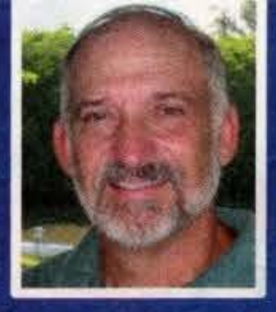

ROBERT N. ROSSIER
COMMENTARY / STICK AND RUDDER

Double Trouble

Recurrent training in a light twin

BY ROBERT N. ROSSIER

ONE OF THE MOST frequently practiced emergency procedures in powered aircraft is the engine-out procedure. It is something that's drilled into us from early in our initial training through every phase of aviation and every type of airplane. When an engine loses power, it typically takes us by surprise. Unless we've been practicing the procedure, our performance is likely to be less than stellar.

Naturally, we tend to react quickly at the first sign of engine trouble. On one of my more recent training flights in a light twin, I made the mistake after a simulated engine failure of too quickly deciding to turn toward the airport where I assumed I would make a single-engine approach and landing. My instructor (and chief pilot) quickly straightened me out and pointed out that I needed to keep the aircraft flying straight until I had positively identified the dead engine and completed the emergency checklist. It was a rookie mistake — one that could land a pilot in a disastrous situation. That is exactly why we need recurrent training.

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A popular myth is that an aircraft with two engines is somehow safer than a single-engine aircraft. After all, if that engine quits in a single, the only place to go is down. One might think that adding a second engine to the mix would relieve some of the concerns regarding an engine failure. And while the second engine may provide additional options, it also requires mastery of some complicated aerodynamics and procedures. The loss of one engine might mean a 50 percent loss of power, but that typically translates to an 80 to 90 percent loss in climb capability. In fact, in many conditions, that second engine is not enough to maintain altitude, and merely extends the glide. And when we do finally touch down — wherever that might be — we're likely doing so at a higher speed than in a single-engine airplane.

Single-engine performance for a light twin is extremely sensitive to loading. Of when we lose an engine, survival depend our ability to extract a hair's width of per mance. Especially for a heavily loaded aircraft, even a slight variance from the proper airspeed, bank angle, or coordinat can mean the difference between maintai ing altitude or sinking into the trees and terrain. As the old saying goes, "The seco engine is there to get you to the crash site

The first thing we do in a loss of powe emergency is establish the source of the problem — that is, we identify which engi is not performing. It would seem like a si ple matter, but often pilots identify the wrong engine and then proceed to paint themselves into a deadly corner. At lower power settings, or in a bank, we might no realize which engine is having a problem. before we do anything rash, we follow a well-rehearsed procedure. We bring mix ture, props, and throttles to the full powe position. We retract the landing gear and flaps to minimize drag and give ourselves fighting chance to stay airborne. We turn the fuel boost pumps to ensure the engine are receiving fuel.

In straight and level cruise flight, our first clue that we have lost an engine is y the aircraft initially yaws into the dead engine, and our trained response is to immediately apply opposite rudder. The

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saying "dead foot, dead engine" comes into play. But there are other indications that we use to confirm the problem, including exhaust gas temperature and cylinder head temperature. Both will drop rather precipitously when an engine loses power, and that gives us a second opinion on our diagnosis.

Once we're certain which engine is no longer developing power, we can feather the prop and secure that engine, turning off the mags, generator, fuel pump, and fuel supply. Now the problem is one of getting safely to a suitable landing site.

engine. In most light twins, to compensate for this wildly asymmetric thrust, we want to raise the dead engine roughly 5 degrees, and then fly with the ball out of center by about a quarter ball's width.

By this time, we should have begun navigating toward salvation, which in VFR could be in the form of a nearby airport, or perhaps a field. If we're flying in IMC, we'll be navigating to and setting up for an instrument approach. In either case, we'll be praying we can maintain altitude, which means keeping a sharp eye on our attitude and airspeed.

In straight and level cruise flight, our first clue that we have lost an engine is yaw; the aircraft initially yaws into the dead engine.

The pilot of any aircraft that has been stricken with a mechanical issue that impairs power needs to take steps to get every aerodynamic edge available. In a single-engine aircraft, we want to be at our best glide speed, which varies to a degree with the aircraft weight. We know to maintain coordination — recognizing that a slip or skid adds drag and robs us of precious altitude — and we know to avoid turns that are too steep or too shallow. Shallow turns can mean we lose too much altitude due to the time it takes to complete a turn. Turning at too steep a bank means an excessive loss of lift, and thus a rapid loss of altitude.

For a light twin, the equation is a bit different. Maintaining the proper airspeed is still critical, but the aerodynamics call for something other than level wings and ball centered. The issue is the fact that we have asymmetric thrust with only one engine operating at full power. Not only is the thrust delivered off the centerline of the airframe, but due to the angle between the relative wind and the rotating propeller, the thrust is off centerline from the engine. This off-centerline thrust creates significant yaw. In addition, we must deal with the significantly greater lift for the wing that holds the operating engine. The net effect is that the aircraft tends to turn and roll toward the side with the "dead"

Once we've arrived in the pattern, we typically want to fly as normal an approach as we can, because that's what we are familiar with. Unusually steep approaches, or turns at low altitude, often don't go as smoothly as we would hope. Steep turns, especially toward the dead engine, put us in an aerodynamically deadly situation, especially if we're too slow. Until we're lined up and ready to touch down, the primary focus must be airspeed, airspeed, and airspeed.

I learned a valuable lesson that day during my training. It was a reminder that no matter how much experience we have, it is essential to maintain a routine cadence of recurrent training. And it's a lesson that applies no matter what type of aircraft we fly. For every aircraft, there are memory items, procedures, and important decision-making steps that are critical to safely resolving an emergency or abnormal situation. And the sad truth is that those skills we hone to a fine edge may dull more quickly than we would like to admit. The only way we can keep them sharp is to practice them on a regular basis. *EAA*

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