to make the call.

Certain kinds of maintenance—horsepower increase, speed modification, STOL (short takeoff) and landing kit, etc.—obviously require a post-maintenance test flight, since these alterations are specifically intended to “appreciably change flight characteristics.” But what about an engine teardown or prop overhaul? Could these be expected to “appreciably change flight characteristics” or “substantially affect the aircraft's operation in flight”? In our real world, mechanics and technicians make mistakes! As I've discussed in previous columns, NTSB data clearly demonstrates the risk of a catastrophic engine failure on the first flight after a teardown or overhaul or rebuild is alarmingly high. More generally, the first flight after

maintenance is by far the most likely time for an equipment failure that can compromise safety.

In my view, a test flight should be made every time an aircraft is returned to service after maintenance. The test flight should be made without passengers, under daytime visual flight rules, and conducted in a safe environment in close proximity to an airport in case something goes wrong. The FARs don't require this, but it's common sense.

**NOT AN ISOLATED CASE**

Two days after I learned about the A36 crash, I received a phone call from the owner of a 1966 Mooney M20C who wanted to put his aircraft under professional maintenance management with my company. “I feel compelled to warn you,” he told me, “that this aircraft hasn't flown for two years.” He then proceeded to tell me the backstory.

It seems that the owner had flown his aircraft to Nassau, Bahamas, and while there he suffered a prop strike involving an object at the airport. His aircraft went into the shop at Nassau, he contacted his insurance agent, and ultimately the underwriter issued the shop a check for \$25,000 to pay for the engine teardown, prop replacement, and minor airframe repairs.

Unfortunately, receipt of this advance payment relieved the shop of any real incentive to get the Mooney repaired quickly. Much to the owner's frustration, things progressed at a glacial pace. The shop ultimately shipped the engine to Florida for teardown, ordered a

replacement prop, performed some airframe repairs, reinstalled the engine, and installed the prop. By the time the aircraft was approved for return to service, a full year had elapsed.

The owner took an airline flight to Nassau, hopped into his Mooney, and launched overwater for the 160-nautical-mile flight to Fort Lauderdale, Florida. Within minutes, the owner discovered that his fuel pressure gauge was reading far below normal, his engine was unable to produce more than about 50 percent power, the propeller pitch was uncontrollable, and the landing gear wouldn't fully retract. Despite all these discrepancies, the owner was apparently so desperate to get his airplane back to the U.S. mainland that he continued the flight over the high seas and miraculously managed to make it to Fort Lauderdale, where the Mooney remained in a repair facility for the better part of another year while the multiple discrepancies were troubleshot and resolved. The Florida phase of this ordeal involved a second engine teardown; replacement of the prop governor, carburetor, fuel pump, fuel selector valve; and extensive airframe repairs.

When my firm finally took over maintenance management responsibility for this aircraft, we called the director of maintenance of the shop in Fort Lauderdale to inquire about the condition of the aircraft. He said, "Let me put it this way: I'm sure glad he didn't fly over my house!" The director made it clear that after inspecting the Mooney, he found it quite astonishing that the owner/pilot managed to make it from Nassau to Fort Lauderdale without winding up in the ocean.

Not long ago, I received an e-mail from another client, a brilliant engineer and owner of a Cirrus SR22. My firm just finished managing his annual inspection, and he was making arrangements to pick up the airplane from a Cirrus-authorized service center in Southern California. He'd mentioned that he needed to pick up the airplane Friday, because on Monday he was leaving on a three-week transcontinental trip. His e-mail:

"Should I ask the mechanic to fly with me around the pattern for an in-flight test? I have never done this; mostly I just preflight the plane and then fly away. What are your thoughts?"

What advice do you suppose I offered him? *EA*

**Mike Busch**, EAA 740170, has been a pilot for more than 44 years, logging more than 7,000 hours. He's a certificated flight instructor and an airframe and powerplant mechanic with inspection authorization. E-mail questions to Mike at [mike.busch@savvyaviator.com](mailto:mike.busch@savvyaviator.com). Mike also hosts free maintenance webinars on the first Wednesday of each month at 8 p.m. (Central). To sign up or access the archives, visit [www.SavvyMX.com/Webinar](http://www.SavvyMX.com/Webinar).




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