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Motor Head #5: Is Franklin Gone For Good?

It isn't always true that the 'best' products are the ones that succeed. Franklin engines are still loved by many, but it looks like there won't be any new ones. AVweb's Motor Head, Marc Cook, looks at what we'll miss with the loss of Franklin, checks out Japanese manufacturing and brings news on the rotary front.

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Motor Head

Natural selection weeds out the weak and encourages proliferation of the strong. It works in nature but I'm not so sure it hasn't been subverted elsewhere. Specifically, I'm talking about Franklin engines, a once-upon-a-time contender in general aviation that is, for the time being, out of business.

The short version is this: United Technologies -- Pratt & Whitney's parent company -- purchased Polish company PZL, which has been a subcontractor for Pratt & Whitney Canada. PZL owned the rights to the Franklin line since 1975, and had been happily producing mildly updated versions of the Franklin engines since. P&W doesn't much care about piston engines and so shut down the old Franklin line. What had been a trickle of new engines into the U.S. has dried up to nothing. Not that this is particularly news -- it happened in 2002 -- but the rumor mill was producing content up to the roofline describing savvy benefactors and/or engine-parts manufacturers interested in buying the rights and tooling to at least some of the engines and returning them to production. With every month that passes since the shutdown, the likelihood of Franklin rising, Phoenix-like, pares itself down to zero.

Should we mourn the passing of a great old marque or just get on with our lives and order up that Lycoming we've been saving for?

Depends on whom you talk to, of course. "This is a shame," says Gregg Horrell, owner of Ryan Aero Service in Tucson, Ariz. Horrell had installed five Franklin engines into older Cessnas under an STC. "The 220 Franklin is a great engine. It's very smooth and not prone to leaks. I would put the design easily on par with Continental and Lycoming," he says.

That's some praise for an engine family that started life before World War II. The firm originated as H. H. Franklin Manufacturing in 1893, builders of automobiles with air-cooled engines from 1902 to 1934. The company was known for its advanced engineering and consistent philosophy of reducing weight and complexity wherever possible. (All good engineers think that way, of course, but some are more successful than others in convincing the accountants that those expensive materials and extra

hours at the drafting table are worth it.)

Franklin didn't survive the Depression, but two of its engineers, Carl Doman and Ed Marks, who had split off from Franklin in 1933, purchased the assets out of bankruptcy and formed Air Cooled Motors Development Co., retaining the Franklin name for marketing purposes. The company, based in Syracuse, N.Y., vigorously developed engines for auto and aircraft applications. By 1945, it had created and received type certificates for 18 different models, ranging from a 45-horsepower opposed-four-cylinder engine up to an 805-cubic-inch, 500-hp, 12-cylinder engine to be used in something called an XBQ-5 Controllable Bomb. From what I can gather, this was to be a radio-controlled twin packing a bellyful of explosives. The program was canceled before the aircraft could be built.

(Incidentally, my deepest gratitude goes to Jack Erickson for his fabulous Web site chronicling horizontally opposed aero engines. Bring a fresh cup of coffee before you sit down in front of this resource. I promise even the hardest-core engine nuts will learn something from this site.)

Having not a lot of rotorcraft experience, I was until recently ignorant to the fact that the Franklin engine was used beyond the odd Republic Seabee and Stinson Voyager. Indeed, various Franklins were used in quite a few helicopters. By some sources, it was the dominant engine for helos before turbines took over. In any event, Republic had big plans for its Seabee and, presumably, enough cash to relieve Dorman and Marks of Air Cooled Motors. The engine company was absorbed into Republic but kept the Franklin name.

Then came Preston Tucker. Perhaps you saw Francis Ford Coppola's 1988 neo-biographical flick "Tucker The Man and His Dream." Tucker enthusiasts pick apart the film for its historical inaccuracies and skewed portrayal of the man and his difficulties producing "the car of tomorrow," but overall it's a compelling story and the car's history is important to us here. Tucker noticed that there were a lot of surplus helicopter engines around after the war and figured that he could save a bundle by refurbishing them for this car, rather than start down the no-doubt ruinously expensive path of creating his own powerplant. The engine was the Franklin.

Appreciating that the lightweight helicopter engine would help him keep the weight of the car in check -- thereby improving performance and fuel economy, a rare but prescient consideration in the mid 1940s -- Tucker worked to convert the engine for auto use. Specifically, as far as I can tell, it was the 6V4-178, the 335-cubic-inch six-cylinder that was similar to the engine used in the Stinson 108 series. Tucker adapted liquid cooling to the engine and proclaimed 166 horsepower with peak torque of 372 foot-pounds. It sat above the rear wheels and worked through a rebuilt Cord transmission.

In many respects, the engine compares favorably with the popular auto engines of the day. For example, the large-displacement Ford flathead of 337 cubic inches that was

used in Lincolns and Ford trucks of the time produced 152 horsepower and 265 foot-pounds of torque. But it weighed approximately 800 pounds!

Tucker eventually purchased the engine line from Republic, although apparently no aero development took place as the company struggled to build the car; only 51 were in fact built, with 47 surviving, according to the Tucker Automobile Club of America. They sell for up to half a million dollars today.

Tucker sold the Franklin line in the early 1960s to Aero Industries, which in turn developed several new engines on the familiar architecture. By 1975, the company was sold again to PZL. There's lots more story in there, but the upshot is that despite all the moving around, Franklin's engineers managed to improve existing designs and develop new models. When the line went dark in 2002, there were two engines still in production, a 350-cubic-inch six and a 235-cubic-inch four.

The six-cylinder engine is what was developing so much interest. STCs were available to put the engine into the Stinsons, as well as the Cessna 170, 172 and 175. Considering that the 220-hp engine was replacing everything from the Continental O-145/O-300 of 145 hp and the GO-300 of 175 hp to the 6A4-335 Franklin of 150 or 160 hp, this kind of modification could be expected to return a big performance increase. "I'd say a lightly loaded Cessna 170 would be off the ground in 150 feet," says Horrell. "And it'll climb at a sustained 1000 fpm." Franklin Aircraft Engines, the U.S. distributor, had also developed (or was in the process of developing) firewall-forward kits for Experimental aircraft, including the Van's RV-8.

Why would anyone want to take a chance on the Franklin when more popular options were available? One might be efficiency. The 220-hp engine has a 10.5:1 compression ratio, which would give it a significant leg up in combustion efficiency assuming that detonation could be controlled. (And I have no data to prove that it was or was not.)

I'm told the 220-hp engine also ran cool. "In fact, we had more trouble getting it up to temperature," says Horrell. "With the Cessna 170, we often had to cover up part of the oil cooler to get the temps up." I've always been slightly amazed at the cylinder finning on the Franklin, which seems to be greater overall than typical aero engines, even if much of it is concentrated in the naturally cooler-running barrels. A cooler engine has an inherently wider detonation margin. I see, also, that the maximum recommended cylinder-head temperature is a modest 392 degrees; not the typical 460 500 degrees listed for Continental and Lycoming engines. Surely that's where some of the detonation margin comes from, promptly spent running the ignition timing to 28 32 degrees; a normal Lycontinental is 20 24 degrees.

There are other aspects of the design that may seem old fashioned but make a lot of sense to me. The simple cover over the crankcase spine sure makes checking the bottom end a breeze. (Although I have to wonder how much case rigidity it gives up for the privilege.) The cam is beneath the crank, which seems to be where it ought to be as long as you can keep the pushrod seals from leaking. The induction system is a

log-and-runner style. I know it seems old school to those of you peeking under the hood of your Acura or Audi, but it works extremely well. The guys at General Aviation Modifications Incorporated (GAMI) have told me that it's easier to balance the Continental-style system with individual logs and runners than the plenum style used by most Lycomings and the top-down Continentals. There may be interactions among the cylinders, but they're wonderfully predictable. "The devil you know ..." you know.

Franklins are said to be quite smooth, a characteristic attributed to the fluid damper on the end of the crank opposite the prop flange. My experience with the Franklin is limited to several flights in various Stinson 108s, in which I was impressed by the engine's smoothness -- for once, the facts join hands with the reputation -- and performance. I never did get a chance to do formal evaluations of performance and fuel consumption, but it's unlikely that the Stinson's 6A4-335's efficiency is much different than, say, a Lycoming O-320's.

And that's with the low-compression 335-inch engine. The 220-hp version, at 395 pounds dry, compares favorably even with Lycoming's new IO-390 Experimental-class engine, which uses more displacement to make slightly less power. True, the Franklin makes max power at 2800 rpm compared to the Lycoming's 2700, but its shorter stroke (3.5 inches to the IO-390's 4.375) means that it's actually subjecting the engine to lower piston speeds.

The final deal was just that: a deal. Were the engines reasonably priced? "No," says Horrell, pausing. "They were cheap. We could get them for $17,000 outright. That's a real deal for an engine with excellent workmanship and durability. I can't tell you what they're like inside because I've never had to open one up."

So, until we hear otherwise, rest in peace, Franklin. We hardly knew you.