The Oil Report

July 2007

"Oil the News That's Fit to Print!"

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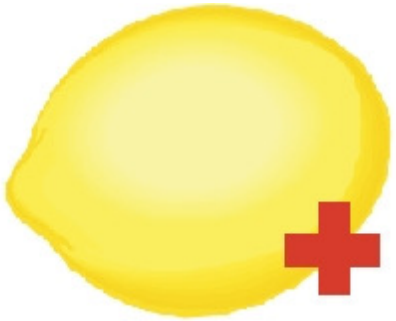

Spotlight on...

Oil Change Intervals

by Jim Stark

I'm not disclosing my age, but the Social Security office is going to pay dearly when I apply this fall for full benefits. We rode one-speed bicycles when I was a kid, with fat pneumatic tires that had tubes in them. Television came into my house when I was ten. A few years later I bought my first transistor radio. It was just larger than a deck of cards and had a green plastic case. That was awesome technology before the word "awesome" was coined.

Desktop computers were just beginning to be useful when I started Blackstone. All programs and memory were contained on floppy disks (which really were floppy!). But times have changed. I could walk around the office today and count the number of networked computers, but I would run out of fingers and toes.

For the twenty years that we have been computerized, I have been running the backup program nightly. In the early years there wasn't much data, so it didn't take long. Data increased rapidly, so more and more disks had to be added to the backup process, until I was loading 12 disks for half an hour each night. Then, a new backup medium would be invented and the process would drop to a more reasonable 5 or 10 minutes. Once in a while, a new backup system comes along. The first time we used a flash drive, it was so fast that the process blew me away.

Advances in Engines and Oil

The builders of piston aircraft engines are sometimes accused of not advancing their machines with the times. There is some truth to that, comparing with automotive motors, but that is the only side of the story that gets much ink. The other side of the story is they make incredibly reliable power plants that we can count on to safely take us aloft and bring us back home again. And Lycoming and Continental are making improvements all the time that don't get any ink. Their manufacturing processes, heat-treating, and metallurgical advancements are keeping up with the times. Parts sizing and

LemonAide:
Coming Soon!

If you're thinking of buying an aircraft, chances are it will be used. Many people already do a pre-purchase inspection, which usually includes an oil sample to determine the condition of the engine. But not everyone is aware of that option.

Enter LemonAide! This is a new service we're offering for anyone interested in buying a used airplane, car, truck, etc. The kit contains a pump, a prepaid sample kit (or two), and a prepaid overnight return envelope so we can get you the results the next day. It's mainly for people who are not familiar with oil analysis (because if you already have our kits and a pump, you have most of the ingredients of the kit). But if you know someone who's planning on buying a used vehicle or airplane, tell them about LemonAide! It will be available soon, and it just might keep a sweet deal from turning sour.

Variables

Here's a brief but not all-inclusive list of the variables that affect your oil change interval.

Type of engine
Age of engine
Mechanical condition of engine
Type of airframe
Frequency of operation (flying, not ground running)
Type of flying
Climate
Location of country
Sump capacity
Type of cooling system
Type of fuel system

microinch surfaces are better. Today's engines start and wear less than the same designation engine built ten years ago.

The technology of oil also continues to advance, though you may not hear about it. Oil blenders make changes to enhance oil stability and dispercency. An oil blended today is significantly improved from the oil your father bought, even if the brand, type, and grade are the same.

But here is something that hasn't changed: "If your engine has an oil screen, change the oil at 20–25 hours. If it has a filter, change the oil in 50 hours. And never leave a fill in place more than four months."

You can honor aircraft tradition and folklore if you want, but the world is a rapidly changing place. There are many variables to consider when deciding the interval to use when changing your oil, but none of them have to do with old wives' tales. See the sidebar for a list of some of these variables.

Since there are many variables, it is impossible to set a standard oil change interval. But there is a way you can determine how long, in hours and/or months, you should leave the oil in your particular engine for your particular circumstances. You won't find it in your pilot operating handbook or engine manufacturer's specifications. The answer is in your oil analysis report, where you can see how the metals compare with averages for your type of engine. Check the condition of the oil in viscosity and insolubles. See if your lead is above or below average from leaded gas blow-by. All these factors will affect how long you can run the oil. If you ask, we will tell you the average oil use hours for that type of engine, so you have a starting place for determining how long your particular oil should stay in place.

Another consideration for how long you can run your oil is the oil's acidity. Corrosion of parts will increase with both the humidity of the air and the acidity of the oil. A Total Acid Number (TAN) test can tell you how acidic the oil is on a scale from 0.0 to 2.0, with 2.0 being the most acidic. This test is most helpful when you know where the virgin oil starts out, because they don't all start at 0.0. We have seen oils run up to 1.4, and they could conceivably get more acidic than that. This is a test to consider if you are in doubt about how long your oil should be run, given your particular flying habits.

The engines that can safely run the longest on a fill of oil are those that are operated every day. We know of flight schools that can run 100 hours between oil changes. Another person with the same type of engine may get an awful report after just 12 hours and four months.

All used oil eventually gets contaminated and needs to be changed out. How long can you run the oil in your particular engine? I don't know offhand, and chances are, neither do you. If you pose the question on the oil slip next time you send in an analysis, we'll try and help you answer the question.

Report of the Month

This month's report of the month is a little different -- it's not a problem to solve but a comparison of two engines. See the caption below to learn more about these two TSIO-520-NB engines.

(To learn where the various elements might be coming from, click here.)

Elements in Parts Per Million

MI/HR ON OIL	56	UNIVERSAL AVERAGES
MI/HR ON UNIT	285	
SAMPLE DATE	10/1/97	
ALUMINUM	16	11
CHROMIUM17	17	13
IRON	206	55
COPPER	11	6
LEAD	7050	5581
TIN	4	1
MOLYBDENUM	9	5
NICKEL	26	5
POTASSIUM	0	0
BORON	0	0
SILICON	10	9
SODIUM	1	1
CALCIUM	2	3
MAGNESIUM	1	1
PHOSPHORUS	1140	272
ZINC	10	5
BARIUM	0	0

Elements in Parts Per Million

MI/HR ON OIL	35	UNIVERSAL AVERAGES
MI/HR ON UNIT	418	
SAMPLE DATE	12/26/06	
ALUMINUM	6	11
CHROMIUM	4	13
IRON	29	55
COPPER	7	6
LEAD	6758	5581
TIN	1	1
MOLYBDENUM	3	5
NICKEL	13	5
POTASSIUM	0	0
BORON	0	0
SILICON	7	9
SODIUM	1	1
CALCIUM	1	3
MAGNESIUM	0	1
PHOSPHORUS	2	272
ZINC	2	5
BARIUM	0	0

Note the sample dates. These two samples are from two different TSIO-520-NB engines, taken nearly 10 years apart. If you look at the wear rates (how much metal each engine was producing each hour), you can see that the 2006 sample is wearing at a better rate, even though that engine has more cumulative hours on it. This is a good example of the improvements in engines over the last decade. On the whole, most engines make a lot less metal today than they did ten years ago.

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