



Newsletter of Van's Air Force—Western Canada Wing



“Tip”
of
the
day!

When Bob Cutting tried to mate his RV-6 wings to the fuselage, he discovered that his shop was only 0.99 RV-6 wingspans wide.
(Bob Cutting photo)

New Editor Sought

Tedd McHenry, Editor

I'm looking for someone to take over publishing the Western Canada RVator. If you're interested in taking it on, contact me at the email or postal address on page 8.

The newsletter has a solid base of over sixty subscribers, mostly due to the efforts of its founder, Ken Hoshowski. It is on solid financial ground, with enough revenue to cover all the costs of production and distribution. And there is a substantial archive of articles yet to be published. All that's needed to keep it going is someone to keep putting it all together.

Inside...

<i>Another Great CZAM Conference</i>	2
<i>Hose Fittings and Fuel Lines</i>	2
<i>Cleveland Brake Springs—the big cover-up!</i>	3
<i>Engine Storage and Pre-Oiling</i>	3
<i>Working Smart</i>	4
<i>RV-6 Fuselage Bulkhead Alignment</i>	5
<i>RV Safety: How do we compare?</i>	6
<i>28 Volts from 14 Volts</i>	7
<i>Letters</i>	8
<i>Classifieds</i>	8

Another Great CZAM Conference

Barry Tunzelmann, Canoe, BC

If you weren't at this year's Salmon Arm RV Builders Conference, you missed a good one. The agenda had the attention of all present, with excellent participation from the audience. All the presentations were excellent according to the feedback I have received. Attendance was a little disappointing, considering everyone had 5 months notice of the event. We had about 31 people there—had hoped for around 60.

The Transport Canada people were very happy with what we presented. Their presentation was excellent, and very applicable to our homebuilt movement. They even stayed to the bitter end to observe the painting demo. At the beginning of the seminar

we observed a minute's silence in memory of the many that died in light planes over the 2 weeks prior to the conference, and the agenda changed slightly so that Eustace could delve on the subject of safe flying. Boy that man is so modest, but when he talked everyone was listening. His presentation led Dave Dixon (TC) later to make comments to the effect that he now understands that we promote the whole aircraft movement from homebuilding right through to safe flying of those same machines, and stated that he will always help us to the fullest extent possible.

I do not know how we can better this agenda as Doug's radio presentation was well received and so was the excellent fuel systems presentation by

Jim. He ran us through all parts of the system from fuelcap/venting through to the firewall-forward problems that could be encountered. Doug's presentation has probably made people go back and look at their radio installations again in order to better them. Even the burgers were good. We had a member of the Flying Club (Tony Parran) present to cook up a storm. Great job by Tony. We couldn't do the formation demo as Ken had new brakes on the plane and had not bedded them in and this was not the time to do that.

We should look at another location for next year as we must spread this around to keep the interest up as we run the risk of having the same faces show up every year.

Hose Fittings and Fuel Lines

Charlie Kuss, Boca Raton, FL

[Charlie is an RV-8 builder and regular contributor to the RV List—Ed.]

Yesterday I opened the package containing my fuel tank fittings. While inspecting the 90 degree bulkhead fitting, I noted that it had debris inside of it. In a past life as an aerospace machine assembler, I was taught to always carefully inspect all fittings and flares carefully before using them. Obviously, you don't want to use anything which is scratched on the flare mating surface. When in doubt, throw it out!

All tubes and fittings should be flushed with solvent before installation to clear out debris and preservative coatings. Assembled lines and fittings should be flushed again before final assembly using solvent and air pressure. Cap one end of the line/fitting/assembly. Partially fill with solvent, cap the open end and tip, roll, shake, etc. Drain the solvent and blow out with air. Repeat as needed.

We used 111-triclorethylene (spelling?). It's not the sort of thing that you find at the local Builder's Square. There is one product which removes grease, oils, and grime, evapo-

rates without leaving a residue & is readily available. Buy the aerosol cans of BRAKE CLEAN available at your local auto parts store. I have no brand preference. I do prefer the old chlorinated rather than the new, safer, non-chlorinated types. It works better. You take your choice. Using a proper painter's mask and nitrile gloves (Harbor Freight, MSC, McMaster-Carr, etc.) will protect your skin and lungs from the fumes.

"When in doubt, throw it out!"

Last year someone else on the list posted an excellent suggestion upon finishing the fuel system. Sorry I don't remember who to attribute this to. Fill both fuel tanks with several gallons of fuel. Disconnect the fuel line from the carburetor/fuel distributor and attach a rubber fuel hose to the line. Place the other end in a suitable container. Operate the electric fuel pump till you've emptied both fuel tanks. This flushing operation should be repeated till all debris is removed from the fuel system. Don't forget to check the gascolator after each run. As the recent thread regarding fires has made everyone aware; this is a critical system. Here, cleanliness and good workmanship are imperative.

Cleveland Brake Springs—the big cover-up!

Mitch Faatz, Bay Area RVators

This won't make a good X-Files episode, but some people are reporting that some of the Cleveland brake cylinders that Van's had stocked several years ago had short springs. Jess Meyers stated the problem like this: "The problem was that it wouldn't return the check valve in the master cylinder, thereby keeping a load on the main wheel cylinder. As it got hot, pressure built up in the wheel cylinder, as it could not release, which caused heat then breakdown of the "O" ring then leakage onto a hot disc, usually resulting in a good fire." Serious stuff.

Van's latest newsletter downplays this, but an RV builder further reported: "The bogus springs varied from 3.3" to 3.5" long in their free state." (They're supposed to be 4.125"

to 4.25" long.) I called Cleveland (1-800-BRAKING) straight-away, and the woman there was familiar with Jess Meyers and the problem he has identified. Yes, the springs are wrong, and they are sending four replacements (P/N 82-00900) to me, UPS red, under warranty.

Dragging brakes are serious business, especially on the run-out. They can cause loss of control, increased runway length on take-off, and increased wear on the tires and brakes. Add a potential fire to this, and maybe it deserves some attention! Don't panic or demand your brake cylinders be replaced, but this is something you may want to check out if you have dragging brakes.

Also, make sure the tail is untied...

Engine Storage and Pre-Oiling

Assuming the engine was properly inhibited and was stored upside down with the cylinders well oiled before hanging, all I would do is keep the dehydrator plugs in good shape and avoid turning the crankshaft until ready to start it.

Then just before starting it pre-oil it. Remember pre-oiling does not lubricate the cam lobes and lifters so cranking should be kept to a minimum. With clean dry plugs and properly primed it should start in the first three or four blades. As soon as there is an indication of oil pressure, go to 1000-1100 RPM to supply some sprayed oil to the cam lobes, lifters, wrist pins, and cylinders.

A simple and inexpensive way to pre-oil is to install a suitable steel fitting where the plug is above the left mag in the area of the oil cooler fitting. Then, with a new one or two gallon size clean garden-type pump up spray can, connect to the fitting in the

engine and run at least a quart of warm oil into the engine. Then cap and safety wire, and start the engine.

This fitting will now be available to pre-oil anytime in the future and will require nothing more than the removing the top cowling and connecting the spray can.

It will take a bit of innovating to rig up the proper connections for the pump up can. Be sure to use a steel fitting in the back of the engine—the proper one to accept a cap. A tip on rigging up the spray can: either replace the hose from the can with another hose if you want to save the spray nozzle then using another piece of hose insert a piece of aluminum tubing in the end with a flared end and the correct nut to fit your engine fitting. By saving the hose and spray nozzle you can use the spray can to wash the engine down with varsol.

Ideally pre-oiling should be done anytime the engine has been idle for

more than thirty days.

Eustace Bowhay Blind Bay, BC

I plan on getting an engine around 1 1/2 to 2 years in advance so the tips that Eustace has been posting on engine storage have really been of interest to me. I was pondering the thought of placing the engine on a tire and rotating occasionally to circulate the oil and had an idea. I am considering modifying a car engine stand to hold the Lycoming. Possibly mounting the Lyc on the engine mount and mounting the engine mount to a flat steel plate that would be attached to the engine stand. This would make rotating the engine very simple and lessen the possibility of damaging the engine.

Has anyone built something like this?

A big thanks to Eustace Bowhay for his tips!

Jerry Calvert, Edmond Ok

Working Smart

by Sam Buchanan
(sbuc@traveller.com)

[I found Sam's article very motivating, and have pinned it on the wall in my shop, in an attempt to remember and heed his advice. You can learn more about Sam's RV project, and read more interesting articles about RV building, on his web site, at <http://www.ath.tis.net/~sbuc/rv6/smart.html>—Ed.]

I have received many comments on the pace with which my RV-6 is taking shape. Several builders have asked, "How do you build so fast?" The answer is certainly not due to my exceptional shop skills (some builders would probably leave my shop in disgust) but rather to a systematized and rational method of approaching the project. It is for the benefit of new and early builders that I submit the following thoughts about how to "work smart." However, all of us have limited time available for RV playtime, so it behooves all builders to get the maximum bang for their investment in shop time.

The construction hours listed in my builders log are shop hours only. This does not include the time spent reflecting on upcoming tasks while in idle moments at the office or sitting on the thunder mug. And herein lies one of the keys to working smart:

1) Hit the shop door running. I suspect many novice builders spend a great deal of time standing at the workbench just staring at the project. This is not productive shop time. The time to figure out how you are going to approach a task is away from the shop. Instead of watching another mind-numbing sitcom, get out the pre-view plans and really study the sequence of steps that you face in the course of completing the next task.

And that brings us to the next step:

2) Previsualize your shop work. Just this morning I had my first Pro-Seal Party. However, the tanks are taking shape just fine because I have already build six sets of tanks. "Huh?"

"Every time you walk into the shop, you should have the task in mind that you intend to complete by the time you leave the shop."

Yep, I have mentally completed several tanks by previsualizing the tools required, the steps necessary, and the mental prepping needed to "hit the shop floor running." When I started this morning, I already knew which tools I would need, what order in which I would proceed with the task, and I had a pretty good idea of how long it would take to complete the task. Consequently, I had that feeling of "I have done this before." And speaking of tasks:

3) Divide the project into small tasks. An RV is by far the most complex project most of us have ever attempted. This thing makes those Christmas bicycles we assembled pale in comparison! It is very easy to be overwhelmed by the sheer magnitude of the project at hand. The way to conquer this feeling of helplessness is to forget that you are building an airplane, and concentrate instead on building airplane parts! Just build the

rudder—forget about how difficult the fuse may be. Or, break it down even further: just build the stiffeners for the rudder.

Every time you walk into the shop, you should have the task in mind that you intend to complete by the time you leave the shop. Don't set the mark too high, keep in mind that your time may be limited. But if you want to work smart, you will never just aimlessly wander into the shop and try to figure out what it is you want to work on today.

Those of us how have been teachers see this as identical to the process we used to prepare lesson plans. The first step was to establish the objective for that day's lesson. Next we determined what tools (books, VCR, lab equipment, etc.) we needed to attain that objective. We then made sure the tools were close at hand. And finally, we had a way to evaluate whether or not we met the objective.

It should be evident how this translates into our shop habits. It is very difficult to work smart if the shop is in a state of chaos. You need to know exactly where every tool is stored. You need to know where those little brown bags with the little parts are located (you did inventory and label all the bags with their contents?). There is no reason why you can't do this headwork before you ever walk into the shop. Then as soon as you turn on the lights, fire up the compressor, and take your first gulp of iced tea, you are ready to work.

Also, when you have completed the evening's task, the last thing you do

more on page 5...

RV-6 Fuselage Bulkhead Alignment

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"When I check alignment of my rear bulkheads by running strings between F-606 and F-612, I cannot get F-610 to align with the other bulkheads."

This is an issue that I came up against, and although the answer is still somewhat ambiguous, I went through an interesting process, and found out some things about this very issue that you probably want to consider.

On the bulkhead fabrication drawing (my old one, I didn't get a new one either), at some point there was a revision to widen the F-607 and F-608 bulkheads by 1/8" per side, or 1/4" overall. Local lore had it that this was done on purpose "so the skins would lie better". When I got my fuselage all jiggled up I found that there was a bulge in the longerons because of this widening. I decided to call Vans and confirm that this was indeed supposed to be there, since nothing was said about it in the manual, and in fact the longeron curve profile on DWG #22 specifically shows the longeron being "straight aft of this point". Tom and

Bill both told me no, the longerons are supposed to be straight, the revision was because previously the bulkheads were too narrow. Not being satisfied with this, I did the geometry and found that, mathematically, using the dimensions prior to the revision, and at the station lines called out, the bulkhead sides would all have formed a straight line. The extra 1/8" per side added in the revision would add a bulge, and you'd have to move the station lines to make them straight again. I pointed this out to Vans (they really hate it when you do that) but they were still not convinced, and told me if I had to change the station lines to make them straight, then do so. This seemed really weird to me. If I had to move the station lines because of the revision, then why the revision in the first place, and why not move the station lines at the same time as the widening of the bulkheads?

As a reality check I looked at four other RV-6s under construction in the area, and ALL of them had this bulge. So I decided to track down the lore that said they were supposed to bulge. I finally found that it originally came from Art Chard who, as we all know, used to build prototypes for Vans. Art told me that yes, a side effect of the

way the tailcone skins are rolled is that there is a slight curve to the skins perpendicular to the bottom "curl", and that the bulge was added so as to offset the tendency of the skins to oil-can. He also said that aerodynamically, an 1/8" bulge should be insignificant.

So according to Art Chard, there is supposed to be a 1/8" bulge per side between the F-606 and F-610.

I went back to Vans with this, and they finally conceded that there may have been a revision such as this that no one remembered the reason for, but they also said that they went out and laid a straightedge up against the factory demonstrators, which were all built by Art Chard, and they couldn't detect any bulge. Go figure.

So I left the bulge in. I did end up widening the next aft bulkhead by 1/16" (F-610) to remove a slight "fish-tail" flaring at that point. Now when you sight down it you can see a slight curve, but otherwise it's undetectable. My skins lie nice and smooth, and there appears to be no oil canning.

Bottom line is, I really don't know if it helped or not, but at least it didn't hurt anything.

...from page 4

before leaving the shop is clean the tools, return them to their proper place (unless you have really taken this lesson to heart and have already visualized tomorrow's task, and laid out what you will need then—in which case you get an A+), and sweep up the filings. The whole point of this exercise is to prepare yourself and the shop for a new task. This is key to

feeling that you are making real progress and generating a pile of airplane parts. It also means that tomorrow you will arrive in a clean shop that is optimized for working smart.

Well, hopefully you get the idea. There is more to be said about the construction sequences used to maximize shop efficiency and personal fulfillment. I apologize for bordering on verbosity, but hey, the whole point is to fly these critters as soon as possible

so we can boast of one of those "First Flight" stories! I suspect that many projects have been abandoned because the builder lost his way, lacking a cohesive plan for seeing the project to completion. I readily admit that circumstances beyond our control can derail our projects, but let's be sure that it is not our own lack of shop discipline that is responsible for our RV becoming another orphan.

RV Safety: How do we compare?

Tedd McHenry, Editor

Some months ago on the RV List, there was an interesting discussion on number of RV accidents in the NTSB database (U.S.). This led to more discussion on the RV accident rate, vis-à-vis the accident rate for other light aircraft. To calculate the RV accident rate, in accidents per 100,000 flying hours (the rate that the NTSB reports), I needed to know the number of RV accidents and the total number of RV hours logged in the same period. The accident numbers are in the NTSB database—no problem there. But to estimate the number of RV flying hours, I decided to survey members of the RV List itself, to see how much they flew over the same period, then multiply that number by the official Van's estimate of the number of RVs flying. The period under investigation was July 1998 to June 1999, inclusive.

This sampling method (voluntary self-reporting by RV List members) is far from random, so I'll try to resist the temptation to draw firm conclusions. I've included all the raw data

“The NTSB accident rates for GA aircraft in the USA are 7.12 accidents...and 1.35 fatal accidents per 100,000 flying hours.”

in the table accompanying this article, along with the statistics I calculated from it.

The NTSB accident rates for GA aircraft in the USA, for 1998, are 7.12 accidents per 100,000 flying hours, and 1.35 fatal accidents per 100,000 flying hours. This has been on a more-or-less steady decline since at least 1982 (the first year

for which I have data), when the numbers were 10.90 and 1.99, respectively.

The fleet rate for all types of RVs in the period 1 July 1998 to 30 June 1999, as surveyed, is 10.8 accidents per 100,000 flying hours, and 1.5 fatal accidents per 100,000 flying hours. This is based on the following data:

- average flying hours in the period (as surveyed) of 107.8
- 1811 RVs (all types) flying in the USA, as estimated by Van's
- 21 accidents, including 3 fatal accidents, in the NTSB database, for the period

But this may not tell the whole story. Quite a few people reported the lifetime hours of their RV, which tells quite a different story. While the 98-99 average, as reported, was 107.8 flying hours, the lifetime flying hours data averages 199.6 hours per year. At that rate of flying, the RV accident rates drop to 5.8 accidents and 0.8 fatal accidents.

So, which estimate more accurately reflects how much RVers actually fly? If anyone has any ideas how to derive that from the data, I'd like to hear them. My gut feeling is that the reported lifetime rate is probably high. Why? Because of the self-reporting nature of the survey. Those who are (justifiably) proud of the amount they fly are more likely to report than those who don't fly so much. There is anecdotal evidence that suggests this is true: quite a few of those who reported lifetime hours said that they thought they flew more than most.

Warning: what follows is my opinion only! The data isn't random enough to draw firm conclusions. I think the data suggests that the RV accident rate is pretty much in line with the GA rate. While the 98-99 rate, as reported, is slightly above the GA average, the lifetime rate suggests a much better number. Given the widely-accepted hypothesis that homebuilt accidents are quite a bit more likely in the first few hours of a new (or newly-acquired) homebuilt, all the data suggests that RVs are at least as safe as the GA average after that initial period.

Database Number	Type	98-99 Hours	Hours Total	Life Hours	Life Rate
1	4	97.0	600	5.17	116.1
2	4	160.0			
3	4	84.4			
4	4		750	6.70	112.0
5	4	80.0			
6	4	88.0			
7	4	75.0			
8	4	100.0			
9	4		516	2.45	210.9
10	6	198.0	355	1.78	199.3
11	6	161.8			
12	6	95.0			
13	6		90.5	0.64	142.4
14	6		288		
15	6A	120.0			
16	6A	1365		5.83	234.0
17	6A	68.0		2.61	
18	6A	66.0			
19	6A		550	1.75	314.7
20	6A		60	0.41	147.0
21	6A	220.0	487	2.17	224.7
22	6A		259	0.88	294.5
23	6A	46.0			
24	8	65.0			
Feet Average		107.8	483.7	2.8	199.6
Standard Deviation		51.2	361.4	2.2	70.6

28 Volts from 14 Volts

Brian Lloyd, Bay Area RVators

[Brian is an engineer at Lucent, and a regular contributor to the RV List—Ed.]

I received a sufficient number of requests for info on running 28V gyros off a 14V electrical system that I felt it warranted a reply here. First, I want to amplify on my comments about 28V gyros being cheaper. I found that older 28V gyros are cheaper than new ones and they appear to be more robust. (I like to do aerobatics which tends to bash gyros.) I was able to purchase an overhauled and yellow-tagged AIM attitude gyro for \$700 from the Gyro House in Auburn, CA. (No, I don't know if they have anymore.) This is the older style gyro with the black background and a single white line for the horizon. None of this "the sky is blue and the ground is brown" sissy stuff. It is a standard 3.125" instrument. This gyro handles 360 degree pitch and roll. (It does incorrectly show a roll if you hold it at exactly +/- 90 degrees of pitch for any length of time but I am not too worried as I do not keep my RV-4 pointed straight up or straight down for any significant length of time.

OK, I have just saved \$700 on the attitude gyro, but how do I make it run on my 14V electrical system? (No, it won't do anything if you try to power it off of 14V—I tried just for grins.) I turned to one of my electrical engineer friends who builds power supplies for a living. He pointed me at the Maxim Max 1771 adjustable, high-efficiency, step-up DC-DC controller chip. You can pick up the data sheet at <http://209.1.238.250/arpdf/1030.pdf>.

One of their examples is a "2V to 12V input to adjustable 24V output"

converter, which is almost exactly what you need to build. The kicker is that Maxim makes an evaluation kit for this chip which is a complete, ready-to-use converter on a 1" square circuit board. This board is designed to take 5V in and output 12V but you can make it do 14V in and 28V out just by adding two resistors, for which they have included space on the board, and

"If you are concerned about soldering just remember that soldering is a skill like driving rivets and you managed to learn how to do that, right?"

changing the output capacitors from 20V units to ones that will handle the output voltage. (I used output caps with a 36V rating.) You can get the data sheet for the evaluation kit at <http://209.1.238.250/arpdf/1260.pdf>

If you are comfortable scratch-building circuits like this (the parts count is pretty low—about 10 components) you can talk Maxim out of free samples of the chip. I am lazy so I paid the approximately \$30 for the evaluation kit since it had the somewhat-hard-to-find components already there. (No, you can't get all the components you need at Radio Shack.) The hardest part of building the converter is solving the formula that selects the two resistors that set the output voltage. As I recall the two nearest standard resistor values resulted in an output voltage of just short of 27V (something like 26.8V). The values I used are 10K for R1 and I think 168K for R2 (these will make sense when you read the data sheet which describes the circuit). The resistors are chip resistors which require somewhat of a delicate touch to solder to the board. This was my first experi-

ence soldering surface-mount components (no leads) but it wasn't too difficult and I didn't destroy anything in the process. If you are concerned about soldering just remember that soldering is a skill like driving rivets and you managed to learn how to do that, right?

The finished converter seems to be able to source about 1.5A at 27V.

Since the gyro only draws about .8A at that voltage, it looks like there is ample margin. The converter gets only mildly warm (maybe 20 degree F temperature rise) in

operation. The gyro seems to like it just fine and the whole mess has run for 24 hours on my work bench with no sign of trouble. If you are planning to power two gyros, I would build one converter for each gyro. That way not only is the converter running at only 50% of its rating, but a failure of a converter would only disable one gyro.

One possible concern is interference with the radios. Since the converter runs at about 200 kHz, I suspect that it would interfere rather badly with an ADF. If you have an ADF you will probably need to build the converter into a shielded box with filtering at the input and output. I did not shield mine since I did not plan to have an ADF in my RV-4. I have run tests and have not detected any interference with my comm, nav, or GPS receivers.

I hope this helps someone. It saved me about \$700 on the price of a gyro and was a relatively quick and rewarding project. If you decide to go this route feel free to drop me a note if you have questions or need assistance.



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Mission

To provide information and entertainment for members of Van's Air Force—Western Canada Wing, builders and flyers of kits made by Van's Aircraft.

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Membership is CDN\$10.00, or US\$7.50 per year, which includes four issues of WCRVator. U.S. members are welcome. Mail membership dues to the address above.

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We encourage submissions from any source, without compensation but with thanks. You can submit by hard copy, disk, or email. Mail submissions to the address above, or email them to

tedd@compuserve.com

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Disks	DOS (Windows) and Macintosh—please use ASCII (text only) format
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Letters

I am still working on the upper skins of the fuselage and about to be delayed by installing a compartment to hold skis and golf bags. I want this compartment fully skinned so that no foreign objects can fall down and jam the elevator controls or rudder cables. I am going to take a small weight penalty (2-3 lbs) to have the peace of mind that my addition is completely safe. Other builders are flying with skis in the back of their planes with only bungee cords holding them down. Not me, I will have hard points to use small ratchet straps for maximum security.

I will then do the baggage compartment, seat pans, and rudder cables before starting on my finishing kit. I went and picked it up last Monday though so it is all here except the cowl. I will use the fancy Barnard Cowl from Florida with their sealed plenum that bends the air gracefully into the cooling fins. The inlet air is used more efficiently this way allowing smaller inlet holes. 52 inches stock down to 35 inches custom. This has the modern round inlets like the Lancairs. Looks beautiful. The Florida guys say it will go faster with less drag. They also claim that their installation is 22 lbs lighter than the stock S cowl but they have to be full of baloney on that one. How could it possibly be? I do believe it will go faster though but I will have no way of comparing. My ship will be a heavyweight, IFR, cross country machine. These are my goals. I want to travel. When the weather is down I want to strap on the oxygen and fly long legs above 14,000 feet. Not much ice up there. RV's can climb well. Stormscopes can keep you out of the ice and turbulence. When coming home stay high and aim for the water

between ZBB and YYJ for letdown. The weather is always better out over the water. If you have a stormscope and stay away from the cells you will find mostly broken layers out there.

I have my finances arranged to buy my new O-360 A1A in July next year. This will probably be perfect timing to have the finishing kit finished. If I finish early I will install the entire tail and fit that funny fairing and rig everything up. I can then take it all apart and paint it. That should keep me busy for a while if I am waiting. Could also get started on the panel too.

I don't need the cowl then until next summer. The engine must be on first I think.

Norm Hunger, Delta, BC

Classifieds

FOR SALE

I have located a 150HP O-320 E3D Engine that has 640hrs on it and is certified and still running in the aircraft. Comes with carb, mags, starter and flywheel. \$12,000CDN no tax and can be flown in the Warrior that it is in. The engine is in Grande Prairie. Barry Tunzelmann, K-1 Design Services Ltd, (250) 832-3538.

RV6A wing kit and tail kit. Tail is built, primed and crated. Wing just started. Anodized Phlogiston spar; "BAC fast build kit"; skins pre-punched. Clecoes, rivets, manuals and plans included. \$9000.00 cdn. Tools (worth about \$800.00 US) optional. 250-558-7838; afternoons 250-558-1200 ext.1504