NEWSLETTER

Carb Heat

Hot Air and Flying Rumours
Vol 34 No. 01

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Jan. 2004

Inside:
President's Page: by Gary Palmer

Next Meeting:
Thursday, Jan. 15, 8:00 PM
Canadian Aviation Museum

inside

NOTAM

"Remember"

NEW MEEETING ARRIVAL PROCEDURES

At NAM

Feature Presentation
If Cloud Could Talk
By Garth Wallace

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President's Page
by Gary Palmer

With the arrival of a New Year, it is appropriate to remind our selves of some goals for the New Year.

As I was preparing our Annual EAA Chapter status report, and making the expensive chapter insurance decisions, George Elliott suggested this was a good time to remind the membership about the **Insurance realities of life** in our chapter.

1. We are **self insured** which means **we all have to take extra care to ensure the safety of our premises**. This includes making sure the chapter clubhouse/hanger is locked when not occupied. Fire is a present risk, and we should make sure we do not keep flammable materials in the hanger, but use the storage shed out back for fuel, etc.
2. The insurance we purchase from EAA covers the chapter and members for **liability claims only**. It does not provide coverage for loss or damage to your aircraft or other personal items when they are in the chapter facilities. That means **each member implicitly accepts all risk of loss when using the chapter facilities**. If you want your project covered for loss, you must purchase your own insurance. The same situation exists for aircraft that are tied down or hangered on the chapter grounds.

Individual acceptance of risk, coupled with a shared contribution of sweat equity is what has made it possible to continually improve our facilities while keeping our membership rates unchanged for over a decade. I am sure we can count on your continued support to keep our facilities ship shape as we enter a new year.

2004 Membership Renewals

John Montgomery has reminded me that almost 50% of our membership has already renewed for the 2004 year. That is a great start, and remaining renewing members may pay their 2004 chapter dues by cheque or cash. They can send their renewal forms and fees in by mail to the chapter mailbox, or renew in person at the monthly meetings.

In order to keep our records up to date, **full** and **associate** members must provide their **EAA national membership numbers** as well as their latest membership expiry dates. This is not required for subscriber members. I am very pleased with the excellent response last year in providing the EAA mandated information. It is also recommended that you carefully review your **email address** to ensure our database contains your current address.

November 2003 meeting summary

Adam Hunt and **Curtis Hillier** teamed up to provide an excellent discussion of aviation insurance options. We are indeed fortunate in Canada to have COPA representing our interests and working to keep Insurance affordable and available. If you are not already a COPA member, why not join?

Upcoming meetings/Events.

Feb 19	**Adam Hunt** has volunteered to introduce us to the role of ultra-lights in keeping flying affordable. Adam owns, and has rebuilt a Lazair, and will answer your questions about ultra-light flying. This is a pragmatic complement to past ultra-light odyssey presentations from Claude Roy.
Mar 18	**Charlie Martel** will discuss his experimentation with tuned exhaust systems to gain power while keeping noise to acceptable levels.

Thursday January 15th 8:00 PM: Garth Wallace "If Clouds could talk" aviation humour at its best

Author **Garth Wallace** will share the lighter side of aviation with us. He will also have copies of his various books, including his most recent, "**If Clouds Could talk**" available for purchase. If you haven't read any of Garth's books, treat yourself to a belated Christmas present, I guarantee you will enjoy it. This session promises to be both informative and entertaining; see you there!

Gary

All In Knots

What was the origin of the now universally applied unit of measuring speed, the knot, in determinations both aeronautical as well as nautical?

A. The term comes from the word naught (also spelled as nought), a now anachronistic word which meant zero. From the nautical (ouch) terminology of the mid-eighteenth century, "naught" originally meant 1000 fathoms (which of course had three such digits) in an hour's time.

B. A knot was a somewhat derisive term used to refer to a "chip log" which was actually a carved piece of wood that was also weighted so it floated low in the water somewhat like a buoy. A light line was attached to it, the chip log was heaved overboard, and the line was then played out as a ship was under way. It was literally knotted at regular intervals (in the case of the US Navy, 47 feet, three inches), and the number of knots that had run over the side during the interval after which a precisely timed sandglass was turned over and then run out (which in the Navy's case, was exactly 28 seconds) thus indicated the ship's speed. (471/4 feet in 28 seconds is darn close to 6080 feet in 3600 seconds.)

C. The term comes from the age of steam power. Back in the days of coal bins and sweaty men with shovels, when the coal ran out, the next option to keep running was to tear out the internal planking of the crew's quarters, which was often made from knotty pine (hence the term). Although it originally had no fixed quantity, a ship's speed came to be associated with the number of revolutions per minute of the engines (originally determined when a ship was new, had a clean hull, and was running through calm seas).

D. A knot was a term used to refer to a "pressure log", essentially a tube bent at a right angle so that its open end was submerged and faced forward into the water (in much the same way that a pitot tube is configured to register dynamic air pressure). The height of a column of water in the tube's vertical segment gave an indication of forward speed. The connection between this metal tube and a knot of wood (though somewhat tenuous) came from the fact that a cylinder of wood, usually made from a knot, was used as a "cork" (into which was affixed a calibrated wire) and indicated the top of the water level in the pipe.

Answer: The "naught-ical" etymology given in choice A is entirely fictional. Choice B is the correct answer. Several different types of speed measuring devices were in use before the pitot tube became the world standard. There actually is some historical truth in the correlation between engine revolutions and forward speed made good mentioned in choice C, and the pressure log mentioned in choice D also really existed (although that stuff about floats fashioned from knots was just bilge water). Other early means of measuring speed included hinged pressure plates, and even airborne anemometers. The nautical precedent favouring knots as a unit of speed (metrification knotwithstanding) certainly would have been hard to ignore!

A Primer On Primers

By Jeff Pardo

We don't give much thought to starting the engines in our cars, even in the dark depths of winter, thanks in part to microprocessor controlled electronic fuel injection. Starting up an airplane, however involves a bit more hands-on skill. With colder weather on the way (and, in some areas, well under way), this might be a good time to revisit the one critical component of the induction system that we usually lay our hands on first: the primer.

GETTING OFF ON THE RIGHT FOOT -- OR WING

(Okay ... Strictly speaking, some might argue that the first thing might really be pushing the mixture in to the full rich position. Picky, picky, picky...) One price we pay for the simplicity and reliability of even the most humble piston powered aircraft engine is a fuel delivery system that is primitive in comparison. Primitive or not however, in addition to delivering fuel to the cylinders in the right quantity and proportions for efficient operation, it must also supply fuel for initial starting.

THE WRONG WAY

First, we all know about carburetors. For carburetor-equipped aircraft, most carburetors are usually underneath the engine. For those carburetors with accelerator pumps (which reduce power lag by spraying extra fuel when extra muscle is called for), pumping the throttle in and out as you're activating the starter motor only fills the carburetor air-box with raw fuel, which can be a fire hazard. That's the *wrong way* to start a carbureted engine. *Never* pump the throttle of an engine having an updraft or side-draft carburetor unless the engine is actually being turned over by the starter motor. This draws the atomized fuel into the cylinders. Otherwise, the fuel mist that you inject into the intake manifold of a non-rotating engine can just drip out the carburetor and into the air box, which is when the excitement usually begins.

THE RIGHT WAY (after a proper preheat, if it's at all cold) is to use the primer.

BACKGROUND ANATOMY

First, let's do a little upstream navigation though the fuel system. Starting up at the fuel tanks -- just for the sake of discussion, we'll take a gravity feed system, say that of a Cessna 172. Fuel flows through a very coarse filter (a screen or strainer, only about 15 mesh/inch), across a fuel shut-off valve, and on down, often to the lowest point in the fuel system, which is the so-called gascolator. This is just a filter screen (about 60 mesh/inch, four times finer than the first one) and often a removable sediment bowl (which also functions as a water separator). Some have quick-drain valves for draining during pre-flight. Incidentally, gascolator bowl assemblies can potentially create fuel flow interruptions if the bowl leaks, or worse, falls off; if you have one, it's a good thing to include in your pre-flight, as well as any associated drain.

NOW FOR OUR FEATURED PERFORMER

After the gascolator comes the primer pump. When you pull that knob out from its knurled base, you hear the rising sound it makes as it sucks in fuel, downstream of the gascolator. (Pull s-l-o-w-l-y; if you pull too fast, less fuel will be drawn in.) Then, each time you push it back in, fuel is forced in another direction, not back into the gascolator, but onward into the cylinders. This trip is totally separate from (it bypasses) the carburetor. This is what you need to assure having a sufficiently rich fuel-air mixture for combustion and engine start when you crank the starter motor: raw fuel in carefully metered amounts, right into the intake ports.

COLD WEATHER PRIMING

A cold engine needs that much richer a mixture (though it's just to get started). The colder the day, the more priming you need to do. How much is the right amount? Start with the POH, tempered by sage advice, your own ears, and experience. As a general rule, it's best to prime conservatively less rather than more. One rule of thumb says to use no more than one stroke per primed cylinder. (It would be good to know just how many primed cylinders your engine may have. If you don't know, ask your friendly A&P, crew chief, or someone who knows the airplane. For a Cessna 152, it could be three; for a Cessna 172, it may be just one; for a Super Cub, four; a 172RG, four as well.) Except for the risk of running the battery down, the next worst thing that under-priming gives you is practice at starting an engine (with perhaps a few character building moments of frustration as well).

Caution: Over-priming is not a good thing. In addition to flooding the engine and/or fouling the spark plugs, the cylinder walls and piston rings may be washed free of oil, which puts them at great risk of dying an early death as pistons grind up and down in the cylinders. Additionally, if you over-prime, liquid fuel may flow down through the intake manifold into the air-box, where it too may be ignited by a minor backfire during engine start (you'll want to continue cranking to suck the flames back into the engine).

TIPS FOR (VERY) COLD WEATHER STARTING

When it's really cold, you can buy one last power play if you leave the primer knob out when you start cranking. Slowly pumping the primer (a darn sight smarter than pumping the throttle) admits extra fuel into the combustion chambers, which might be what you need to keep the engine going those few additional seconds. Fuel that has been atomized in the carburetor has to travel much further, against gravity, and at low temperatures; it can fall from suspension resulting in too lean a mixture before the engine has had that time it needs to warm up. Another tip in cold weather starting is to pull on the carburetor heat after the engine initially starts. This provides extra heat to help keep the fuel-air mixture atomized.

THE BOTTOM LINE: Like closing your flight plan though, once you're done with the primer knob, be sure it's latched back into its slot; if you leave it partly open, fuel can siphon from the primer into the intake, resulting in an overly-rich mixture. If it's already warm, do we need to use the primer at all? If the engine was running an hour ago, or less, you probably don't. Try it without priming, first. If it doesn't catch after a few turns of the prop, stop and proceed with normal priming. (Just be mindful of the workload on the battery.) But remember that the way to sound your engine's wake-up call is by using the primer, not the throttle!

The Mystery of “Octane” Uncovered

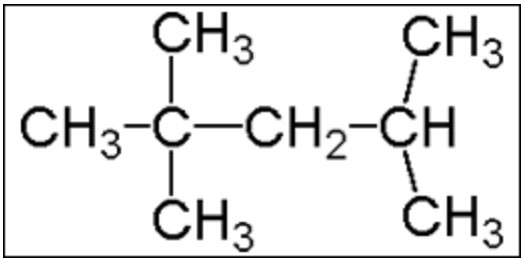
What is octane? The concept of octane is peculiar to many people, including myself. I can't see it, I can't hold it, I can't buy it by itself, but I know I know I pay extra for it if I want more than 87 of it in my gas. Today we take an in-depth look at what octane is, and what significance a gasoline's octane rating has with regards to a supercharged engine.

The Simple Definition

An octane rating (87 vs. 89 vs 92, etc.) is a measure of a gasoline's ability to resist detonation, which manifests itself in a pinging or "knocking" noise. Higher numbers indicate that the fuel can be compressed to a higher level before detonation / knock occurs in an engine, which occurs when. Detonation / knock occurs when air and fuel that is ahead of the combustion flame front ignites before the flame front arrives. Revealed

The Complicated Definition

Octane is actually more than just a rating - it is a hydrocarbon just like methane (single carbon atom), propane (three carbon atoms), butane (five carbon atoms), and heptane (seven carbon atoms). Octane (C_8H_{18}) is a hydrocarbon with eight carbon atoms and eighteen hydrogen atoms. 100% octane fuel is remarkably resilient to compression (i.e. it does not combust when compressed) and is thus resilient to detonation / knock. This resilience is derived from the branching of octane's carbon chain (see figure). Because of the nature of octane as being resilient to detonation, all fuels are compared to 100% octane as a benchmark fuel, from which an "octane rating"can be obtained. Heptane, a hydrocarbon with seven carbon atoms, compresses very poorly and spontaneously combusts even under small amounts of compression. In other words, Heptane's behavior when compressed is diametrically opposed to Octane's behavior under the same conditions. For this reason, Heptane (which has an octane rating of zero) is the other benchmark fuel used in the octane rating system to determine a fuel's octane rating. A fuel that spontaneously combusts (knocks) under the same amount of compression as a fuel composed of 87% octane and 13% Heptane would have an octane rating of 87. This is not to say that 87 octane gasoline is made up of 87% octane and 13% heptane, rather that the 87 octane gasoline "knocks" in a laboratory knock engine at the same compression ratio as a fuel composed of 87% octane and 13% heptane.



The coomposition of an octane hydrocarbon.

Unfortunately, it gets even more complicated. Because various fuels respond differently under varying engine loads, a gasoline may get a different octane rating on a free running engine and one under load. For this reason, the octane rating label that we see at the pump (monitored by the U.S. Cost of Living Council) is actually an average of two octane ratings - the motor method rating (where the engine is run under a load) and a research method rating (where the engine is run freely). The formula used to get the CLC Octane number on gas pumps in the United States is thus: (Motor Octane Number + Research Octane Number) / 2.

What's the benefit of higher octane?

Higher octane fuel has only one beneficial feature - it allows an engine to run at higher temperatures with more advanced ignition timing under higher levels of compression without detonating / knocking. Higher octane fuel does NOT have more potential energy and will not make an engine perform better unless that engine is knocking. On modern engines with knock sensors, higher octane fuel may make the engine run better if the knock sensors are retarding the ignition timing, which hinders performance. High octane fuel does not burn cleaner, it does not clean your engine, it does not increase horsepower or torque (unless you are experiencing knock), it does not smell better, it does not increase fuel economy (unless you are experiencing knock) and is not better for the environment. If you buy higher octane fuels for any of the above reasons, STOP!

When should I switch to a higher octane fuel?

First off, never run lower octane fuel than is recommended by the vehicle's manufacturer. If the vehicle manufacturer recommends 89 octane gasoline, this means that the engine has been tuned to perform optimally without detonation on 89 octane fuel. Once you've done some modifications to your engine, the manufacturer's recommended gasoline may no longer suffice. Obviously, if you can hear detonation inside your engine in the form of pinging or "knocking", try a higher octane fuel. You will also need to run a premium grade fuel (91+ octane) if you have a supercharger, turbocharger, or if you have an ignition programmer that advances your ignition timing.

Why is higher octane fuel more expensive?

Higher octane fuels are more expensive because they must go through more refining steps that increases the octane rating. These additional steps do not make the fuel better in any other way.

How is it possible to have 100+ octane gasoline?

There are some fuels that are even more resilient to compression than 100% octane. Some additives, like tetraethyl lead, increase the gasoline's ability to operate without knock. Some racing and airplane fuels have octane ratings of 110+!

Fuel Trivia

It's Not Easy Being Green
You take a fuel sample during your preflight, and the color of the sample is green. This means

A. Either the fuel farm has some real vintage fuel left sloshing around, or you've entered a time warp: Grade 100/130 fuel is no longer produced

B. Antifreeze has leaked into your fuel tank.

C. Two fuel grades have been inadvertently mixed, and you've been mis-fueled.

D. It's March 17.

Answer: It could be Saint Patty's Day, but that's not the excuse. If two grades were accidentally mixed, they'd come out clear, not green. And it's doubtful that automotive antifreeze would find its way into your fuel tanks. The answer is choice A.

By Jeff Pardo

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Do you have a favourite web aviation sight? Would you like to share it with other chapter members? If so please forward it to your newsletter editor via email and I will assemble them into a report in a future newsletter.

WINTER FUN

Feb: 14, Mo’s fly In on the Ottawa River 8 KM west of Aylmer, near Pinhey’s Point.

Call Maurice @ 819-682-5273

Mar. 06, Kars annual ski fly in. Call Dave for details @ 613-226-7889

For Sale

Item	Qty	Description	ea	Asking price C$	Value each US$
Flight Computer	1	Jeppeson Tech Star Ser#14238		80	100
Fuel Testers	2	ASA 1used, 1 new	3	6	6
Vertical Speed indicator	1	Pioneer Model A57S, order # AC20662		Make an Offer	
Aircraft Spruce Controls	1	2 lever throttle quadrant		25	40
Tillitson Fuel Bowls	2	Gascolators	20	40	50
Primer	1	unknown		Make an Offer	
Cabin Pressure Altimeter	1	2 1/4 " panel mount		Make an Offer	
Turn & Bank Indicator	1	Ball style		30	39
Panel Airspeed Indicator	1	unknown		Make an Offer	
E L T personal portable	1	Narco Avionics Battery operated		185	185
Magnetic Compass	1	New Airpath CB2100-T4		100	120
Aircraft Intercom - Flightcom	1	Voice activated 4 place II2GX new		125	150
Dynamic Microphone	1	New		60	87

If interested in these items please call Hugh Glynn at 613-225-7356

Place your ads by phone with Rodney Stead @ 613-836-1410 or e-mail to stitstmp@sympatico.ca
Deadline is first of the month. Ads will run for three months. You may request a two month extension.

For Sale: Federal 1400 Skis, 10 inch wide.	**$900.00**
Set Continental A65 exhaust pipes	**$175.00**
2 New Avcom headsets model AC200	**$150.00**
01/04 Brian Mckinley @ 613-487-2451 or 613-299-8424	

For Sale: McCauly prop DTM533 73 x 57 1A170 8 bolt	
Fits Continental 0300	**$600.00**
Wheel Pants for Cessna main gear pointed end style no backing plates	**$100.00**
Stromberg carb. For 65-85 HP Continental with air box	**$100.00**
baffles for 85 HP Ciontinental	**$50.00**
Soft Com 4 place intercom	**$100.00**
01/04 Call Jim	**@613-830-4317**

For sale: Lycoming 0235-C1, firewall forward with all logs SMOH 1500 hrs. Removed from wind damaged aircraft. Compression good, one new cylinder.	**$4995.00**
Engine mount from Fleet Canuk for 0-235	**$350.00**
01/04 Peter @ 613-729-0683, piper909@magma.ca	

Wanted 2 six inch cleveland wheels
10/03 E-mail: acholush@yahoo.ca Gerhard Herget

Articles wanted

I am always interested in receiving submissions for this, your Newsletter. You may bring articles to the monthly meetings, or mail information to the post office box, or

e-mail **stitstmp@sympatico.ca**

EAA Chapter 245 Membership Application

NEW:___ RENEWAL:___ DATE:__/__/__
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OTHER AVIATION AFFILIATIONS:
COPA:____ RAAC:____
OTHER:_____

Annual Dues: January 1st to December 31st. (porated after March31st for new members/subscribers).
Associate Member ____: $30.00 Newsletter plus Chapter facilities
Full Member: ____: $55.00 Newsletter, hangar, workshop, tiedowns. (Note: there is a one time $200 initiation fee when you become a Full Member)
Newsletter subscriber ____: $30.00 Newsletter
Note Associate and full members must also be members of EAA's parent body in Oshkosh WI, USA

Make cheque payable to:
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