



**JEFF SKILES**

COMMENTARY / CONTRAILS

# Radial Engines

Round engine reflection

BY JEFF SKILES

**I WAS RECENTLY CONTACTED** by a reader of this column asking me for a piece of advice. Advice is tough for me; I generally don't consider myself to be an authority on much of anything. In fact, I would caution anyone to take what I might say with a rather large grain of salt. Still, I try to be helpful and to encourage fellow aviators as much as I can.

The reader was considering buying a T-6 Texan. A lovely airplane with a proven engine and loyal fan base. But, he was hesitating in part because of a statement attributed to me he had read in Dave Matheny's column a year or so ago. Apparently I had proclaimed that I would never own a radial engine airplane again! Such a definitive statement no doubt delivered with extravagant hyperbole does sound like the sort of thing I might say, but it may only prove that I need to choose my words more wisely.

## THE JAKE

I like radials, I just didn't like the one I owned very much. Radial engines are perfectly reliable and are no more expensive to own than a horizontally opposed engine, but radials can be messy, particularly Jacobs radials like mine. You don't just push a Jake into the hangar and close the door at the end of a flight. They're like owning a horse. They eat before you eat.

## GRAVITY

Every flight behind a radial, at least my radial, will culminate with a wipe down of the airplane while the oil is still hot, before it congeals. Much like with kitchen cleanup, speed is a virtue. After a quick rubdown, I carefully array my collection of drip trays underneath the offending brute and hook up the clean kit to drain away what oil might still be left in the sump attempting to work its way past the rings into the bottom cylinders.

Gravity is a powerful force of nature with radials, and the oil wants to make its way back to earth. Unfortunately, the low points of a radial engine are the combustion chambers of the bottom cylinders. The whole idea behind a cylinder is to compress a fuel-air mixture and then ignite it. Unlike air, however, oil is not compressible. When oil gets into the cylinder it displaces space for air and can cause damage to the engine on start. For this reason, before starting up the airplane, radial owners rotate the engine through manually to check for a potential hydraulic lock. This is evidenced by either resistance in rotating the propeller or a reverberating "glug, glug"



sound emanating from deep within the engine as oil is sucked from the intake tube into the cylinder. When you detect hydraulic lock, everything must stop until that oil can be drained. It doesn't matter how much you were looking forward to that EAA chapter pancake breakfast; you're dead in the water.

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#### BLACK GOLD, TEXAS TEA

My Jake didn't have an oil filter, only an oil screen to capture the larger parts of the engine that might potentially let loose. Because of this, the oil must be changed at half the normal interval, every 25 hours of operation. The new oil doesn't stay clear and amber for long either. It will turn black as midnight within just a couple hours of flight as it does its job and collects all the detritus generated by engine operation.

Phillips 66 makes a special, thicker multigrade oil designed specifically for radial engines, Phillips X/C 25W-60. I guess thicker means that it won't leak out as fast. Note: I said, "as fast," not "at all." My Jake still seemed to leak with determined proclivity.

The Jake on my Waco burned about a quart an hour — not horrible at all by radial engine standards. Still, at annual time, I would relentlessly try to track down every leak, but there are just so many areas to leak from.

You might be concerned with such outsized oil usage that on a longer flight you could simply run out, but radials carry excess capacity to accommodate for all the oil that might leak or burn in-flight. A full oil change may hazard exposure to carpal tunnel whilst filling up the 5-gallon oil tank with those little quart bottles. Not to worry though, they sell radial oil in gallon and even 2-1/2-gallon jugs for heavy-users. The B-29 *FIFI I* occasionally fly for the Commemorative Air Force has a 90-gallon oil tank — per engine!

#### CYLINDER HEAD BOLTS

Oil usage is not the only maintenance concern with a radial engine. On a Jake, the cylinder head nuts must be retorqued every 100 hours — a real hassle since it seems like you must practically disassemble the engine to do it. The components of the engine case are made from dissimilar metals, and the differing expansion and contraction from heat can cause the nuts to lose their torque. They make a special wrench to accomplish this laborious task, but getting access to the nuts with the engine baffling around the cylinders and the oil cooler location is a huge challenge.

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**HOUSEKEEPING**

Owning a radial can make you an expert in the use of grease-cutting cleaning supplies. Many varieties of citrus cleaners will be arrayed on your shelves, along with kitty litter to soak up what escapes your carefully crafted oil containment strategy.

The oil disbursement pattern on your hangar floor can be maddening. Oil will inexplicably puddle as far as 3 feet away from any potential drip source. It defies the laws of physics. The inside of my hangar must be some sort of alternative universe worthy of study by Einstein.

**WARDROBE SELECTION**

When you become the owner of a radial-engine airplane, your wardrobe will change dramatically. Forget Tommy Bahama — most of your purchases will skew toward grays and black. Better to hide the oil stains that will inevitably appear.

Any new clothing you purchase will be evaluated for its fabric's absorption capability.

Natural fibers are good; polyester, bad. The life cycle of any shirt will inevitably end with it serving as a hangar rag soaked with oil. You may as well recognize that at the outset.

**I LOVE RADIALS**

Having said all that, I am sure I will succumb to the lure of a radial again. I sold my cabin Waco a few years back and replaced it with a thoroughly modern, at least by airplane standards, 1968 Cessna. I'm currently telling people that I like my 185 because it stores its oil on the inside and not on the outside. But, the Skywagon is only a gap airplane in my life, a short-term respite from the travails of radial ownership.

My all-time favorite airplane is the Skywagon's big brother, the Cessna 195. In a year or two, or five, I'll sell the 185 and buy a 195 as the final airplane I own in this life. I will try to find as clean and tight an example as I can, all the while knowing in the back of my mind that clean is impossible. I will buy that extra-thick radial oil under

the misconception that it won't drain out as quickly. Conversations with other 195 owners will quickly turn toward oil and oil collection. And I'll be thoroughly happy wiping down my art-deco classic and enjoying the sound of that radial rumble.

**MEMBER OF THE FAMILY**

Owning a radial engine airplane isn't like parking a new Tesla in the driveway; it's like adding a member of the family. Quirky, stubborn, and eccentric, but you love them all the same. So, what was my advice to that reader who contacted me about his potential purchase? I'm an enabler. Buy that T-6 and give me a ride! Everybody should own a radial at least once in their lifetime. *EAA*

*Editor's Note:* For more on the care and feeding of big, round engines, see Lisa Turner's "Keep Your Radial Engine Airworthy" column in the June issue of *EAA Sport Aviation*.

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