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NEWSLETTER

Carb Heat



Hot Air and Flying Rumours

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August 1989

Next Meeting 18 August - 7:30 PM.
Chapter Hangar - Carp.

Program - Oshkosh wrap-up. Horror stories
and Good times.

- Hangar Flying
- Planning for Fly in Breakfast (Sept)
- Notification of Annual General Meeting (Oct 89)

This is your opportunity to affect the
direction taken by your chapter.

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Flight Lines

by Olav Peterson. July, 1989.

EAA 33135

Unless you already have an alternative, the addition of this simple circuit shown below will monitor the health of the voltage regulator in your airplane.

In your car, "idiot lights" were installed by the manufacturer in order to cut the cost of meter movements or digital components; but in this application, idiot lights are actually more useful than the instantaneous voltage that would be presented by either an analog or a digital voltmeter.

All you really need to know is that everything in the charging circuit is either normal or that there is a serious problem. Anything intermediate is superfluous, needlessly distracting your attention from other flying chores.

Most a/c do have a crude, zero-center, ammeter indicating either a charge or discharge, but unless you keep track of and can correlate the magnitude on the ammeter with each load placed on the battery at any one time, there is no direct information to warn you of impending trouble.

The battery is a constant voltage device, ie. the voltage across its terminals remains essentially constant over a range of current - either sourced or sinked. If the regulator voltage rises above or falls below the battery voltage, the charging/discharging rate will be determined essentially by the low internal resistance of the battery. Hence, depending on the charge storage capacity and the internal resistance, there is a relatively limited range of voltage differential allowed between the regulator and the battery where the battery will operate normally without becoming overcharged or discharged.

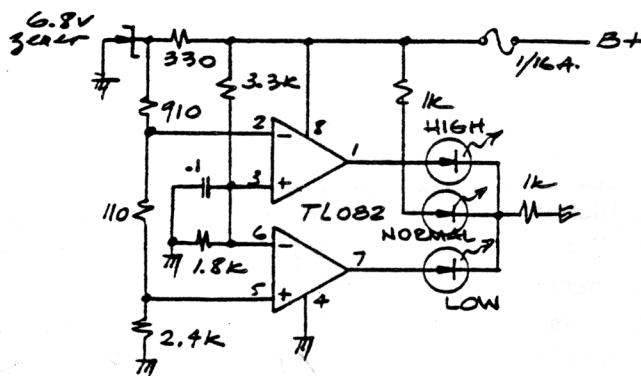
The function of the circuit below is just that -- to keep an eye on the regulator voltage while you are flying.

The "voltage window" is set here to approximately $+13.9 \pm 0.3$ volts. The HIGH alarm (red LED) turns on if the 14.2 volt level is exceeded and the LOW alarm (red LED) lights up when the voltage drops below 13.6 volts; otherwise, the NORMAL (green LED) assures you acceptable operation.

This little indicator could have saved us a battery some years ago when the regulator malfunctioned and caused over-charging: the water boiled off and once the plates were exposed, deterioration proceeded rapidly.

The circuit occupies an area of approximately $3/4" \times 1"$ and could easily be added into your intercom case; with surface mount components the real estate could be further cut in half.

If you plan to build it and try it out and you need more detail, let me know.



From stealth aircraft, through fuel efficient cars to general aviation and homebuilt planes, the modern high-tech way to build structures is by imbedding load-bearing fibers in a plastic matrix.

On commercial scale, the manufacturing of composites is still very labor-intensive and requires highly skilled labor.

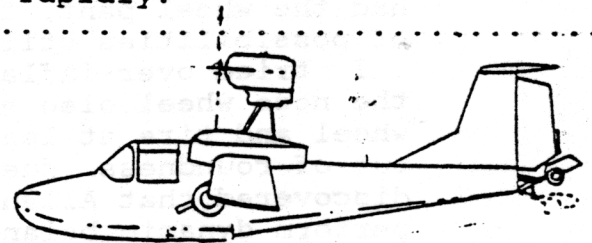
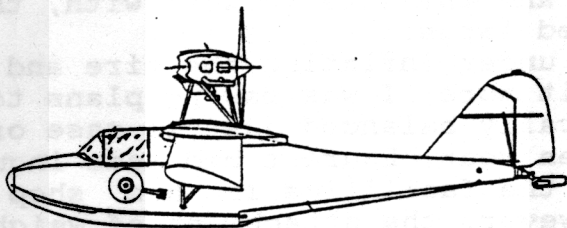
The objective in manufacturing, of course, is to remove the human element so that parts of consistently high quality can be turned out. So far only simple robotics has been installed for layup and laser and water jet trimming.

To speed up the long curing cycle of the commonly used thermoset plastic matrix material, epoxy, investigations are being carried out with high-temperature forming thermoplastics which allow processing in minutes.

There are also tests being carried out with fiber shapes; square, rectangular and I-beam cross-sections appear to offer closer packing in a composite and hence withstand higher loadings than round fiber.

A lot has been learned to mass-produce parts reliably and major strides are expected over the next decade.

The "plastics age" is enveloping us rapidly.



We would have wanted to go and I'll bet so would have many others but the prospect of having to sit in a car for 5 hours, and that's one way only, just isn't acceptable.

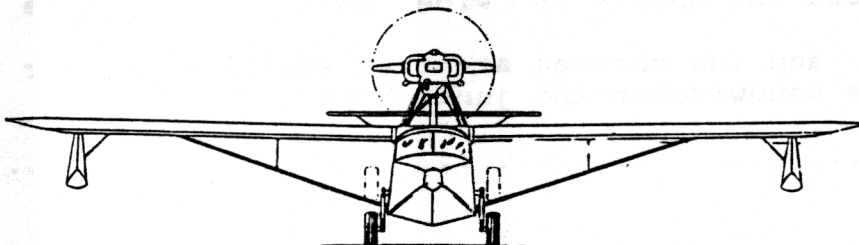
I'm referring, of course, to the Sport Aircraft Expo, held in Toronto across from Lester B. Pearson.

Last year we flew into Malton and walked a short distance to the exhibition site, the Toronto International Center. This year, with all the hullabaloo about congestion and restrictions, we never even dared to entertain the thought.

The man on the street doesn't wish for wings -- he is enamored by the automobile; obviously the show was not for his benefit.

But a pilot isn't going to waste his precious spare time cruising on busy highways and congested downtown streets either; he'd rather go flying.

So why such an awkward location for such a potentially interesting show? Can aviation activities not be planned to take place on or near airports which are also accessible by planes. Take the centrally located Norman Rogers airport in Kingston, for instance: roughly equidistant from Toronto, Ottawa and Montreal.



My very own first car was a 1958 VW "Beetle". It would have been a fine car without the horrendous front end shimmy problem which reoccurred in a 2-year cycle - the life expectancy of the king pins or the mechanism which allowed the front wheels to pivot for steering.

As soon as some sloppiness developed due to wear, even a mild perturbation, such as driving over a manhole cover or a gutter grating, would send the front end into a frenzy which could be stopped only by standing on the brake pedal. Needless to say, the onset of these vibrations resulted in some exciting surprises also to the cars behind.

So when QDK, our Cess172, developed a front wheel shimmy I had already the background to endure it - but how to cure it on a plane?

The kinematics of nose wheels, with a negative "rake angle" (the inclination of the swivel axis from vertical) and a small "trail" (the distance between the center of contact of the wheel and the swivel axis), shows that such a system is dynamically stable and only statically unstable. Since the steering linkage and the scissors were "solid" and the shimmy damper action was flawless, the problem had to lie elsewhere. In spite of the fact that I now only had the wheel pant, the wheel and the tire to work with, the number of possibilities still appeared large.

I tried over-inflating and under-inflating the tire and pumped up the nose wheel oleo strut a bit more; I was making plans to get the wheel and tire at least statically balanced just in case of possible out-of-roundness due to uneven wear. Laurent had made inquiries and discovered that Allen Joy had the facilities in his shop to also perform dynamic balancing; however, the attachment of weights to the rim of an aircraft wheel would raise further problems.

Even nose wheel fairing resonance had been suggested as a possible source!

Once the wheel pant was slipped off and the wheel removed the source of the shimmy became immediately evident: a separated ply!

I do hope that this was the sole cause because a new tire set us back already \$111.

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The goodies in the lunch bag for your Saturday or Sunday at the Carp airport may be A-OK and you may be quite content getting by on potato chips and pop but now and then it would be nice to put some variety into that weekend menu.

The next best thing to bringing your wife and her kitchen stove and oven down to the hangar for lunch is to take a leisurely drive to the Village of Carp and stopping in at Ernie & Laurie's Restaurant on Main Street.

It's all home cooking, the portions are generous, the price is right, the place is clean and the atmosphere is pseudo-country with photographs of early Carp on the walls.

Don't expect to find Bouillabaisse, borsch or fiddlehead quiche on the menu but the choice is wide enough to please most noontime palates.

Try it and the chances are that you'll lose your taste for those dry, stale sandwiches and junk chips.

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THE CERMICROME CODE

ENGINE OVERHAULERS and operators are hailing a new process called Cermicrome as the first important development in overhauling worn engine cylinders since chroming was introduced in 1940. The new salvage process has the corrosion resistance of chrome, but is more durable. It also overcomes the unpredictable piston ring break-in and oil control problems of chrome.

Cermicroming starts with the regular chroming and sizing of the inside of the cylinder wall, then silicon carbide particles are embedded in the chrome. According to Bernie Coleman, vice-president of marketing for Engine Component, Inc., (ECI) the resulting surface is harder but more oil wettable than naked chrome. The engine cylinders are better lubricated, run cooler and last longer, he said. His company is responsible for bringing Cermicrome to aviation and is the world's largest independent supplier of remanufactured parts for the aircraft piston engine market.

"Cermicromed cylinders don't wear out," Coleman said. "We are seeing our cylinders come back from engines that have reached their TBO and they are worn only five or six thousandths of an inch. In a year and a half, we have sent out 3,000 Cermicromed cylinders and the worst oil consumption report we have received is one quart in 10 hours and that includes radial engines."

Engine Component Inc. is the only aircraft cylinder shop in the world licenced to use this patented process, although the idea is not new. Infusing ceramic particles into cylinder walls has been used in diesel engines in Europe for 30 years. Laystall Engineering in England perfected and patented the process. It is currently found in the air-cooled Porsche 911 automobile, BMW motorcycles, Mercedes-Benz 560 engine and Kawasaki snowmobiles.

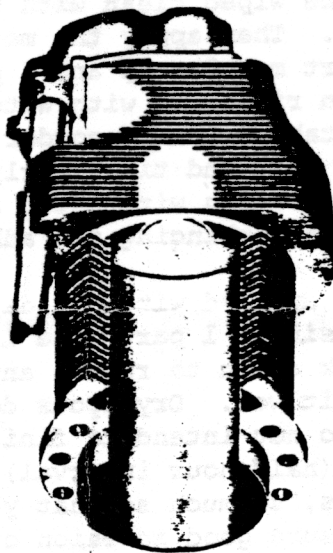
Engine Component president Gary Garvens investigated the process when he was working in Europe. His San Antonio, Tex.-based company did the legwork necessary to get U.S. Federal Aviation Administration process approval, which it received July 29, 1987.

Possibly the most important advantage of Cermicrome is that it requires no special break-in procedures. That's good news for aircraft operators who are familiar with the lottery of chrome overhauls. There's no need to switch to mineral oil and pray for a good break-in. "You just fly it," said Coleman. "Cermicrome is a tolerant and forgiving process. There is none of the black art that is associated with straight chrome."

Another advantage may occur between

This new method of smoothing cylinder walls could be the way of the future.

By Garth Wallace



overhauls. A bad cylinder can be removed from an engine and exchanged for a Cermicrome unit. The new cylinder can be installed over the same undisturbed cast iron rings and run on detergent oil.

Texan Charles Hutchins raced his AT-6, "Silver Baby" on Cermicrome at the Reno National Championships last year. Hutchins won the Silver Class final and reported that it was the first time that he did not have to throttle back during the race to keep the oil temperature down in the desert heat of Nevada.

ECI is not interested in farming out the process and won't let anyone see how it's done. But Cermicroming is available to anyone willing to join one of ECI's distribution networks. In Canada, Field Aviation and Aviall are distributors of complete ECI cylinder assemblies. Canadian Aero Engines, Stauffer Aero and Munro Aero Engine in Calgary, Leavens Aviation in Mississauga, Ont., Leggat Aviation at Toronto/Buttonville Airport and Progressive Air Services in Kamloops, B.C. are Canadian overhaul shops currently sending cylinder barrels to ECI for Cermicroming.

Coleman said ECI will also deal directly with smaller overhaul shops or even homebuilders, although it has a discount structure for the high-volume shops.

Canadian Aero Engine's Ron Newburg is convinced Cermicroming is the way of the future. "We're converting all of our

cylinder inventory to Cermicrome," he said. "Shortly, we will have over 200 cylinders in stock, ready for a 48-hour exchange."

Progressive Air president Alvin Hickey said he was not yet changing all of his inventory over to the new process. "We'll wait and see how it is accepted by the operators."

Gerry Stauffer at Stauffer Aero shares his caution, although "I've spent about \$150 on 'phone calls to the United States and I can't find anything wrong with it. One AgCat operator was getting 14 to 15 hours per litre of oil. We're overhauling two Bonanzas and a Pratt and Whitney R1340 for an AgCat using Cermicrome. All three are local machines so I can keep my eye on how they work because you never know until you try it."

At Leggat Aviation, Jim Leggat said, "Cermicrome looks good based on the technical information and the concept. They have been doing it to aircraft engines in Europe for three years. I'll be interested in how it performs with the Canadian temperature extremes."

None of these shops has an aircraft flying on Cermicrome but they all have cylinders waiting at ECI. If success is measured by backlog, then business is good at ECI. Cylinder turnaround time is currently six to eight weeks.

"In the long run, we may have a marketing problem," said Coleman. "We're in the business of repairing cylinders but the service life is so good on Cermicrome that people may be leaving them for a second go-around at overhaul time."

The cost is \$40 to \$50 per cylinder more than plain chrome, although how much of that is passed on to the customer may vary from shop to shop. Alvin Hickey said, "It still makes the Cermicromed cylinders cheaper than new steel replacements."

Terry Spence of Bonneyville Air Services in Bonneyville, Alta. may be the first Canadian operator flying on a Cermicrome overhaul. Spence is a man who can't afford an engine failure. He flies at five feet, crop spraying in a Cessna Ag-Truck. Said Spence, "If chroming is an art, then there aren't many good artists out there. With the high incidence of cylinder cracking in Continental engines, I like the idea of replacing a defective cylinder while on the same oil and with no break-in time."

Cermicrome cylinders can be identified by a grey-black matte finish inside the barrel and an orange chrome color marking on the outside, split by a white band. Time will tell if this is the sign of all cylinder overhauls of the future. ✦

PAINTING METAL AIRCRAFT —

If you're still wanting to go ahead here are a few things that you'll need. Rubber gloves---clean absorbent rags---Scotch Brite---sponges or scrub brush---tack cloth---Solvent-M.E.K.-lacquer thinners or enamel remover---Metalprep-Dupong M-3 Metal conditioner.---Alodine power-Amchem---Epoxy Primer - catalyst---Epoxy Primer - thinners.

New aluminum should be wiped clean with solvent and dried off as you go, to get rid of any oil etc. Then apply the metal prep thoroughly using Scotchbrite or scrub brush. Mix 1 part metal prep and 3 parts water, keep the surface wet for about ten minutes then rinse off with water. When the material is dry again, apply Alodine mixture (1 tablespoon of powder to 1 quart of water) with scotch-brite or a sponge. Allow to stand till nearly dry at which time the metal should be looking brown. Wash off again with water and wipe dry. This procedure guards against corrosion as well as enhancing the adhesion of the paint.

Prime coat should be applied within a day after prepping. Mix the primer about 15 minutes before using. 1 part base 1 part catalyst 1 part thinners. Wipe the metal with a tack cloth to remove any dust or lint. Apply a light even coat making sure to keep it wet. Dry spots do not adhere well, and also cause rough finishes. If you do not intend to finish-coat the job within two days, apply a second of primer (half hour interval). Epoxy primer becomes very hard and durable after two days, so much so that you will have to scuff lightly with #320 grit sandpaper to insure good adhesion on your finish coat.

This may sound all very involved, and I guess it is, but the end result is worth it. After all the finished product can only be as good as the preparation. 65 to 80 degrees F.

FROM OSITAWA-CHAPTER 34A NEWSLETTER

1964 Beech Musketeer, 165 hp Cont IO
346, 2080 TT. Narco Comm
11A, Ter **SOLD** ve ADF, Mkr
Bcn Rec, 10, strobe, 4 ch EGT.
Asking \$17,900. Gary Palmer
(613)596-2172.

Piper Pawnee, 150 hp, \$17,000.

Mike Sacoutis 729-3774.

Minicoupe project, partially completed.
Unable to continue due to discontinued
kits. All offers considered. Call
Richard Taylor 596-6913 after 7 pm.

Davis D2A plans. Call Russ Robinson.
831-2485.

Brakes and wheels, Rosenhan. Suitable
for Vari-Eze, Davis, etc. Offers
welcome. Eric Taada 749-4264.

CLASSIFIED SECTION

Contact Mike Sacoutis at 729-3774 for
the following parts:

Propellers - 0 time constant speed
- Wood pusher prop.
- Zenair wood 68x46

Hanlon Wilson mufflers.

Mooney Parts - Complete retract gear
with 6.00x6 main wheels, 5.00x5 nose
wheel. Also seats, fuel tanks, gauges,
gyros, and control surface pushrods.

Forged VW crankshaft and propeller hub.
For details, call Richard Taylor at
596-6913 after 7 pm.

Child's seat for C150, aircraft type,
\$150 or offer. Jim Robinson 830-4317.

WANTED: One set of Cleveland wheels and
brakes 5.00x5. James Oliff. Wor
722-9115, Home 596-1949.

CLUB NEEDS

Hot Plate for top of 4-burner stove.

Needed for Fly-In Breakfast

Platform weigh scale like type to weigh
farm animals. We have one, need a
second one.

Gas-powered snowblower needed.

KIT SHOP

Ch 245 golf shirts with logo available
in white, light blue, dark blue \$16.

See Andy Douma or call 225-1559.

Classified Editor: Lars Bif 837-6680.