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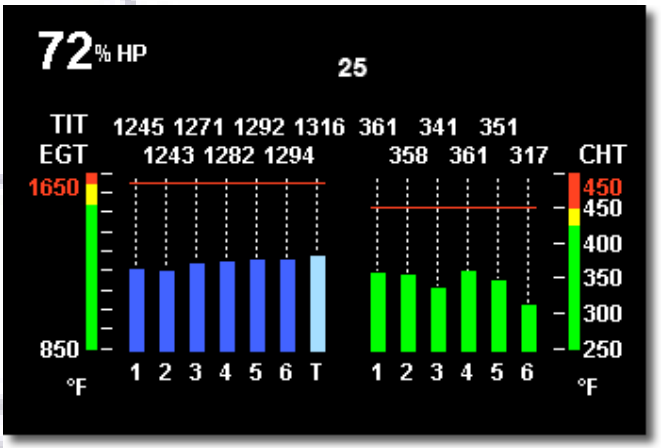
NOVEMBER 2007 NEWSLETTER

It's All About The Temperature



Many of us were initially trained how to fly by the elderly semi-retired gentlemen at the local flying school or Aero
Club, These great men (or women) would share great stories about their exploits the old De Havilland Tiger Moth and other legendary aircraft from days gone by, and if you were really lucky your instructor would fall asleep during your navigation exercises, like mine did, giving you increased confidence in your navigational skills.

All excellent experiences and your instructor passed on as much as he/she knew at the time, but times change, and engineering improvements have changed dramatically since the Tiger Moth days of engine operation, but is our training keeping up to the advances in new technologies?
This is Columbia's (Now owned by Cessna's) claim, come and do the training and learn how to get the most out of your new aircraft.

One of the items that the nice old instructor insisted on adherence to was rich-of-peak settings for that aircraft. There was a lot of emphasis placed on this procedure. And for each manufacturer there's a set temperature that you are told is the best rich of peak figure. (Make sure you consult your own operations manual for your aircraft type for these details).

So when someone tells you to run the engine lean of peak, you are bound to be sceptical and reluctant, it goes against everything you've ever been taught.

Recently Australian Air Ferry travelled to Portland, hired a car and drove down to Bend in Oregon to take delivery of a brand new Columbia 350 aircraft from the factory. The new aircraft was to be flown into Brisbane and then moved up to Cairns, where its new owner awaited.
Columbia were insisting that I do the four day factory coarse to learn how to fly their aircraft, now none of us are beyond learning something new, but the four days down time was hard to justify. There was no budging Colombia though, so we travelled to Bend earlier than required ready to commence classroom sessions Monday morning.

One of the issues covered by the coarse was running the engine lean of peak, and it all makes sense provided you have the appropriate equipment to do so, it's all about knowing exactly what's going on inside your engine, within every cylinder simultaneously.

Piston engine aircraft have moving parts that are continually exposed to high temperatures. There are parts within the engine that do not receive adequate lubrication and therefore rely on metals operating at extremely close tolerances and at extremely high temperatures, all of which is a testament to the modern engineering techniques that have evolved with the engines. The latest TCM engine is worlds apart when compared to the old Gypsy Major Engine in the Tiger Moth.

Arguably the most important temperature within your engine is the cylinder head temperature (CHT). Engineering evidence would show that engines operating over 400 degrees Celsius on a regular basis will show up to five times as much wear metal in the oil analysis. When compared to an engine that is consistently limited to 350 degrees Celsius or less.

Despite the importance of this temperature, many manufacturers have not provided a CHT instrument as standard equipment, leaving the pilot to operate the aircraft, based on what you don't know won't hurt you.

To really know what's going on inside your engine you need a modern, multi-probe, engine analyser, with a digital readout. These instruments are not cheap, but if it extends the TBO on your engine or saves you cooking a couple of cylinders it's more than paid for itself.

TELEDYNE CONTINENTAL MOTORS
A Teledyne Technologies Company
www.tcmlink.com

TCM service instructions SID97-3C contains a lengthy table that specifies full-power fuel flow as a range (minimum and maximum). The fine print SID97-3C instructs mechanics to adjust the full-power fuel flow to the high end of the specified range, but many mechanics miss the subtly and adjust it to the middle range. Experience shows that this is simply not enough fuel flow to keep the CHT cool during hot-weather takeoffs.

Many manufacturers talk about operating the engine at three alternate mixture settings, "best power," (-125 degress F, rich-of-peak) "recommended lean mixture" (-50 degrees F rich-of-peak), and "best economy mixture"(-{something) degrees F lean-of-peak). This is the one that would send a shiver up old Charlie's spine, or cause him to roll over in his grave.

Most pilots would operate the engine somewhere between best-power and recommended lean mixture.

When considering the CHT, "recommended lean mixture", it's just about the worst possible place for keeping CHT temperatures low. If you look at an engine graph you'll see that CHT reaches maximums very close to 50 degrees F ROP. So if you operate recommended lean mixture, and you want to keep CHT down, you operate low power settings, 60% or less. In other words you're babying the engine.

The other alternative is to operate very rich, and yes you'll keep the CHT temperatures down, but you'll have to pour in lots of 100LL.

In addition to the extra running cost, a very rich engine mixture results in dirty combustion with lots of unburned by products in the exhaust gases. Do it long enough and you could end up with stuck rings, stuck valves, worn valve guides, and fouled plugs.

Operating Lean OF Peak

The third way to keep CHT's low is to lean even more aggressively and operate the engine lean of peak. Using these very lean mixtures you can go fast, stay cool and obtain outstanding fuel economy.

The only down side to LOP, is that the engine has uneven mixture distribution amongst the cylinders, it will usually run unacceptably rough at LOP mixture settings.

Uneven mixture distribution can usually be overcome by "tuning" the fuel injector nozzles to eliminate the mixture imbalances. GAMInjectors and tuned nozzles that are now STC'd for the majority of fuel injected Continentals and Lycomings. TCM now offer its own version of tuned injectors on some of its premium engines.

Whatever your strategy, the important thing is to keep a close eye on your CHT's and ensure that they remain cool. The best way to do this is to install a multi-probe digital engine monitor and program its CHT alarm to go off at 390 degrees F or 400 degrees F.

If it goes of during take-off or initial-climb, you'll need to get your mechanic to check and adjust the fuel flow for full power. If it goes of during cruise you'll need to re-lean or/and reset an acceptable power setting.

If you don't have a multi-probe, digital, engine monitor, its installation will undoubtedly save you money in reduced mechanical repairs, especially if the engine reaches TBO.

All this information was acquired from Columbia during the coarse, and it is not the ramblings of the writer.

From personal experience we do not operate "Lean of Peak", during the ferry of brand new aircraft to Australia. Because the manufacturer recommends the first 50 hours of engine life be completed at very high power settings, and they recommend not using LOP for the running in period.

After the first 50 hours is completed, we may run LOP provided the engine is manufactured to do so, and provided the CHT and EGT indications are all working and within normal engine operation parameters, as per the manufacturers published procedures.

It's important to have the right equipment, if your aircraft is fitted with one EGT probe only, and it is reading on one gauge. Most probably that cylinder was chosen by the manufacturer as the hottest at the time of testing, and so the probe was fitted to that one cylinder. If you try and run LOP with this engine, you'll find that it is a different cylinder that peaks last when moving through peak to find LOP. Also if you do not have CHT readings from each cylinder simultaneously, you'll risk damaging the engine, because you may be exceeding the maximum recommended temperatures on one or more cylinders.

If you have the latest engine from TCM, and it is equipped with all the necessary equipment to run LOP, then when you do so, the CHT's run cooler, the oil temperature reduces significantly and the fuel flow per mile travelled is amazingly low.

I believe that this is the future for piston engines in aircraft, the majority of new engines will be able to run LOP, you'll see higher times before overhaul and less rebuilds early, if the owners are using LOP correctly.

Don't try LOP unless you have an engine designed and built to do it, or it has been modified to do so properly, it is not suitable for older engines without the tuned injectors and engine monitoring systems.

Columbia Comes Down Under

After completing the course we headed for southern California, the new Columbia has a climate controlled cabin. You get in turn on the engine and inflate the seals around the door, turn the climate control system on and forget it. Yes the Columbia does not require you to turn of your climate control for take-off or landing. It will heat if necessary or air condition if appropriate, Technology we take for granted in most new cars !

Actually the Columbia redundancy is amazing, there are two separate alternators, so you can loose either one, tie the system together and you've nearly lost nothing at all, only a few lights or insignificant equipment. This is one of the reasons why you do not need to turn of your climate control during take-off and landing, there' enough electrical power to run it easily without additional drain on the engines horsepower.

The Columbia 400 has three separate alternators; it has the third to run the climate control only.

Columbia 350 fuel capacity is 98 gallons useable, and at 12 gallons an hour, it means you can go a long way between (FBO's) bowsers.

This aircraft has been fitted with special high desert Columbia seats, which are very comfortable. And of coarse the Garmin 1000 glass-cockpit is nice as well. Interestingly every time you go to get a new aircraft that has been fitted with the G1000, you find they've made some additions. Either they make additions or I'm still finding new stuff, which is also entirely possible.

It's early in the morning and the Columbia accelerates quickly to take-off speed and leaps into the air, this is our first take-off with full ferry fuel and it handles it with surprising ease. As we climb out over the water leaving the sleepy California coast behind us we engage the autopilot using the set speed feature. So now the aircraft will climb at the set speed up to and intercept the pre-set cruising altitude. Even passing through 2,000ft it is maintaining a healthy 1,000ft/min climb, fully loaded.

The day was uneventful, the Columbia seemed to like the idea of living in Australia and it was eager to get there.

After 13 hours airborne the wheels rolled onto the runway in Hawaii, we'd managed to average 161 knots throughout the entire trip. This leg was done without using LOP, we've still not got 50 hours on the clock, but a mid power setting using ROP meant we averaged 15 gallons/hour throughout the trip, which is again impressive when compared to like aircraft.

As far as fatigue was concerned I felt a lot better than I normally do after 13 hours of flying, and I put that down to the climate control package, it is very effective and I normally do not use air-conditioning for long over water ferries to conserve fuel. Because nothing was increased when this unit was activated there didn't seem to be any reason to turn it of.

The noise levels are also reduced when compared to other like aircraft, and I put this down to the vacuum air sealed door, and its very effective thick firewall.

Every morning we managed to get airborne early and make good time towards home. The aircraft proved to be ultra reliable and best of all, very comfortable to fly.

The side-mounted control stick feels very natural after a few hours and the Columbia 350 is a pleasure to fly.

This is the last Columbia I'll get to ferry, because Cessna has purchased Columbia Aircraft and as such the aircraft will be called the Cessna 350 and 400 from now on.

Cessna Acquires Columbia

In a move to further broaden its single engine product portfolio, Textron Inc.'s (NYSE: TXT) Cessna Aircraft Company announced it was the successful bidder for select assets of Columbia Aircraft Manufacturing Company, a Bend, Oregon-based producer of high-performance, single-engine aircraft. The bid of $26.4 million was the high bid in United States Bankruptcy Court for the District of Oregon.

This is a significant day as it brings together two top aircraft design and production companies to offer the global general aviation community the widest range of propeller aircraft, along with world-class product support, all under the Cessna brand.

Cessna is the world's largest general aviation manufacturer in terms of annual unit sales, producing single-engine piston aircraft, turboprops and the world's best-selling line of business jets, the Cessna Citation. Columbia has produced more than 600 aircraft in its 10-year history.

Once the transaction is completed, which is expected to occur by December 4, 2007, the Bend operation will take on the Cessna name and be one of six Cessna manufacturing facilities. Cessna intends to rename the current Columbia product line to become the Cessna 350 and the Cessna 400. Cessna and its network of authorized dealers and service centres plan to integrate sales and support of the former Columbia aircraft, and Cessna Parts Distribution is expected to become the source for parts. Cessna also intends to develop direct communications with current owners.

The Cessna 350 will feature an all-composite airframe, Garmin G1000 avionics and GFC700 flight control system, and Teledyne Continental TSIO-550-C engine, while the Cessna 400 will offer the same features with dual turbochargers for the engine. The 400 is one of the fastest piston aircraft in the world with a top speed of 270 miles per hour – more than 235 knots.

MOONEY ACCLAIM AUSTRALIAN TOUR

Flagship of the Mooney Fleet Heads to Australia With the successful debut of the Mooney Acclaim in the United States, Mooney Airplane Company will now send their flagship aircraft to Australia for a two week tour throughout the country in early 2008. Recognised as the fastest single-engine piston aircraft in the world, the Mooney Acclaim will enter the Australian market boasting features that include a Garmin G1000 Integrated Avionics Suite, 237 ktas cruise, 1240 fpm rate of climb and a 1445nm range. For more information, contact Hamish Ramsay at Ramsay Aviation on (03) 5722 3726.

NEWS BRIEFS

THE PIPER MATRIX RECEIVES FAA TYPE CERTIFICATION

VERO BEACH, Fla., October 31, 2007 – Piper Aircraft, Inc. reported today that the Federal Aviation Administration has awarded type certification (TC) to the Piper Matrix, a cabin-class, six-seat aircraft based on the world renowned Piper Malibu Mirage and operating with the economy and simplicity of an unpressurized aircraft.

The Matrix, which was unveiled at AOPA EXPO 2007 earlier this month, is the latest addition to Piper's PA-46 family of aircraft. Delivering unsurpassed luxury in a niche currently unfilled in general aviation – cabin-class, high performance aircraft, with standard air-conditioning – the Piper Matrix is priced well below any comparable aircraft.

The Piper Matrix was certified on schedule with terrific support from the FAA," said Piper

President & CEO James K. Bass. "Moreover, since we introduced the Matrix, customers have responded enthusiastically. To date, we have pre-sold our first-year production and have more than 100 contracted orders for the Matrix."

In launching the Piper Matrix, Bass cited widespread consumer interest as the driving force behind bringing the Matrix to market.

"Many of our customers and prospective buyers told us that they wanted a simplified, unpressurized version of the Piper Mirage that provided the best in luxury, elegance and performance at a price that is hundreds of thousands of dollars below what has been available," he said. "The Piper Matrix fills those requirements, and it does it on the finest, most proven, airframe coupled with the most advanced technology available in General Aviation."

The Matrix is Piper's next generation cabin-class aircraft, featuring the very latest in advanced glass avionics, the sophistication that comes with a retractable-gear aircraft, and the benefits of unpressurized simplicity at a best-in-class price of $757,000.

The Piper Matrix and its 350 horsepower piston engine deliver a maximum cruise speed of 213 knots and a full-fuel range (at long range cruise power) of 1,020 nautical miles. Carrying an 800-pound payload at 17,500 feet – close to the maximum altitude where oxygen cannula can be used – the Matrix achieves a maximum cruise speed of 200 knots and a range of more than 800 nautical miles. At a typical non-oxygen altitude of 12,000 feet, again carrying an 800-pound payload, the Matrix delivers a maximum cruise speed of 188 knots and a range of 800 nautical miles. At 17,500 feet and 12,000 feet, the Matrix could increase its range by approximately 190 nautical miles by reducing cabin payload by 120 pounds and filling the tanks with an extra 20 gallons of fuel.

Featuring the very latest in advanced glass avionics, the Matrix deploys with the Avidyne Entegra integrated flight deck as standard equipment. It is also the first aircraft to offer Avidyne's new MLB700 Datalink Receiver for WSI InFlight® weather service and SIRIUS Satellite Radio as standard equipment. Moreover, those components are part of a rich set of standard Piper Matrix features that also includes Avidyne's exclusive *MultiLink*™ two-way datalink service, *EMax*™ Electronic Engine Instrumentation System and *CMax*™ Jeppesen JeppView® electronic chart display. In addition, the TAS610 active traffic system and the TWX670 Tactical Weather Sensor are available as options.

Luxury is the hallmark of the Piper Matrix, from its air stair door with remarkable ramp appeal to its rich interior styling and amenities. Moreover, the Piper Matrix draws on Piper's deep heritage and the legacy of the Piper Malibu family of aircraft, currently represented by the Piper Meridian and Piper Mirage – models that continue unchallenged in their respective segments.

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