



NEWSLETTER

Carb Heat

Hot Air and Flying Rumours

Vol 26 No. 1

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January 1997

**Next Meeting: Thursday 16th January 2000hrs
Bush Theatre
National Aviation Museum**

Program: Regular monthly business

Inside:

- Questionnaire - re-potential relocation of our Chapter to another airport (see Presidents message inside)
- Preparing Aircraft For Painting (Topcoating) by G. Fancy
- The Jug Jungle by Mike Busch (mbusch@avweb.com)

Guest Speaker: Lionel Robidoux on his recently completed Wittman W10 Tailwind project

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I hope all of our members have enjoyed a relaxing and happy holiday season, and are refreshed for tackling a challenging building project.

As noted in our last news letter **Les Staples**, has embarked on an ambitious **Mazda Rotary Conversion** project. Les has most definitely not been wasting any time and has completed the rebuild of the engine, built a test stand and engine mount, and is working on the PSRU built from the manual transmission.

Les has taken lots of photos for a future presentation on his project as promised. If you drop out to the club house, most days you will find Les more than willing to share a bit of time and display his pride and joy. I fully expect first firing before the snow departs.

Carp Airport Status

The good news is that transfer of ownership of the airport from Transport Canada to the RMOC has been completed. This is clearly an important step forward to a hopefully brighter future for general aviation in the Ottawa Carleton region.

The **bad news** unfortunately, is that lease negotiations represent a major challenge. The initial **terms and conditions** proposed by the West Carleton Airport Authority are **simply unacceptable**, representing a 100% increase in our land rent and operations costs above our current costs.

Your executive has prepared a position paper that outlines our objections to the proposed lease terms, while also putting forward proposals that we believe will lead to fair treatment for all tenants while encouraging new tenants to

locate at Carp. We have **three major objections** to the current plan:

1. Rates are based on a simplistic area formula which does not take into account different relative values of properties on the airport. In essence we are being asked to pay first class fees for a third class location.

2. The terms of the lease leave the Airport Authority owning all buildings and improvements at the end of a lease term of 20 to 40 years.

3. The simplistic area formula used to establish rates does not encourage cost efficient use of land on the Airport. This is a serious waste of the public funds invested in the airport and a major constraint to cost effective growth.

Following this column you will find a **brief questionnaire** that I would encourage all **Full Members** to fill in. This will help your executive adopt the proper negotiation posture on your behalf. The bottom line is that **we must be prepared to relocate** to either **Arnprior** or **Smiths Falls** if the financial burden imposed by WCAA is unacceptable.

We have initiated discussions and the initial response from Arnprior is that they would be **delighted** to have us. I anticipate a similar positive response from Smiths Falls.

I sincerely hope we can reach a satisfactory agreement with the WCAA and are actively seeking **political support** within the region and on the board; hopefully not all politicians in the region are as intransigent as Peter Clarke.

November highlights

The November meeting featured **George Mayer** who related his experience flying an **Argus** in Coastal Patrol. This was an extremely interesting illustrated talk, and many of the slides illustrating our remote northern territories were both beautiful and awe inspiring. If you missed this one, you missed a beauty.

Regulation Changes Oops.

At the last meeting I believe I may have misstated the requirements hidden in section RAC 3.6.1 for mandatory flight plans or itineraries for any flight more than 25 nm from the airport of departure. Both Bob Shuter and Bill Pepler checked up on this one for me, and while one or the other is mandatory; a flight itinerary can be filed with a responsible individual, and does not have to be filed with an ATC or FSS facility. Note however that a flight itinerary is more specific than the older flight notification. My apologies for any confusion arising from this mis-interpretation.

Jan. 16th Mtg. at NAM:

Our next meeting will feature **Lionel Robidoux**, a past president of our chapter who will describe his construction, and test flight experiences with his recently completed **Wittman W10 Tailwind**. I look forward to seeing you Thursday January 16th at the **National Aviation Museum**, 8:00 PM start.


Gary

EAA245 Relocation Opinion Survey for Full Members Only. circle response

Member Name: _____

Tel No: H: _____

Relocation Preference: **Arnprior** **Smiths Falls**

Remain at Carp: **irrespective of cost** If increase less than _____%

Do you have any special skills that you are prepared to volunteer?

i.e.: **legal real estate/leasing political contacts**

Additional Comments: _____

Editors Comments

As we go into a new year I note how the newsletter has evolved since I first provided front pages back in the mid '80's and took over from Jamie Oliff over three years ago. I've again made a few format changes to try to keep things from going stale.

I am now connected to the Internet and you will now be able to contact me directly at **adouma@ftn.net** I'm always happy to receive any and all submissions.

In this issue Garry Fancy has an article about aircraft painting and I picked up some information about this years National Capital Airshow.

If you wish to place an ad you may phone it in to 591-7622 or e-mail me at the above address. The ads will have a date field at the end and I will run ads for three months only unless you instruct me otherwise. This should periodically "freshen up" the ads page. If someone out there wishes to take over doing the ads I'd be happy to have the help. Again you can contact me at the numbers above.

Andy

Ottawa Airshow update from the net

Ottawa in May? What happened to Canada Day weekend?

They decided that they wanted a ski equipped C-130 Demo ;-)

The NCAS is hoping to take advantage of the USAF 50th Birthday Air Show the week before. They hope to catch transients on their way back from the blast at Nellis AFB. What is hoped is The Italian Team, one of the Russian Teams and of course the 431 Squadron (Snowbirds) the show has also booked the Northern Lights. So it seems there will be 4 Teams at the show. Three mil jet one civilian team (former Snowbirds) plus the normal airshow stuff. No more details are confirmed yet. But keep your eyes on the National Capital Air Show WWW page at **URL= <http://ncas.ottawa.com>** for updates.

PREPARING AIRCRAFT FOR PAINTING (TOPCOATING)

(prime source: Aircraft Painting and Finishing, Crane & Carlson)

Proper aircraft refinishing demands attention to the following: removal of the old enamel, cleaning and preparation of the metal surface, application of primer(s), and application of the topcoat(s).

Stripping

There are two types of strippers: the solvent type which are clear and not very effective because of their fast evaporation rate and wax-type removers which are preferred when stripping an entire aeroplane because the wax holds the active solvents against the surface until they penetrate it. Methyl chloride is the active agent in this type of stripper. It penetrates the film of enamels and some primers to expand them so they pucker up and break their bond with metal. After the bond has been broken, the wax gets between the film and the metal, preventing it from resticking. Never remove the stripper until all the area has puckered. However, acrylic enamel will not expand or wrinkle, it will only soften. Scrape off the softened paint with plexiglass or similar material. Enamel or polyurethane residue must be flushed off with water and the entire surface scrubbed with a good solvent. It is very important to remove all the wax by careful scrubbing with toluol, xylol, acetone or MEK. (Do not use lacquer thinner as it will not absorb the wax, it will only spread it around). Clean around rivet heads, and other surface discontinuities, etc with an old stiff tooth brush. If the primer has not been removed chemically, it may be removed mechanically by light sanding with #400 or #600 wet-and-dry.

Corrosion Removal

Examine all surfaces for corrosion and determine the appropriate action. If corrosion damage is relatively light, the metal may be treated with a conversion coating (essentially a phosphoric acid etchant which reacts with the metal to convert it into a phosphate film over the metal and prevent recurrence of corrosion. The acid content of these materials is so low that thorough flushing with water followed by air drying is sufficient to remove all unconverted acid. More serious corrosion will require more detailed treatment. Conversion coatings also are applied to new clad aluminum to

microscopically roughen them so additional coatings will adhere.

Priming

After the surface has been properly pre-treated, a primer is applied to provide a good bond between the metal and the topcoats.

Zinc Chromate Primer For years, zinc chromate has been the standard primer because of its good corrosion resistance. However, because it does not provide as good a bond to the surface as some of the new primers, its use is decreasing. Zinc chromate should not be used as a base coat for acrylic lacquers as the solvents in the acrylic will lift the zinc chromate unless it has aged for several days. Further, zinc chromate should not be used over a wash primer unless all of the phosphoric acid in the wash primer has converted to the phosphate film, since the zinc chromate will tend to entrap water and allow the formation of filiform corrosion. Most aircraft today are primed with wash primers and/or epoxy primers

Wash Primers These primers are self-etching and can be used on aluminum, magnesium or steel and acrylic or enamel. Topcoats can be applied directly over wash primers but for maximum protection such as seaplanes or agricultural aircraft, an epoxy primer is applied over the wash primer. When wash primer is applied over a properly cured conversion coating, the organic film of the wash primer bonds with the inorganic film and provides excellent adhesion between the topcoat and the surface. Wash primer is a three-component material. Four parts primer are mixed with one part acid diluent and four parts thinner and allowed to stand for 20 minutes to begin the curing action. Restir and spray. Never use more than 8 parts thinner to 4 parts primer. Wash primers should have a film thickness of no more than 0.3 mil. (0.0003 in). This can be determined by looking at the surface: the proper thickness will not nearly hide the surface, but give a slight amber cast to the aluminum. The topcoat must be applied no sooner than 30 minutes and no more than 8 hours after wash primer application. Wash primers are desirable because they may be topcoated a short time (30 minutes) after application. This is the time the acid in the primer requires to convert into the phosphate film. The most critical aspect of using wash primers is the necessity of having sufficient moisture in the air (9/100# of water for each 1# of

dry air) to properly convert the acid into the phosphate film. (Charts provide easy determination of this). Wash primers are often not necessary if an epoxy primer is used, in fact Dupont forbids the use of a wash primer with Imron. Typical wash primer requirements for the average single-engine light aeroplane are 4 quarts of wash primer, 2 pints of acid diluent and 4 quarts of thinner.

Epoxy Primer The most popular primer for use under polyurethane finishes and where maximum corrosion protection is required is an epoxy primer such as Corlar 824S. They can be used on most metals and over wash primers. Wait at least five hours or more before applying acrylic or enamel topcoat over an epoxy primer. Polyurethane enamels, however, are compatible with epoxy primers and may be applied after one hour. If there is more than 24 hours between the time the primer is sprayed and the topcoat application, the epoxy primer will have to have its surface glaze broken by scuffing with crumpled Kraft paper, number 600 wet-and-dry or Scotch-Brite. Before applying epoxy primer, wash the surface with acrylic lacquer thinner, toluol or MEK. Mix and apply the epoxy primer according to the manufacturers instructions. An epoxy primer may be applied directly over the conversion coating. Typical epoxy primer requirements for the average single-engine light aeroplane are 4 quarts of epoxy primer, 4 quarts of epoxy catalyst and 2 gallons of epoxy primer reducer.

Topcoat

The topcoat can be an acrylic enamel such as Centari which is a popular easy to use, acrylic lacquer, or polyurethane enamel such as Imron. Follow the manufacturers instructions for application.

Note: All applications must follow the manufacturers instructions exactly and primers and topcoats should be from the same manufacturer where possible to ensure compatibility.

Spraying Sequence

Spray all difficult and irregular surface before the large surfaces 1-spray ends and L.E. of flaps ailerons, flap and aileron wells, wing tips, L.E. and T.E. of wings, control arms, hinges, wheel wells, etc

2-spray fuselage bottom using a creeper

3-spray bottom of wings and tail

4-spray top of fuselage and wings

This sequence applies equally to prime and top coats.

Garry Fancy, 15 November, 1996

The following is an article obtained from the net. As it is quite long I'll run it in several instalments. Ed.

The Jug Jungle

Whether you're approaching major overhaul or just dealing with one jug with a mid-life crisis, you face a bewildering array of cylinder choices: factory new, oversize, rebarrel, nitrided, through-hardened, channel chrome, Cermicrome, Nu-Chrome, Cermisteel, IFR, Freedom, and now CerMiNil and Millennium cylinders...whew! Here is our survival guide for sorting through this maze and choosing replacement cylinders wisely. This originally appeared in *The Aviation Consumer*.

by Mike Busch (mbusch@avweb.com)

Twenty years ago, in the heyday of piston powerplant production, things were different. Lycoming and Continental were working three shifts, cranking out three thousand engines a month, mostly brand new engines for brand new airplanes.

When powerplants got old and tired, they would almost always be overhauled in the field. Factory remans were available, but they cost a king's ransom--in the neighborhood of twenty or thirty thou for a six-cylinder reman. (That was a chunk of change back then!) Owners would opt for a factory engine only if their old engine was a real basket case, or if they were so well heeled that money was no object.

Factory cylinders cost a small fortune, too. New power assemblies (cylinder, valves, rockers, piston and rings) could set you back \$2,000 per jug, plus a \$400 core deposit. As a result, virtually all overhaul shops used reconditioned cylinders--weld-repaired heads, barrels either bored oversize or chrome-plated back to new dimensions--and maintenance shops did the same thing when top overhaul was necessary.

Welcome to the '90s, Folks!

My oh my, how things have changed in twenty years! Continental and Lycoming are mere shadows of their former selves, turning out maybe 600 engines a month between the two of them (in a good month), most of them remans destined for twenty-year-old airframes. Both companies have finally figured out that hardly anyone is buying new engines anymore, and have focussed on the aftermarket. Both have slashed the price of reman engines to the point that top-notch overhaul shops can barely compete, and lots of marginal shops (as well as some of the big-name ones like Schneck and Western Skyways) have gone belly-up. Today, factory reman engines account for better than half of the powerplant replacement market. The price of factory new cylinders is half of what it was twenty years ago—more like a third if you consider what has happened to the dollar. Logically, then, you'd expect that nobody would bother reconditioning old cylinders anymore. The compelling economic incentive just isn't there nowadays.

The Cermicrome Phenomenon

That's what you'd expect. But you'd be dead wrong. Today the cylinder reconditioning business is alive and more vigorous than it ever was. It has transitioned from a cottage industry to a business dominated by two big firms: Engine Components Inc. (ECI) of San Antonio, and Diversified Manufacturing Company (Divco) of Tulsa.

The watershed event in this transformation occurred five years ago when ECI introduced its Cermicrome(TM) particle-impregnated chrome-plating process. Cermicrome cylinders made it through the FAA-mandated 150-hour test cell run in fine shape, and seemed to work well for a couple of Part 135 fleet operators who "beta tested" the cylinders for ECI.

Then, in a tour de force of aggressive marketing, ECI managed to persuade aircraft owners and mechanics alike that its Cermicrome cylinders (which were, after all, simply old worn jugs that ECI weld-repaired, reground, chrome-plated, and impregnated with silicon carbide particles) were actually better than factory new ones! Drove of owners started demanding that their mechanics and overhaul shops use Cermicrome cylinders. For awhile, all the big-name overhaul shops (Mattituck, Victor, RAM, et al) were recommending Cermicrome as their cylinders of

choice. At one point, Continental jumped on the bandwagon and offered Cermicrome cylinders as an option on their factory remans! Meantime, industry experts like John Frank of the Cessna Pilots Association and John Schwaner of Sacramento Sky Ranch viewed Cermicrome with some skepticism, and quietly recommended their members and customers to adopt a wait-and-see attitude until it had a chance to prove itself in the field for a few years. This recommendation turned out to be spot-on. We now know that Cermicrome cylinders have not held up well in high-power hot-running turbocharged engines, nor in low-utilization owner-flown airplanes subject to long periods of disuse. There have been plenty of cases where Cermicrome jugs required replacement after as little as 500 hours in service. RAM no longer uses Cermicrome cylinders in its engines, and it appears that other big-name overhaulers are about to follow suit. ECI has started to gradually phase out Cermicrome in favor of a quite different plating process which they've dubbed Cerminil(TM). [See sidebar.] (Coincidentally, Mobil introduced its all-synthetic AV-1(TM) oil about the same time, and marketed it very aggressively. It too became all the rage with owners. Five years later, Mobil withdrew AV-1 from the market because of severe lead sludging problems. But I digress...)

How Cylinders Wear Out

When a cylinder needs to be replaced, it is almost always for one of three reasons: metal fatigue, barrel wear, or valve problems. Metal fatigue failures are the culmination of repeated mechanical and thermal stresses. They are increasingly likely in high-time cylinders, particularly reworked cylinders that have been weld-repaired and kept in service for two or three TBOs. The aluminum head casting gradually becomes embrittled and more vulnerable to cracking. Head cracks are the most common sort of fatigue failures. They usually emanate from a spark plug or injector hole. Fatigue can also cause catastrophic failure of the head-to-barrel joint. Fatigue failures are more common in turbocharged and other hot-running engines, particularly if pilots are not meticulous about avoiding rapid throttle and mixture changes. For example, RAM Aircraft Corp. in Waco, Texas, is a premier overhaul facility that

specializes in high-horsepower turbocharged Continental TSIO-520 engines. They were plagued by warranty claims due to head cracks. Finally, in 1988, RAM decided to start using only factory-new cylinders on their engines. Head crack problems dropped precipitously after that.

Barrel Blues

Barrel wear usually manifests itself by increased oil consumption and deteriorating compression test scores. It doesn't take much wear to do a cylinder in—most cylinders become unairworthy (beyond service limits) if any portion of the bore measures more than .005" above new dimensions.

Fortunately, cylinder barrels incur zero wear during normal climb-cruise-descent operation. This is because there is normally no metal-to-metal contact between the cylinder wall and the piston rings. The cylinder wall is coated by a thin oil film, and the rings hydroplane on this film. For this reason, it's quite common to tear down a high-utilization Part 135 engine at TBO and see the original hone microfinish along the full stroke.

So why do some cylinders suffer significant barrel wear?

Hot-running high-horsepower engines (particularly turbocharged ones) tend to suffer barrel wear because the high combustion pressures and temperatures can breach the oil film under extreme conditions.

Low utilization is another major culprit. During periods of disuse, the oil film that normally adheres to the cylinder barrel has an opportunity to strip off—particularly if multigrade oil such as Aeroshell 15W-50 or Phillips 20W-50 is used. This has two adverse consequences: corrosion and dry starts.

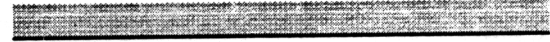
If the cylinder walls are steel, the loss of protective oil film leaves the barrel vulnerable to corrosion. Rust pitting will eventually destroy the cylinder's ability to hold compression. Chrome-plated barrels are relatively immune from such corrosion, which is why they are particularly popular in highly corrosive environments (e.g., near the ocean or in humid climates).

Even where corrosion is not a problem, the loss of oil film during periods of disuse results in a dry start—a brief period of metal- to-metal contact between the rings and the cylinder wall

until sufficient oil splash has occurred to replenish the oil film on the cylinder walls. Corrosion and dry starts explain why low-utilization owner-flown airplanes often fail to make TBO or require a mid-time top overhaul. On the other hand, freighters and flight-school ships that fly every day often go well past TBO without needing top- end work.

(To be continued next month.)

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From the NET

"Living at risk is jumping off the cliff and building your wings on the way down" (Ray Bradbury)



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