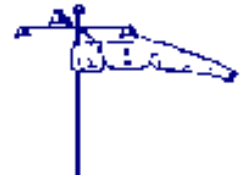


The Static Line



News and Views of EAA Chapter 538

Volume 29, Number 7-9

July-September 2004

AIRVENTURE PHOTOS WANTED

Did you attend Oshkosh this year? If so, did you get any great shots? How about sharing them with the rest of the chapter members in our next newsletter? Please submit all photos to the newsletter editor, Tina Christie. Digital images via email or diskette are preferred, but printed photos are also welcome.



Here is the entrance to AirVenture (photo by Bill Christie).

EAA Chapter 538

2004 Officers & Staff

President	John Lunning 623-581-1060
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Secretary	Dave Biddle 602-265-1172
Treasurer	Don Ridder 602-942-5934
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The Roy Castle Chapter of the Experimental Aircraft Association publishes the Static Line monthly (except July, August & September, which may be combined).

Unsolicited submissions are welcome.

Please send photos, art, articles, letters, calendar events, or classified ads to the Editor at the return address listed on the mailing label portion of this newsletter.

Articles and ads may be submitted on paper, Windows or MS-DOS 3.5" floppy diskettes (MS Word, RTF or text only, please). Photos and artwork may be submitted on paper or by floppy diskette and will be returned upon request. Submissions by telephone or e-mail are accepted for ads, short articles, and calendar events.

Classified ads are free to all members of EAA Chapters. Ads should generally be aviation-related or of interest to aviators or chapter members.

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Treasurer's Report

08/11/04

submitted by Don Ridder

Beginning Account Balance: \$ 6,636.95

Income:

2004 Dues	\$ 10.00
2004 Dues	\$ 5.00

Total Income: \$ 15.00

Expenses:

Name Tag	\$ 5.19
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Total Expenses: \$ 5.19

Ending Account Balance: \$ 6,646.76

50 paid members for 2004 as of this date.

Calendar of Events

September 2004

18: Sedona, AZ – Sedona Airport Day and Car Show, Information: 928-862-0210

October 2004

2: Prescott, AZ – ERAU All Day Airshow, Information: 928-777-4322

2: Scottsdale, AZ – Annual Lancair Certified Southwest Open House, SDL. Information: Michele Luchner (888) LANCAIR Email Address: info@lancairusa.com Website: www.lancairsw.com/rsvp.html

2: Willcox, AZ – Chapter 1291 Rex Allen Days Fly-in Breakfast, Cochise County P-33. Information: Harry Myers 520-384-2992 Email Address: harrymyr@vtc.net

3 – 4: Tucson, AZ – Mooney Pilots Maintenance Familiarization Program, Information: 210-525-8008 or mooneypilots.com

7 – 10: Maricopa, AZ – Copperstate Regional EAA Fly-In, Phoenix Regional Airport A39 Information: Bob Hasson Website www.copperstate.org

November 2004

6 – 7: Mesa, AZ – Annual Veterans Day Fly-in and Community Expo, Falcon Field FFZ. Information: Chris Clark 480-924-1940 Email Address: chris12@hotmail.com Website: www.arizonawingcaf.org

Secretary's Report

submitted by Dave Biddle

June 8, 2004 meeting

No **Secretary Report** was available for the last meeting.

The **Treasurer Report** was given.

Tech Counselor Report: Traffic pattern changes to North side of Payson Airport – Right-hand for Runway 24 left-hand for Runway 6.

State Council Report: New Bylaws were ratified.

Dee Grimm gave an update on the status of the City of Phoenix Minimum Standards project. See: www.phoenix.gov/AVIATION/support_content/ga_public_comment.html#TopOfPage

www.dvtpilot.com/tenantissues.htm

The discussion lasted long enough that there was motion and approval to postpone the program until the next meeting.

Subject: Brake Fluid

submitted by Jim Buchanan

From the musclebiplane.com website

My search for information on wheelpan fires was prompted by a friend who's Extra 300 burned. Apparently he had a fuel drain that exited on the wheel pant, which somehow caught fire. This interesting story was sent to me.

I had a brake fire on an RV-8A last weekend. Tidy combination of operator error and design issues, much of which is specific to the 8A and/or castering nosewheel, steer-with-the-brakes airplanes in general. However, research did turn up a few items perhaps everyone should know. The fire started after an overheated caliper leaked fluid on a hot disk. The fluid flashed and lit the resin in the fiberglass wheel pant, as well as the tire sidewall. The brake worked fine, with only slightly higher pedal pressure required even when on fire.

I've posted a photo to the vault (yep, a bystander had a digital camera). In the photo, I'm holding pedal pressure while shutting down for the fire crew. Note the fire on the ground under the pant, believed to be fluid and dripping resin. I don't recall any additional pedal travel.

When something like this happens I get curious. Why did the seal leak at some temperature well below a failure temperature for the rest of the brake? And why did the fluid catch fire?

Fast forward: It turns out the Cleveland piston seal for the little 30-9 caliper is an ordinary MS28775-218 nitrile o-ring. Nitrile's temperature rating is -65F to +275 F. We found the seal to be brittle and flaking when we dismantled the caliper. A caliper seal with a 275 F temp limit is below automotive standards, but that's another story. As for fluid, Cleveland's tech manual specifies either Mil-H-5606 or Mil-H-83282 as acceptable. Both are listed in AC-43 and the A&P texts. Turns out that Mil-H-83282 was created because the military was tired of setting it's airplanes on fire. Mil-H-5606 is the standard red hydraulic fluid sold by Spruce, Wicks, Chief, etc. It is a petroleum base, and turns out to have a very low flash point. The Mil-H-83282 is also red, and compatible with 5606 fluid as well as seals created for 5606. However, it is a synthetic, with much higher flash and burn points, and is self-extinguishing when removed from the ignition source.

You can download complete specs for Aeroshell Fluid 41 (Mil-H-5606) and Aeroshell Fluid 31 (Mil-H-83282) at: <http://193.113.209.166/aeroshell/aeroshellhydraulicfluids.pdf> Note the flash points of the two fluids. Aeroshell 41 is 104 C, which is only 219 F. Aeroshell 31 is 237 C, or 458 F. A flash point of 219 F means that when a Cleveland caliper seal fails at something above 275, the fluid is already hot enough to light when it hits a hot disk and vaporizes inside the pant. Makes for an interesting combination. Live and learn. I always assumed standard "mil-spec red brake fluid" was something special, and I doubt I was alone in this assumption. It's not. It's just another one of those "always done it that way" things prevalent with light airplanes. Note that the Shell literature declines to even refer to it as brake fluid.

Spruce, etc, doesn't sell Mil-H-83282 fluid, but they should. I've already ordered a gallon of Fluid 31 from the local Shell distributor. Since the old and new fluids are compatible, switching is as easy as draining the old, flush with new, refill, and bleed. Let's be careful out there.

(continued on page 5)

Subject: Brake Fluid (continued from page 4)

A coworker has asked me to gather any information on wheel pant fires for his friend who's Extra burned. Apparently he had a fuel drain that exited on the wheel pant, which somehow caught fire. He is having trouble with his insurance company and wants to have some other cases of such an event to help his case. Seems like I remember this happening to someone a few years ago. Any information is appreciated!

www.shell.com/aviation

BACKGROUND

For many years, hydraulic systems have been utilized in military and commercial aircraft. They have provided power transfer which has been proven to be reliable, efficient and lightweight compared to mechanical or electrical power transfer services. Since the 1940s, MIL-H-5606 hydraulic fluid, a mineral oil-based fluid, has been one of the most widely used types of fluid. This hydraulic fluid has provided excellent operational properties over the temperature range of -54°C to 135°C (-65°F to 275°F). A major deficiency of MIL-H-5606 fluids, which was recognized early in its use, was its high degree of flammability. The hazard generated by the flammability of the fluid was greatly increased by the high pressure required for hydraulic system operation, 2.07 x 10⁷ Pascals (3000 psi), and the vulnerability of hydraulic lines widely distributed throughout the aircraft.

Recognition of fire hazards associated with MIL-H-5606 (NATO Code H-515) fluids, resulted in the commercial aircraft industry developing hydraulic systems based on phosphate ester based hydraulic fluids. However, the phosphate ester based fluids were not adopted by the military at that time because they were not compatible with MIL-H-5606 fluids nor with many of the materials (e.g. elastomers) used in MIL-H-5606 hydraulic systems in the aircraft. There was a view that the use of two incompatible hydraulic fluids could cause supply/logistic problems and could result in significant problems if the two fluids were ever inadvertently intermixed as they were not compatible or miscible. The cost of converting a MIL-H-5606 based hydraulic system to a phosphate ester based system was believed to be prohibitive owing to the requirement to change the elastomeric seals as well as many of the other materials used within and also outside the hydraulic system with which the fluid may come into contact (e.g. wiring insulation, paint, etc.). The commercial aircraft industry has found a significant reduction in the number of hydraulic fluid fires since the adoption of phosphate ester hydraulic fluids, and now all big civil transport aircraft use this type of fluid in the main hydraulic system.

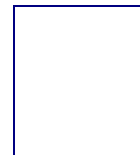
Although the military did not move to phosphate ester type fluids they did identify the need for a more fire resistant fluid as a direct replacement for MIL-H-5606. As a result a synthetic hydrocarbon-based fluid, MIL-H-83282 was developed. This fluid is completely compatible with MIL-H-5606 fluids and MIL-H-5606 hydraulic system materials. All physical properties of MIL-H-83282 (now MIL-PRF-83282) were equivalent to or superior to those of MIL-H-5606 (now MIL-PRF-5606) except for low temperature viscosity.

In particular all fire resistant properties of MIL-PRF-83282 are superior to those of MIL-PRF-5606. More recently MIL-PRF-87257 was introduced in order to address the concerns over the low temperature viscosity of MIL-PRF-83282.

Interesting Web Site:

http://www.rokits.org/gallery/slideshow.php?set_albumName=x-prize

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ADDRESS CORRECTION REQUESTED



**Roy Castle EAA
Chapter 538**

Next Meeting: The Usual Time and Place

**Tuesday, September 14, 2004
7:00 PM**

**Refreshments: Dee Grimm
Raffle: ???**

Program: Speaker From DVT Tower

The location of the meetings is the Deer Valley Community Center, 2001 W. Wahalla Drive (1/4 mile south of Beardsley on 19th Avenue)
We will be in Room 2 this month.