Duke FLYERS ASSOCIATION NEWS

NUMBER 01-1 **APRIL 2001**

Scott Stipp's P-525 at Bahama's Winter Get-Together
Arranged by John Jacobs

✈ ✈

Our 2001 Fly-in will be held in San Diego, CA, September 13, 14, 15. Our host is Shaker Razook. Destination airport - Montgomery Field. Headquarters hotel is Westgate Plaza. A great city if you have never been there. Plan now to join a great group. Registration forms will be sent this summer.

2002 Fly-in will be held in Saulte Ste Marie, Ontario, Canada.

President	Vice President	Secretary-Treasurer
Mike Greenblatt	Ralph Cohen	Marge Gorman
P-590	P-412	P-596

Spare parts on hand for your Duke

1 - Generator
1 - Starter
1 - Pilot Hydraulic Seat Control
1 - 5 x 6.0 Nose Wheel Tire
4 - Prop Brush 3E1206-2
6 - T10541 Cylinder Assemblies
1 - Gear Motor
4 - Voltage Regulators (see below*)
2 - Oil Coolers
1 - Magneto
1 - Lycoming Exhaust Pipe Part No. 77429
1 - 19 x 6.75-8 Main Gear Tire
1 - 19 x 6.75-8 Main Gear Tube
1 - Flap Motor
Recognition Light Bulbs, DN25-3

The arrangement we have with Aircraft Systems, 5187 Falcon Road, Rockford, IL 61109, is they will ship an O/H generator, starter, magneto, or motor to you by UPS or Federal Express. You return to them (same day) your part. They will overhaul, charging for work done and the item becomes Association emergency part. Phone number 815/399-0225.

For oil cooler contact Bill Passey, 602/969-2291 (office).

For other items contact Jim Gorman 419/755-1223 (office).

Remember: Overhaul of generator at 900 hours will cost you three times more than O/H at 500 hours.

*Fire Wall Forward have donated 4 voltage regulators for generator equipped airplanes. These are used but serviceable. Two types were available . . . Bendix and General Electric. If one is needed, there is no charge except for $25.00 Association handling fee. Specify Bendix or GE.

✈ ✈

Glenn Adams, President of Royal Air Charters, Inc. has spent the last year gearing up for a fractional ownership program using the Duke as the primary aircraft. They have purchased seven aircraft and are updating them with new avionics and interiors. The program will get kicked off March 1, 2001. If the demand is as good as expected, they will be adding more aircraft almost immediately.

If you have a low time, no damage airframe, parts plane or just some parts you would like to sell, contact Glenn Adams at (318) 393-7770 cell or (318) 868-0030 office.

Add Glenn to your list of airplanes being dismantled for parts, he has P-103, P-137, P-192.

✈ ✈

Those of us at the 2000 Rockford Fly-in will well remember a great deal of rain. A number of airplanes had wet carpet including ours. We installed foam tape 1/8" thick, ¼" wide as shown in above picture. So far seems to work and does not affect pressurization. Jim Gorman

✈ ✈

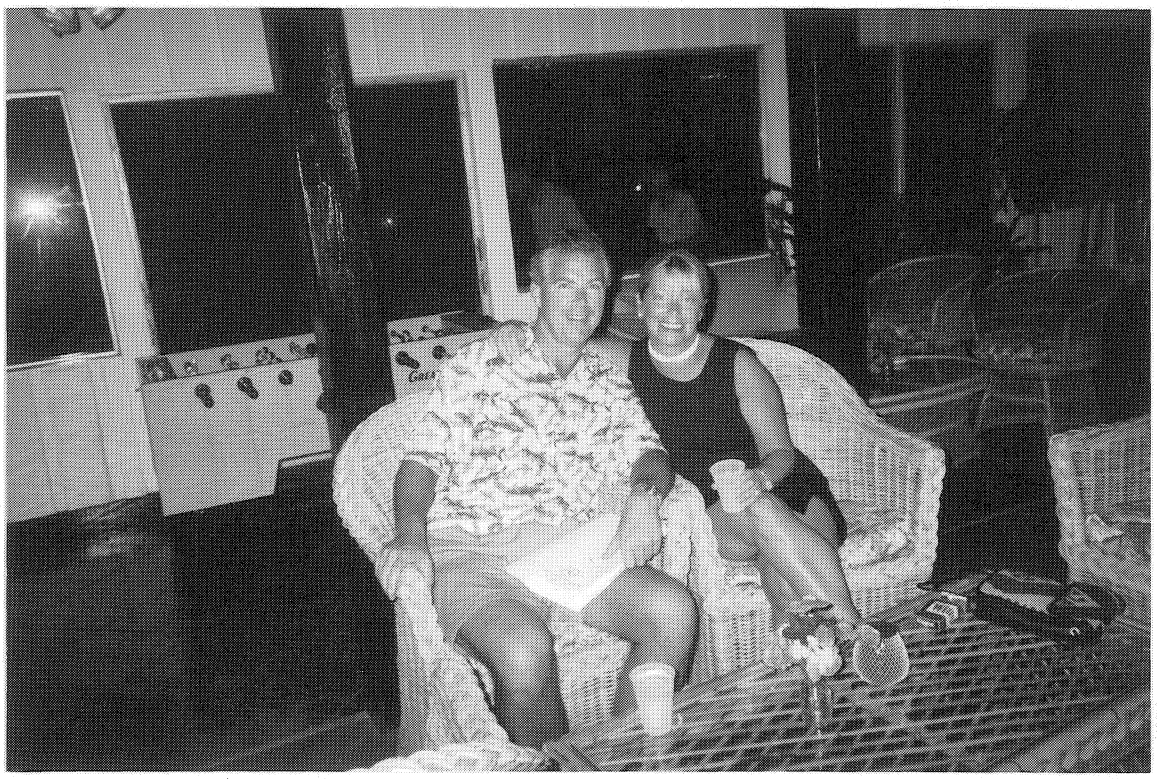
Many received a survey from Dr. Hynes of Western Oklahoma State College.

Our member Jim Foresman did make contact with Dr. Hynes. Statements by the good Doctor were:

1. Sorry he did not review letter before it was sent out.
2. 540 and 541 engines are the same. (which is totally false)
3. Survey was aimed at Malibu Mirage owners.

AOPA will provide more information when it become available.

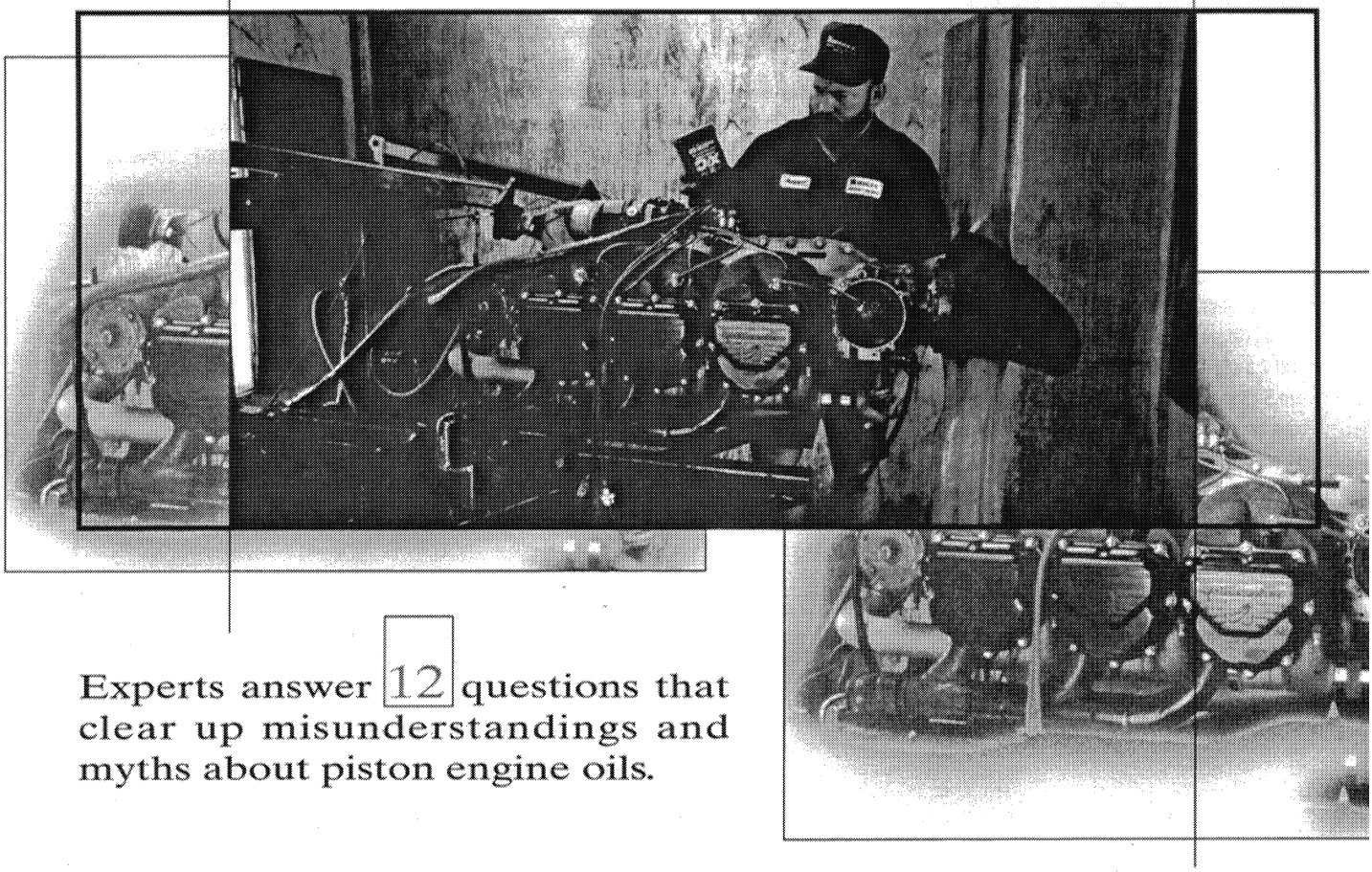
✈ ✈



More pictures from Bahama get together

By Dale Smith
Contributing Editor

PISTON LUBE PRINCIPLES



Experts answer 12 questions that clear up misunderstandings and myths about piston engine oils.

From those big twin-row radials to tiny two-cylinder engines, there are only two consumables that all piston engines share: fuel and oil. If we save fuel for another story, that leaves oil. And with all those engines using all that oil, you would think that owners, operators, and technicians would have a better understanding of what it can and can't do.

It's not that technicians and owners don't think they know all about oil: they do. The problem is, a lot of what they know is hear-say information that's heavily spiced with personal prejudice. Most oil knowledge is something that someone told someone who heard it from somebody. But, as they say on *X-Files,* "The truth is out there."

In an effort to help clear up some of those misunderstandings, **Aviation Maintenance** interviewed representatives from Exxon/Mobil, Phillips 66, and AeroShell to get answers to some questions that every owner, pilot, and technician should ask about piston engine oils.

#1: What does oil do?

Oil is the lifeblood of a piston engine. In protecting engines from the harmful effects of heat, friction, pressure, corrosion, oxidation, and contamination, oil has four basic functions:

- Lubrication. Oil protects against excessive wear between moving parts by creating a fluid barrier that keeps parts from contacting each other.
- Cooling. Cooling is another major function of oil. In fact, in air-cooled piston engines, oil contributes up to 40 percent of the cooling function.
- Sealing. Oil provides a seal between piston rings and cylinder walls. In doing so, it helps reduce wear, provides better compression, and keeps contaminants out of the cylinders.
- Cleaning. The fuel/air combustion process creates many contaminants, none of them good for the engine. As oil travels through the engine, it collects contaminants and transports them to the filter for collection and removal.

#2: What is the difference between single-grade and multi-grade oils?

"Single-grades are all mineral oil and semi-synthetic multi-grades are blends of mineral oils and synthetics," said Harold Tucker, lubricant technical director for Phillips 66. "Simply, multi-grades are superior for use in all temperature ranges, especially colder climates. Single-grade oils are great for warmer temperatures, but when it's cold they cannot

provide the quick-flow characteristics aviation engines need at start-up For example, during a cold start, a 20W-50 will flow as freely as a 20-weight, yet protect as well or better than a 50-weight at operating temperatures One thing most technicians and operators don't know is that a cold-start is any start in temperatures below 60 degrees

"Aside from that, they're basically the same And most technicians don't understand that," he explained "They have exactly the same additives and base oil, the multi-grade just has a little more polymers and some other viscosity modifiers Another misunderstanding technicians have is that you can't switch between single- and multi-grades in mid-engine life That's just not true All the oils conform to the same specifications so you can switch between them whenever you want to "

#3: Is it true that multi-grade oils break down faster than single-grade oils?

Oils don't really "break down " Many people mistakenly believe that multi-grades lose viscosity or break down But the truth is viscosity modifiers in multi-grades make them extremely "shear stable " The fact is, multi-grade oils remain stable throughout the normal oil change interval and beyond That's another reason why oil change intervals are so important Oil that goes too far beyond the prescribed time will lose some of its ability to catch and hold contaminants, but it will not break down

#4: Are there any operational differences between single-grade and multi-grade oils?

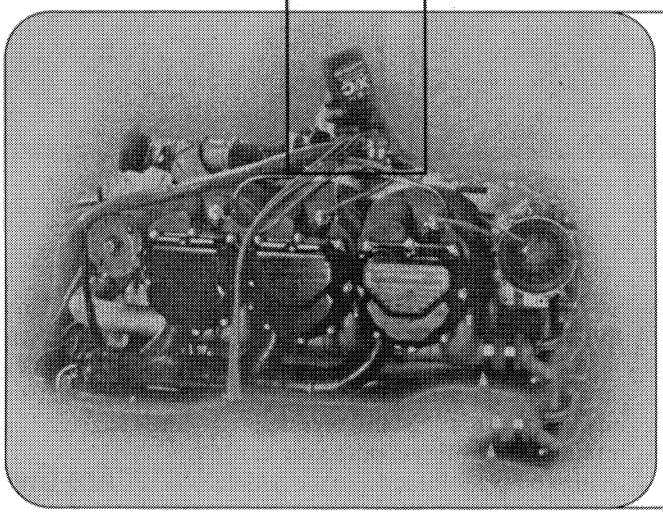
Aside from having better performance in a wider range of temperatures, multi-grade oils offer a number of operational differences A few are: The engine will be easier to start in a wider range of outside air temperatures Oil pressure will stabilize faster because lubrication is quicker Engines will warm-up faster because the oil has a better volumetric flow Operating temperatures will be more consistent And, oil consumption may also be lowered, because multi-grade oils provide a better cylinder-ring seal

#5: What happened to totally synthetic oils?

They came and went pretty fast "What we found in our testing was that 100-percent synthetics provided excellent lubrication properties," said Paul Royko, senior research engineer for AeroShell "The problem came when the engines reached 600 to 900 hours, some began to have oil consumption control problems What we found was the piston rings were covered with lead byproducts from the avgas " He explained that by the time they added the right blending of solvents to eliminate the build-up problem, they were adding so much mineral oil that they were effectively creating a semi-synthetic oil Because of this, the decision was made to stick with the semi-synthetic formulas that were already on the market

#6: Some engines use auto-gas, what about using automotive oils?

Unless the airplane has a modified car engine, simply, don't even go there There are major structural and operational differences between automobile and aircraft engines and they have vastly different needs in their oils Aviation



oils contain fewer additives and they differ chemically from those used in car engines In fact, many of the detergents and anti-wear additives used in auto oils are prohibited in aviation oils because of the concerns that they may actually harm some internal metal parts and they tend to leave deposits that could lead to pre-ignition and detonation problems

Also, viscosities for the two oils are quite different Because of the wider operating temperatures and larger internal machine clearances, aircraft engines require much heavier oils than auto engines—SAE 50 instead of SAE 30, for example Sure, you'll save money with a case of Pennzoil from Kmart, but you'll do it at the expense of the engine

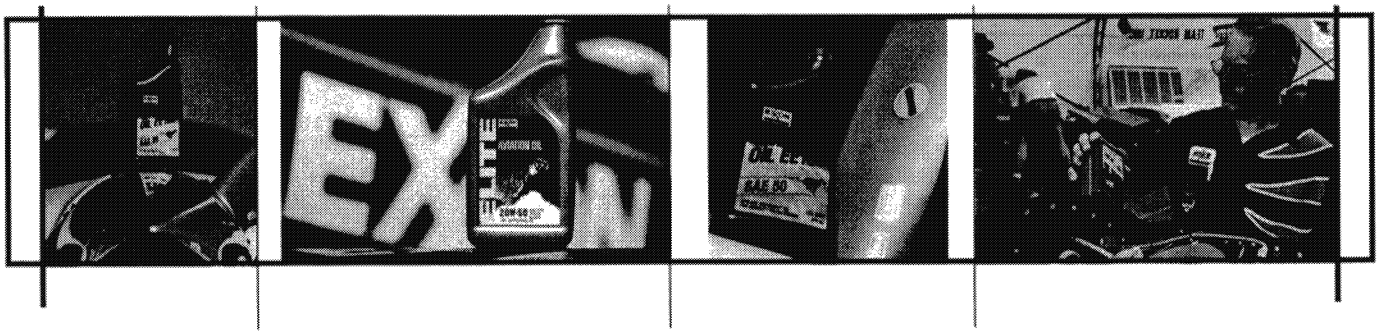
#7: What are the best cases for using ashless dispersant oils?

"Except for break-in, ashless dispersant (AD) oils are required for use in Continental and Lycoming engines," explained Steve Sunseri, general aviation industry manager for ExxonMobil "During break-in, non-AD oils are often, but not always recommended to promote wear-in and achieve better conformation of the surfaces in contact between the cylinder liners and the piston rings " [Editor's note: The use of AD or non-AD oils during engine break-in periods is a point of great debate even among the oil manufacturers The best way to stay on the safe side is to contact the engine overhauler or OEM and follow their recommendations For the most part, AD oils work fine for break-in]

#8: Do ashless dispersant oils contain detergents?

No AD oils are not the same as detergent oils, which are popular in automotive products While detergents will loosen and remove existing deposits, AD oils will not Instead, they will suspend contaminants and keep them from attaching to the metal surfaces until they can be filtered or drained out

For example, if an operator runs an aircraft engine for 500 or so hours using non-AD oil, then switches to an AD oil, the new oil will not clean off the 500 hours worth of deposits that have built up inside the engine What it will do is suspend any new contaminants that haven't yet solidified to engine components That's why AD oils seem to discolor or darken faster than non-AD oil types The darkening simply illustrates that the oil is doing it's job



#9: Are different brands of aviation oils compatible?

According to the manufacturers, this is another point of generations of misinformation "Many technicians mistakenly believe that you can't change oil types [brands] in the middle of an engine's operational life," Tucker explained "Somewhere along the line they got the idea that the oil gets in the metal of the engine, which is wrong Oil can't penetrate the metal of the engine The truth is, it doesn't make a difference which oils you mix with which Mil-Specs and SAE guidelines mandate that all oils are compatible with each other Multi-grades are compatible Single-grades are compatible Multi-grades are compatible with single-grades It really comes down to a matter of which oils the operator or technician believes will give them the best lubrication and protection for their engines "

#10: Are there advantages to using supplemental oil additives?

No In fact, except in the rarest of circumstances, aircraft piston engine manufacturers do not recommend using any supplemental additives While "approved" additives may not harm an engine, there is little, if any benefit to be gained from using the additives It's agreed that it is better to put your money toward more frequent oil changes, which is proven to be beneficial

#11: What are the benefits of oil analysis?

A lot of experienced technicians misunderstand what oil analysis can and can't do It's not the magic bullet that can foresee engine failures It can be a valuable tool in a more effective long-term preventative maintenance program

Oil analysis is a good way to spot trends in metal wear, viscosity integrity, fuel dilution, and air intake system leaks, among other things

"The real value comes from being able to trend the content of contaminants and wear particles suspended in the oil," Sunseri said "But trends take time to develop, and the trend analysis is much more valid if the samples are taken at consistent intervals Whether it's at 25 or 50 hours, the oil analysis samples need to be taken each time you change your oil if you are looking to get maximum advantage from the data "

"For example, Embry-Riddle initially found the piston-pin plug wear when there's a spike in the next analysis they freak out In those cases, we recommend the owner get another analysis as soon as possible

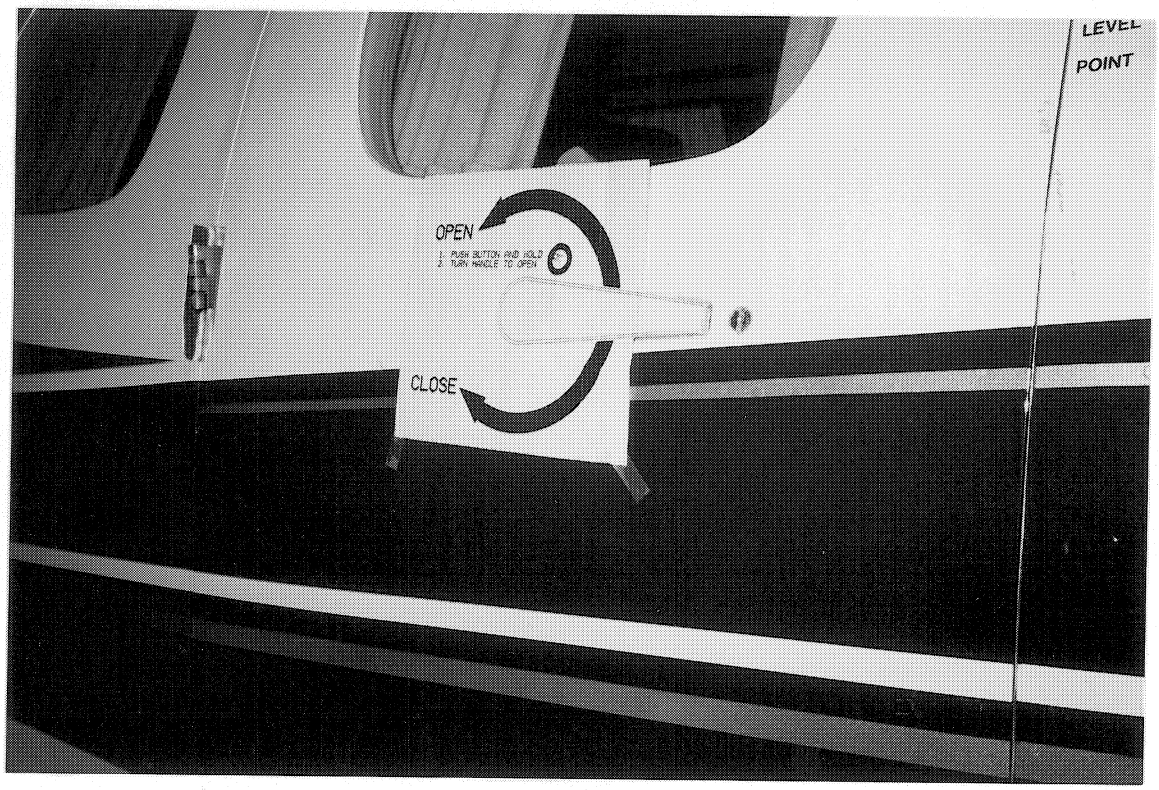
Sometimes if the sample was taken improperly, there can be some outside contaminants in the sample which will sway the readings " With that in mind: into the drain tub to get a sample, that leads to contamination and inaccurate readings The idea is to keep the sample as clean as possible " ■AM

"One thing most technicians and operators don't know is that a cold-start is any start in temperatures below 60 degrees." —Harold Tucker

This article appeared in *Aviation Maintenance* magazine - 1201 Seven Locks Road, Suite 300, Potomac, MD 20854 - reprinted by permission

WELCOME NEW MEMBERS

Russell Large	
Christopher Larson	P-567
Joseph Konkki	56TC
Dean Robert, Jr.	
Tino Valente	
Roy Peake	P-345
Dan Bruhl	P-452
Gerhard Fendler	A-36
David Baldi	P-449
Michael Riemann	P-432



Ron Gros of Raytheon sent the above decal which may be made available to assist emergency personnel in opening cabin door in event of an accident. This is result of Beech 1900 occurrence where emergency people could not figure out how to open the door.