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RECREATIONAL RFLYER

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The Voice of Canadian Amateur Aircraft Builders $6.95

From The President's Desk

Gary Wolf RAA 7379

CHAPTER 85 ACCIDENT INVESTIGATION

The Canada Transport Safety Board frequently does not commit resources to investigate accidents involving uncertified aircraft. The reason is that their investigations are meant to provide information to prevent future accidents. Since each Amateur aircraft is considered to be a unique project the rationale is that there is little of general interest to be learned by performing an investigation.

A member of Chapter 85 who had recently imported a US Amateur aircraft recently had a sudden engine failure during climb. He lived but the plane was substantially damaged. The Chapter safety committee, led by Peter Whittaker, dismantled the engine to discover the cause of the engine failure, and their report is in this issue. Chapter 85 is to be commended for initiating and following through on this safety matter.

REUSING A FUSELAGE IN A NEW BUILD

There are a few considerations when beginning an Amateur aircraft build with a fuselage that was previously part of a registered aircraft. The legal consideration is what to do about the fuselage's current data plate. An aircraft cannot have two data plates so the current one must be removed, but written permission from Transport is required to do this. First matter is to contact your local TC office to explain your intentions, and they will then send you permission. If the plane has not already been deregistered, they will also want its C of A and C of R. The fuselage will then lose its status as an aircraft and become just a used part. The same procedure must be used if you wish to deregister any registered aircraft to rebuild as an ultralight.

Transport Canada's regional offices have some measure of autonomy so it is possible that procedures might vary somewhat. First matter is to contact your local office for direction.

With your fuselage now removed from the registry you may have the MD-RA do a 51% evaluation of your project. If the fuselage requires repairs, wait until after this inspection so that any reconstruction can become part of the 51% evaluation. Repairs performed before the 51% evaluation are considered to have been maintenance of the fuselage in its previous life, and do not count towards the 51%.

UNMANNED AIR VEHICLE OR MODEL PLANE?

Recently Amazon had commercials showing that they wish to deliver packages using UAVs, and some pilots became concerned that these would intrude into the airspace used by conventional aircraft. Transport Canada and the FAA are both working on a means to integrate these aircraft into their systems, and at present under CAR 602.41 a Canadian commercial UAV requires a Special Flight Operating Certificate (SFOC) for each flight. The UAV is considered to be an aircraft that has its pilot on the ground. In future a commercial UAV aircraft will be marked and registered, and it will meet a design standard and hold a flight authority. There will be an operating certificate and the pilot will be suitably licensed. All of this is still a long way off.

A Privately owned UAV such as the Radio Shack Parrot is considered to be a model aircraft, as long as there is no hire or reward for its operation. Model aircraft may be used for aerial photography, same as any non-commercial aircraft, but only for personal, noncommercial purposes. As soon as there is any form of payment, the regs have been broken, and Enforcement would take a dim view of an illegal commercial operation.

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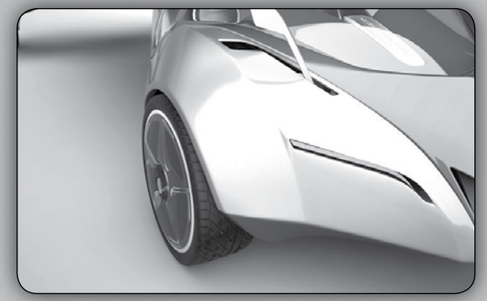
features



columns

George Gregory

A Nanching lifting off at Delta Heritage Air Park, 2009. On the cover: The Wiebe RV-6. Mike Wiebe photo.

BY JACK SEAMAN

TO TALK WITH DON KINGSLEY one would hardly guess that he was an avid airplane builder.

Don learned to fly at the Brampton Airport in 1982. After reading an article about Red Morris' solo non-stop flight across Canada on July 1, 1978 in a Zenith 300, he decided to build his own 300.

At that time , in the early 80's, Don was living in a small house in Mississauga and the only place to build was in the basement. Armed with a set of plans and inspired determination he worked away on evenings, weekends and days off crafting and assembling the various components in the basement workshop. After 2 years of steady work, the wings and fuselage were ready to be assembled, and like countless basement builders before him Don had to cut a large hole in the livingroom floor to fit the large pieces through. Somewhere in Mississauga there is a house with a living room rug that covers the patch of the hole through which the fuselage was passed on it's way to the backyard.

Once the wings were attached and the engine installed, it was time to start it up. So, under the watchful and curious gaze of interested neighbours, Don cranked the engine over and it fired up in a victorious roar that resounded throughout the neighbourhood.

After flying it out of the Brampton Airport for a while, Don sold it and decided to build a Zenith 701.

By this time he had moved to a 2 bedroom apartment on the 8th floor of a building in Mississauga. No basement here, so one of the bedrooms was converted into his workshop. After the ribs and various pieces were made they were stored under his bed while awaiting assembly. The wing spars were too long to fit in the elevator so they had to be passed down the fire escape.

Don had the foresight to build the fuselage in 2 pieces, each one just able to fit into the elevator. By now Don had retired from his job at Medtronic, a pacemaker manufacturer, and he and his wife Beate decided to build a house together on Christian Island, northwest of Midland. After the house was started they moved all of their furnishings out of the apartment, including the 701 components, and transported everything to Christian Island. The work on the house and plane went on until finally, when it was completed, the 701 was loaded onto a trailer, shipped to the mainland on the ferry and moved to the Huronia/Midland Airport, home of the Zenair Company. Tom Mills, a friend of Don's, checked out the plane and test flew it. The plane was kept and flown from there while Don tackled his next project, building a set of amphibious floats for the 701.

Being a do-it-yourselfer, Don built his own arc welder and used it to make a bending brake, press and other tools that he would need to make the bulkheads, ribs and fairings from aluminum. Once the floats were completed, Don decided that he would fly the plane from Huronia/Midland over to the island and

install them at his house. There was only one problem..... there is no airstrip on the island. Since he is innovative, Don arranged to land on the beach at the other side of the island. At precisely 10 AM when the kids were in school and the road traffic was at a lull while the ferry was out, he taxied the plane 6 miles along the road to his house while enjoying a police escort, with one police cruiser ahead of him and one behind. Once the floats were attached, he taxied on the float wheels back to the beach and then taxied by water on the new floats around to his house on the shore.

Don's next project was finishing a partially built Zenith 200 that someone else had started. He needed a good sized workshop so, being a builder.....he built one .....beside his house. He discovered that the previous workmanship on the Zenith 200 was lacking so he had to replace all of the bolts and wiring before he could proceed to finish it. It took about two and a half years to finish and when it was finally complete he transported it via the ferry to the Huronia/ Midland airport.

Not long after this he and Beate decided to move so he sold the Zenith 200 and they purchased a shoreline property near Owen Sound. Once again Don and Beate donned their carpenter's aprons and after clearing the lot proceeded to build yet another house and garage. Recalling his Mississauga livingroom floor experience, Don incorporated an extra wide opening and door in the foundation of the new house ... he wasn't finished building airplanes.

After moving his 701 to the Owen Sound Billy Bishop Regional Airport, he removed its floats and installed Jeep gears and large wheels. He flew it out of Owen Sound for a while then sold it to a buyer from the US. Next, Don bought a Cherokee 140 in New Brunswick, and he and Tom flew it back to Owen Sound. At this time Don purchased a hanger at the airport to house the Cherokee.

Don felt that he needed "something to do" and Gary Wolf put him onto a wrecked Zenith 701 in need of rebuilding. Don and Beate decided to take advantage of their shoreline location, so they had a harbour dug out in front of their house to provide a swimming area and a place to run a floatplane onto land. After rebuilding the 701 and installing a Rotax 912 engine, he installed a set of Zenith 1150 amphibious floats and flew the plane off the shore for about 5 years.

Some of Don's stable: top and second down, his first project, a Zenith CH-300. Next came a 701 on floats, then he adopted Zenith CH-200 (bottom, left) in need of a little TLC. Next came another 701 (opposite, top) restored from a wreck; they even dug out a small harbour in front of their cottage to provide safe haven on the lakefront. After that came the RV-6 (opposite) - a kit before predrilled CNC kits came online.

Besides his interest in building airplanes Don is also a Big Brother and a mentor to several young boys in the area.

In his spare time Don took on the task of repairing a damaged 701 and then he sold the Cherokee and decided to build a Vans RV6 from a kit that he located. This was before the advent of predrilling, so over the next 4 years Don toiled away in the basement drilling and riveting , making and assembling the parts. Once completed, he installed a Lycoming 0320 engine and added a Dynon panel. Don enjoys flying this plane around Ontario and is very pleased with it's performance.

Don sold his 701 on floats but soon had it back for repairs under contract as the result of an accident. Once that was completed he picked up an unfinished kit for a Corby Starlet and started his first project working with wood and fabric. Having previously worked exclusively in aluminum and steel, this was a new challenge, and Don is up to it; he is currently about three quarters done and has installed a VW Aero-Vee 2180 cc engine.

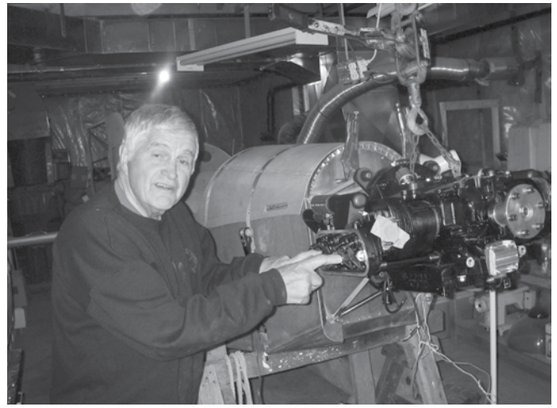
Besides his interest in building airplanes Don is also a Big Brother and a mentor to several young boys in the area. One of them,

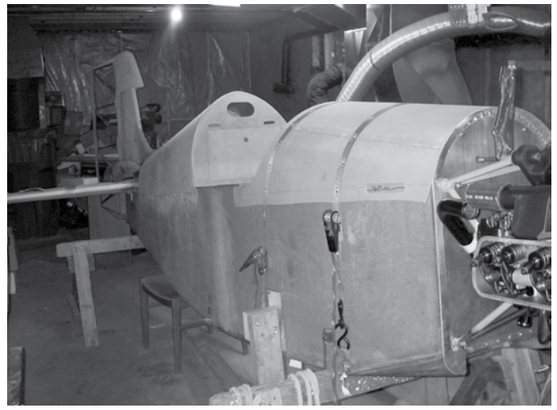
Don's latest project - an Australian designed Corby Starlet - is a zippy VW-powered wood aircraft capable of sportsman level aerobatics.

with Don's encouragement and assistance, joined the Air Cadets, earned his pilot's licence, and is currently in Ottawa studying computer science.

Beate is very supportive of Don's "building bug" for over the years she has helped build their houses and has patiently put up with having her living spaces double as work areas. She is an avid quilter and is always working on a new sewing project while Don is "tinkering away" in the basement workshop.

So what is over the horizon for Don to build? He is currently content to fly his RV6 and work away at the Corby Starlet but judging from his past achievements, when the Corby is completed Don's attention will turn to a new project and the challenges that it will present.





***Jack Seaman** is a friend and fellow pilot who enjoys accompanying Don on trips in his RV6.*

Free IFR Scenario Training iPad app from PilotWorkshops

Nashua, NH - PilotWorkshops.com has announced the release of their new IFR scenario-based training app for the iPad. Called "IFR Mastery", the free app provides two challenging IFR scenarios based on PilotWorkshops' popular IFR Mastery online training. The app is available at: http://pilotworkshop.com/ifrapp or by searching for "IFR Mastery" in the iTunes store.

Within the app, pilots watch a video that sets the stage by putting them in a real, challenging IFR flight situation. After watching the video, pilots are presented with multiple options and relevant resources to help them decide which course of action to take. The pilot commits to their decision via a poll and immediately sees how their decision compares with thousands of other pilots.

Pilots are then presented with a brief instructional video where a PilotWorkshops expert instructor explains how he would have handled the situation, providing valuable tips and tactics. Finally, a roundtable audio lets the pilot listen in as the entire PilotWorkshops' team of instructors discusses the scenario and shares their own relevant experiences and strategies.

Making a Difference

Gratitude and thoughts on a mentor / by George Gregory

I was a socially awkward kid, small for my age, but just crazy about airplanes. Born that way, I guess, with dreams of flying, but with no like-minded individuals to get excited with. I had my first ride in a family friend's Cessna 170 about the time I was 12 (though already a confirmed aviaphile), and thereafter made a few attempts to build my own wings, even recruiting my Dad to tow me down our Edmonton street with the family station wagon.

When I was 14, two life-changing events occurred. The first was the discovery of a Chanute type glider designed by a fellow called Jack Lambie, and for which the plans cost was a mere $3.00. The advertised build price was around $25 (though it eventually cost me closer to $50): within reach of even a kid with only paper route money. And I did eventually build and fly it, albeit briefly. But that's another story.

What I want to write about is the fact that about the same time, we got new neighbours. Right across the street from us moved a family *with an airplane project.* The man of the house was one Bill Marsden, and he was working on an Isaacs Fury, a replica of the famous 1930's era British fighter, perhaps the zenith of biplane development.

It wasn't his first airplane. He'd build a Jodel D-11 with a rather elaborate paint scheme, which he had sold to his brother, and who gave me a ride in it shortly before our move to the coast (it was wonderful, and my first ride in a homebuilt).

I became fast friends with his son Mark, and became a regular groupie around the Marsden home. Bill was patient and seemed happy to answer my many questions. I remember watching him put fabric on the wings, the smell of dope and glue being carefully applied to the white fabric. The completed fuselage sat on its gear downstairs, and it truly was a thing of beauty with (if I recall correctly) a wood dash and period instrumentation. Building is a very esthetic experience, and the sights, sounds and smells made a deep impression, instilling a passion that lingers to this day.

Of course (this was 1970) he was a member of the EAA and presumably the Edmonton chapter.

We moved to the coast in 1972, scant months before the Fury flew. In the few years immediately following, I visited my old Edmonton neighbours, and was shown pictures of the first flight. It was, evidently, a hot little number, a far cry from the docile Jodel he'd built previous.

I sort of lost touch with the Marsdens after that. Shortly after our move west, I joined the EAA, but for some reason never looked up the Vancouver chapter until 1993, by then an RAA chapter. Being a printer by trade, I was soon involved with the newsletter (still am), and would often get sister publications mailed to me by other chapters, including the Edmonton chapter.

I noticed one issue mentioning the donation of a Ganagobie project by Edmonton member Bill Marsden. Could it be the same fellow? It had been 20 years. I called up the chapter president, and so it was. I was able to get hold of Bill's wife Sally, who explained that Bill had lost his medical and had - being the inveterate builder he was - taken up *boat building,* of all things. He was out of town, though, and I never did get the chance to chat personally with him.

continued on page 41

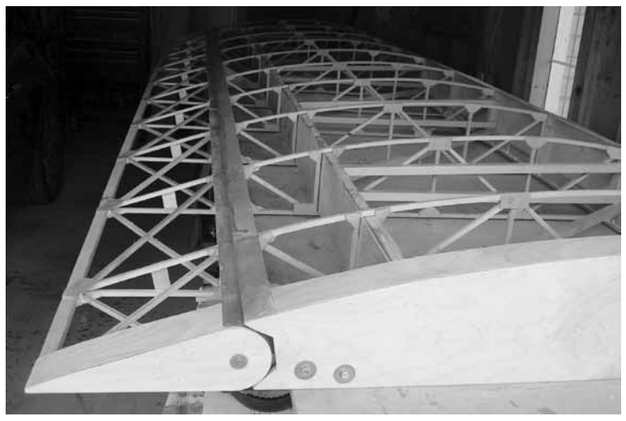
BUILDING THE RW-11

by Jesse Beauchamp

WHEN I STARTED THINKING seriously about building a plane I knew I had to base my selection for a design on a few key factors: it had to have two seats, it had to be able to be flown year round and it had to be cheap to build. The first condition is a no brainer; like most pilots, I earned my permit daydreaming about taking friends and family up for a ride. If I could do this in a plane I had built myself, well that would be even better. The second condition was based on the fact that the plane I currently fly, the RW-1, is a scaled down replica of a Pietenpol Aircamper. The plane has an open cockpit which really limits my flying to warmer weather. This means I miss all those sunny, still air days in late winter when I'm really itching to get flying again. The third condition is the most important. When I started this project I was twenty-eight years old. I was renovating our house, and my wife and I were thinking about starting a family. Now five years later I'm renovating a new house and we have that family; cost was and still is the most important factor.

You would think from the limitations that were imposed on me by my own requirements that my list of possible designs would be very short, but home-building was born during the depression. Its existence is owed to tinkerers and scroungers who just wanted to be able to fly, and so I found a multitude of designs to choose from. I settled on the RW-11, it's a replica of a Piper Vagabond designed by Roger Mann of RagWing Aviation and is appropriately called the Rag-a-Bond. I was familiar with the design already as the structure is essentially a scaled-up version of the RW-1 that I currently fly. There have been a number RW-11's built already and they are reportedly quite nice to fly, with characteristics that favour that "low and slow" flight that I really enjoy. But the most important thing that this design had going for it s that it's all wood, and this is where my building experience starts to get a little different.

My parents own some land in Tiny Township, about 75km North of Barrie ON, and my dad spends a lot of his time

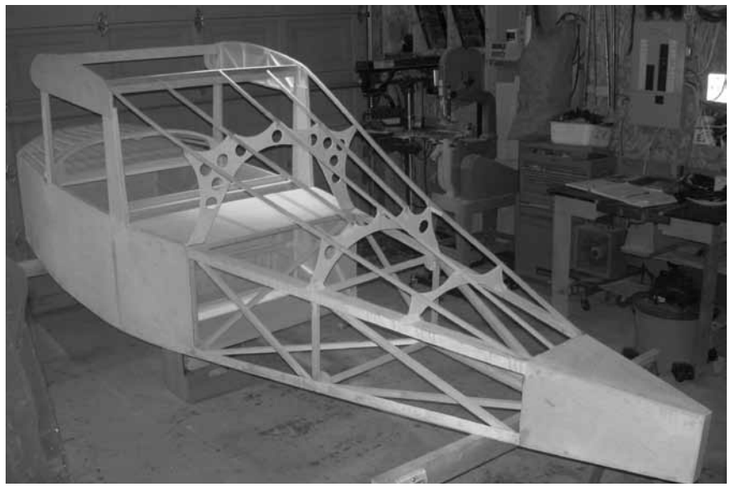


there selectively harvesting trees for lumber and firewood production for his personal use. He also owns a small portable sawmill which allows him to cut his own lumber from those trees that he removes. So when it came time to procure the materials for my airframe I had to look no further than the nearest suitable white pine. Luckily we already had some cut, dry lumber of suitable quality for me to start on the wing ribs and spars, but it was necessary to make an additional trip into the bush to find lumber for the fuselage and portions of the tail.

The first step in finding a suitable tree was to find the right species, in this case a White Pine. White Pine is an acceptable substitute for Sitka Spruce, it is not quite as strong but it is lighter so it's possible to increase some of the dimensions for strength without compromising weight, and it is a species that is quite common in homebuilding. Next, my dad and I had to find a White Pine with a straight section of 12' or more that was relatively free of branches, and therefore free of knots. With the tree down and limbed we cut it into saw-logs and trailered them back to my parents' house where the logs were loaded on the mill. We cut them into 1" boards then we stacked the boards to dry. After a couple of months the humidity in the boards had reached the atmospheric humidity and so they were ready to use. I selected the best sections, free of knots and grain run-off, ripped them to size and ran them through the planer and I was left with aircraft quality lumber.

When building a wooden plane you will repeatedly hear of the necessity to use quarter sawn lumber, and this is because it is the most strong and stable grain pattern available. The term "quarter sawn" refers to

Construction is pretty standard for a wood airplane - just like a big model. White pine was used instead of spruce; when dimensioned properly, it's an acceptable substitute. Jesse harvested his own wood for the aircraft.



All those little bits of wood glued together make a structure that is light and strong.

...the most important thing that this design had going for it s that it's all wood, and this is where my building experience starts to get a little different.

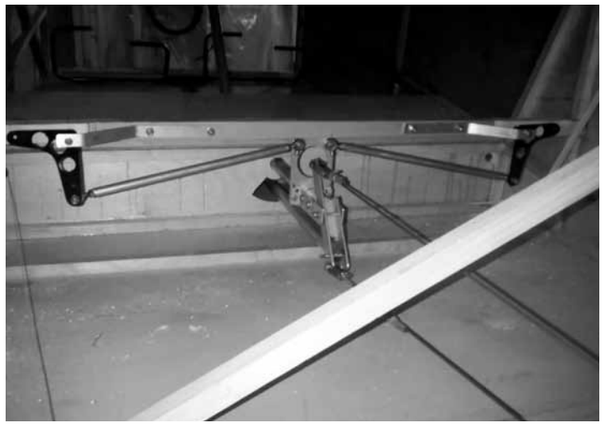
the arc of the tree rings being between 60 and 90 degrees in reference to the edge of the board. To produce quarter sawn lumber you would essentially rip a log in half, rotate it 90 degrees and rip it in half again. You would then have a log cut into quarters from which you could begin to slice your lumber, rotating 90 degrees after each slice. This method yields smaller boards dimensionally but they are of high strength. Generally production lumber is flat sawn, (the log is simply sliced horizontally into boards) and this is not suitable for airframe production; however, if you are to look at the end of a flat sawn board you will see that portions of that board have grain between 60 and 90 degrees to the edge and this portion is acceptable quarter sawn lumber.

The first step in the construction process was to build the tail feathers. The tail is constructed entirely out of ¾" by ¾" stock gusseted together with either 1/16" or 1/8" ply. The curves of the tail were made by slicing thin strips of ¾" pine, soaking them in the bathtub, and bending them around a jig made of small blocks screwed down to the surface of my workbench in the necessary arcing pattern. I used polyurethane glue to adhere the strips together, as the water from the bathtub draws the polyurethane into the wood as it cures and creates a superior bond.

The next step was to build the wings. It started by building a wing rib jig by taking a full scale drawing of the wing rib, adhering it to a piece of MDF, covering it with waxed paper and nailing little blocks of scrap wood in place that would be used to hold the rib pieces together while the glue dried. After that all I had to do was build a standard truss rib..... twenty four times. With the ribs done I moved onto the spars. Spars on the RW-11 are made from ¾" by 1" (I used 1 ¼") cap-strips joined by a 1/8" web to form a C-spar. There are hardpoints of solid pine built into the spar for fuselage and strut attach points. All ply web material was cut and the seams were scarf jointed using a belt sander to make the scarfs.

With the ribs fastened onto the spars and all the compression members in place, it was time to wrap the leading edge with 1/16" ply. I found that the easiest way to do this was to cut the ply to size and glue just the bottom edge so that there was essentially a long strip of plywood running from root to tip, glued only to the bottom of the wing. I then made temporary tabs out of ply and glued them to the other edge of the leading edge ply. Once all the glue was dry all I had to do was hook ratchet straps to my temporary tabs and tighten them up. This drew the leading edge wrap tightly around the leading edge ribs, and once the glue had hardened I could remove the ratchet straps and sand off the temporary tabs. Wings complete.

The last step, as far as woodworking is concerned, was the fuselage. The fuselage is a simple truss struc-



Left, the control linkages looking forward. Below, it's starting to look like an airplane - time to sit and daydream.

ture made of ¾" by ¾" pine with 1/8" plywood gussets reinforcing the joints. It was built by first drawing out the truss shape onto the work surface, then temporarily fastening down blocks to the surface to hold all the stock in place while the glue cured. After the first truss was complete I just had to remove it from the jig and repeat the process for the opposite side. The two sides were then stood vertically and tied together with more pine of the same dimensions to form the 3D truss structure of the fuselage. The cabin area was sheeted in 1/8" ply, as well as the tail cone. There were no plans included for the turtle deck as this is not part of the loaded structure so I had to improvise the design myself and I'm quite satisfied with the result.

With all the wood structure complete it was time to move on to the metal work. The RW-11 was designed with the non-welder in mind and as such it has many drilled and bolted aluminum joints. Although I understand the rationale for designing in this way, I still find it a little frustrating as it is much more difficult to drill perfectly aligned holes in round stock and bolt them than it is to jig and weld thin walled 4130. With this in mind I substituted where appropriate. Landing gear, rudder pedals, aileron bell cranks are welded 4130, while fuselage reinforcing, stick, torque tubes and pushrods are 6061 aluminum. Welding some of these parts also allowed me to "clean up" elements of the design that were made necessary by bolting, particularly the main gear legs and the aileron bellcranks. I built two wing tanks that fit within the innermost bays of the wing using .025" 6061 and sealed the seams. The metal work on this airplane was a great learning experience for me, I wasn't a novice but I had never needed to build with this level of precision before, and it was very satisfying to be able to build these parts successfully.

As it stands now, the plane has passed the pre-cover inspection. I was given the "go ahead" to complete the plane and I have moved on to the covering process, using Ceconite and Certified Coatings dope. The tail and fuselage are covered and I just have to make a couple of changes to the wings, and then I will cover them too. In May 2013 our second son was born so progress on the plane has obviously slowed while I concentrate on bigger things. Although progress has slowed, it has not stopped, and I now look forward to the completion of this project with the help of my boys.

If any member has a suitable A-65 engine, please contact Jesse at jbeauchamp_bell@hotmail.com.

Anatomy of an Accident

The crash of Zenith C-GNYX / Peter Whittaker

ON NOVEMBER 3RD, 2013 Zenair 601 HDS C-GYNX was conducting initial circuits at Delta Heritage Airpark, Delta, British Columbia, Canada (CAK3) after being imported from the USA. The aircraft was powered by a Subaru EA81 engine with a Stratus aircraft conversion. On the third circuit after take-off and upon initial climb out, the engine stopped abruptly at an estimated height of between 150 and 200 feet above ground. The aircraft suffered a very hard landing on the grass runway and bounced into a row of bushes lining the runway. The aircraft was deemed a write-off as the landing gear was destroyed and the fuselage both behind and forward of the cabin was crushed. The pilot was alive and conscious at the scene and sustained non-life threatening injuries. After the pilot was safely removed from the aircraft, the structure was secured by turning off all electrical and fuel systems. The aircraft was moved into a hangar where it was covered until a later investigation could take place.

After discussion with the Transportation Safety Board, it was recommended that Chapter 85 of the Recreational Aircraft Association Canada, undertake an investigation into the accident with the permission of the pilot/owner. The owner requested that the chapter proceed with an investigation and it was carried out on Saturday, November 23rd, 2013 at Delta Air Park.

Summary

The aircraft was flying normally during post import test flights. Several engine components were serviced during the inspection period including the distributor. Fragments of metal were found jammed between the distributor housing and the shaft. These metal fragments caused the distributor shaft to seize and in turn this stripped the aluminum drive gear at the engine. The loss of rotor movement stopped ignition to the engine. It was later established that a brass distributor rotor tip had become lodged in the distributor housing during servicing of the distributor which led to mechanical failure of the distributor. Accounting for all lost items during construction or servicing an aircraft is a task that is essential to flight safety.

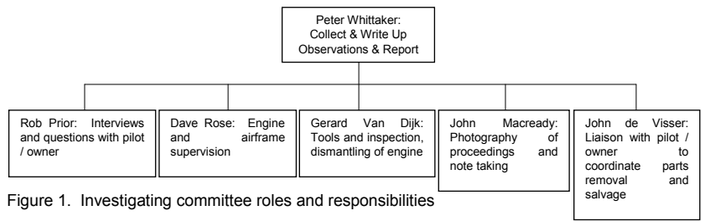


Figure 1. Investigating committee roles and responsibilities

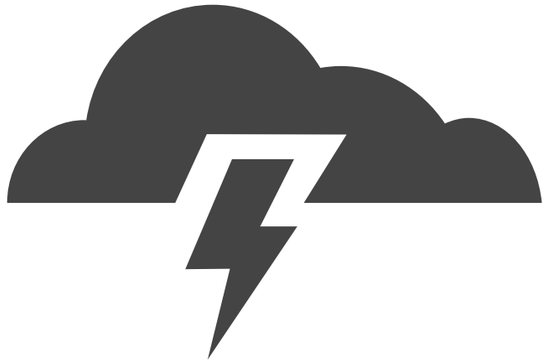
Investigation Committee

An investigation committee was formed from members of Chapter 85 with a plan to carry out an inspection of the engine and airframe on Saturday, November 23rd, 2013. The committee consisted of the individuals with their roles and responsibilities outlined in Figure 1. The investigation was undertaken with the permission and involvement of the pilot / owner.

Background Information

A number of questions were discussed with the pilot/owner prior to the inspection and these provided background information about the condition and readiness of the airplane prior to the flight. The aircraft had been purchased in the USA and flown by the previous owner and the new owner to Delta Heritage Airpark (CAK3), British Columbia, Canada. The trip logged 17 hours of air time. Afterward, the aircraft underwent an inspection by MDRA (Ministers Designate Recreational Aircraft) before being cleared for further flight in Canada. The only modification required to the engine was the addition of electric carburetor heat units to both carburetors. Information about the condition of the aircraft prior to flight from the pilot / owner confirmed that:

1. The engine had accumulated 317 hours at the time it arrived at CAK3
2. All requirements from MDRA had been satisfied
3. The engine had been given a thorough run-up prior to take-off, the Hobbs indicated 0.4 hours of which approximately 0.2 hours were for the engine run-up
4. Sufficient fuel was on board for 1.4 hours flying (30 litres) with the header tank at ¾ full
5. The engine achieved full take-off RPM
6. The distributor had been serviced prior to test flying at which time the original brass rotor tip, which was loose, fell off, *(continued on page 34)*



"THERE YOU ARE," my CFI said as he handed me my endorsed license, "Your license to learn." How wise! Piloting is a highly skilled and responsible accomplishment, much more so if the pilot has built her own airplane. Many of us, however, are victims of gaps in our knowledge, forgetfulness, or misconceptions left with us by others. It has been unkindly commented that some pilots know how to fly airplanes, but not how airplanes fly.

by Frank Gue

What You Don't Know Can Kill You

Knowing why things work and how it can save you

HOW AIRPLANES FLY is aerodynamic theory in which we may not be interested. Yet there are important situations in which it is vital that the pilot know the theory of how airplanes fly, and in which accurate knowledge of it can be lifesaving. This article smokes out some of the most dangerous of these gaps and misconceptions.

THE STALL

We had a trick question from our ground school instructor. "You are in a full-throttle climb 100 ft. off the end of the runway and your engine fails. What is the first thing you must do?" The correct answer, which only a few in the class knew, was: Get the nose down or she will stall.

Knowing this would have saved the lives of hundreds in the Air France Airbus over the South Atlantic. They flew their airliner into the sea, at full throttle and fully stalled for 30,000 feet, the stall warning screeching and rattling the columns the whole way. A designer of a 1940 Wakefield rubber powered model airplane could have told them (all three of them!); get the nose down!

An aircraft stalls because of too high an angle of attack of the wing, not because it drops below what we call its stalling speed. Unawareness of this accounts for many of the notorious stall-spin accidents. Here's one scenario:

A pilot circles low over a point of interest, adding power and back stick, a little rudder as he has been taught, maintaining what he thinks is a safe airspeed. As the aircraft rolls into its turn, the elevators begin to act as supplementary rudders, unexpectedly tightening the turn. We have the start of a stall-spin accident.

Now: "Reductio ad absurdum" is an ancient debating technique that goes clear back to the Romans, who said: Sometimes reducing a problem to the absurd brings a solution. Let's try it on this one:

Suppose this turn gets so tight that the wingtip on the inside is right at the centre of the turn. The longitudinal airflow at that tip is therefore zero. But the aircraft, having lost much of its lift, is dropping. Therefore the only air the inner wingtip gets is vertical, which means that its angle of attack is 90 degrees, far beyond its stalling angle of maybe 15 degrees. The outer wingtip, however, has good air flowing over it, is flying at a high forward speed at a much lower angle of attack, thus is not stalled, and therefore powerfully wrenches the aircraft into a spin. In a spin, the inner wing remains stalled all the way down. Attempting to roll-out will only make the inner wing stall worse. That is why recovery from a spin is totally different from recovery from a spiral dive. It is vital to recognize this difference.

By the way, dorsal fin strakes at the tails of all big aircraft since the B17 are there to impose a large drag on any airflow across the fuselage; that is why they are called "anti-spin" strakes.

Most aircraft do not have an angle of attack instrument, and a stall warning buzzer can be too late. A stall can happen at any speed. It is up to the pilot to know how to handle it.

EXECUTING A TURN

A CFI, no less, told me that the airplane turns because the rudder points the nose in the desired direction and the engine pulls it around.

Wrong. A turn is initiated by rolling the aircraft, which causes part of the wing lift to point inward toward the centre of the desired turn which, since the tail is behind the c.g., causes the aircraft to yaw in the desired direction. This is how a sailplane, with no engine at all, is turned.

Nor is a turn quite that simple. As Wolfgang

He killed himself and some of his family in which what was, without much doubt, a spiral dive he didn't recognize (because he lost his horizon in the mist) and from which he therefore made no effort to recover.

Langweische said long ago in his 1944 classic Stick and Rudder, "The rudder is there to correct the errors of the designer." Rolling into a turn raises the angle and increases the drag on the outside aileron, lowers the angle and decreases the drag on the inside one; this causes the aircraft to yaw out of the turn ("adverse yaw") unless the pilot nudges it back with a little rudder. Frise ailerons are shaped to cause extra drag in the "up" position, which neutralizes the extra drag caused by the down deflection of the other aileron. They make the airplane a little easier to fly (no rudder required).

LONGITUDINAL STABILITY

Pasted in off the Web, we have:

Longitudinal stability arises from this simple principle: Lower angle of incidence at the back, higher angle of incidence at the front.

Wrong. Longitudinal stability arises from area aft of the c.g. multiplied by its distance from the c.g. being greater than area before the c.g. multiplied by its distance ahead of he c.g., i.e. "the feathers have to be at the back of the arrow"! An important indicator of inherent stability is "tail volume", called "volume" because it is the result of multiplying three dimensions - aft area (principally horizontal tail) multiplied by distance of the tail from the c.g.

Not often mentioned is "nose volume" partly since, in conventional aircraft, it's much more complex because of the powerful, varying, invisible effect of the rotating propeller. Nevertheless, for stability the tail volume must exceed the nose volume at all throttle settings. It is true that most aircraft are rigged with the horizontal stabilizer at a small negative angle of incidence, resulting in a small nose-up lift and drag. This is for trim purposes, not for stability. Most hours on most recreational aircraft are with one or two people very near the c.g., thus disturbing the c.g. position only a little and in a stabilizing direction when they board. But baggage is usually located well aft, which disturbs the c.g. position quite a bit to the rearward, nose-up direction. The pilot trims this out by increasing the incidence of the stabilizer, bringing it closer to zero. This reduces the drag and negative lift of the stabilizer, which brings the nose back down while maintaining the wing attack angle, thus lift, required to carry the aft load.

LONGITUDINAL STABILITY OF CANARDS

From Wikipedia, under" canards", we paste-in:

Stability[edit source | editbeta]

14. A canard foreplane may be used as a horizontal stabiliser, whether stability is achieved statically[15][16][17] or artificially (fly-by-wire).[18]

Being placed ahead of the center of gravity, a canard foreplane acts directly to reduce Longitudinal static stability (stability in pitch). Nevertheless, a canard stabilizer may be added to an otherwise unstable design to obtain overall static pitch stability.[15]

Wrong. The statement contradicts itself. A canard surface (or indeed any forward surface) is NEVER a stabilizer, vertical or horizontal. ANY surface ahead of the c.g. is de-stabilizing and must be counteracted by some surface or other aft of the c.g. "The feathers must be at the back"!

Visualize the airflows: if a conventional aircraft enters an updraft, the horizontal stabilizer acquires a higher angle of attack, nosing the aircraft down, thus smoothing the bump and reducing its decelerating influence; while if a canard enters the same updraft, its foreplane will similarly acquire a higher angle of attack but this time in a nose-up direction, emphasizing the bump and decelerating the aircraft. Canards, therefore, exactly the same as conventional aircraft, must have sufficient "tail volume" (mainplane, rotating prop, strakes, and other areas, far enough aft of the c.g.) to compensate for the forward area of all components (foreplane, fuselage, wing leading edge, strakes, and all) that are ahead of the c.g. They can also be expected to give a rougher ride in turbulence. The fact that the small surface of a canard will stall before the main surface when the aircraft is put into a nose-up landing attitude (reverse to a conventional aircraft) also has safely implications and makes it even more important that the practices in the POH be understood and adhered to.

NEVER SECOND-GUESS BURT RUTAN

I once learned of an Ontario builder who was considering increasing the angle of incidence of the canard he was building. I had built free-flight model canards and noticed a sharp, unpleasant stall characteristic and prolonged recovery. I phoned and begged him to consult the RAF before he did it. He had the grace to call back: the RAF folk had told him in no uncertain terms not to do it. Review "Longitudinal stability of canards" above and you'll see why: it would increase the possibility of an inadvertent canard-surface stall and the probability of an immediate, hard to control dive, perhaps at an altitude too low for recovery.

The Wright Flyer, a canard, was horribly unstable. One must stand in awe of the nerves and reaction times of those men. They taught themselves to fly an unstable airplane in the space of a few seconds, when it takes the rest of us hours to learn to fly a C150, an airplane that will fly itself if left entirely alone!

C.G. POSITION

Several authorities say that the c.g. must be at or near the aerodynamic centre of the wing, i.e. about 25% aft of the leading edge.

Wrong: The c.g. can be anywhere you like so long as the area and moment arm ("volume") relationship explained above is in effect. The Quickie demonstrates this: its c.g. is between the two surfaces, nowhere near either wing. Aeromodelers flying conventionally configurated Wakefield rubber-powered aircraft with large, lifting tails balanced them with the c.g. at the trailing edge. This is not for a moment to de-emphasize the importance of keeping the c.g. inside the envelope specified in the POH.

SPIRAL DIVING

"She'll over-bank a little in a full-power climb, so watch it," warned the late Reg Spence of happy memory, CFI of the Hamilton Flying club, where I soloed in CF-VHL of equally happy memory.

Aha. The 25-year-old nickel dropped. The success of every free-flight contest model I ever flew in the 40s was determined by her ability to climb under very high power without spiral-diving to a crash. Just the torque from the high-power engine, I reasoned wrongly. Now here I was learning that a C150, the most docile airplane ever, would also spiral under high power, though not spiral-dive.

I decided I would treat a Cherokee

as a stick-fixed, free-flight model airplane and see what happens. So my son (who was current in the type) and I took up a Cherokee, which I suspected would be more susceptible than a high-wing type (it is). Over the practice area we simulated a contest model airplane: full throttle, trim for straight climb, hold stick and pedals fixed. Ten seconds: no change. Twenty: rolling a little right. Thirty; rolled well right. Forty: nose below the horizon, airspeed, wind, rpm and engine noises rising. Fifty: we are in a full-blown spiral dive, with airspeed approaching Vne. Deceptively, there is no increased "g" force or sidewise throw, because we aren't in a spin. We have perhaps one or two minutes to live unless we do something ....

OK, power all off, roll level, kill the zoom which we knew we would get because that's how we got a loop in the early R/C rudder-only model days - straighten her out from a spiral dive and let her do her thing, which was a zoom and a loop (or, if we wanted, an Immelmann) - with no gross or abrupt control motions, resume straight and level.

We recall, sadly, querying an experienced pilot about spiral dive recovery. "You mean a spin?" he replied. Clearly, he either had never been instructed on the subject or had forgotten.

We recall much more sadly that JFK Jr., having had no instrument or spiral dive training, took off in the evening in marginal visibility. He killed himself and some of his family in which what was, without much doubt, a spiral dive he didn't recognize (because he lost his horizon in the mist) and from which he therefore made no effort to recover.

Lesson: Instrument rated or not, we must trust our instruments, especially horizon, altimeter, and ASI, if horizon is lost. Further, in a safe area at a safe altitude (without doing anything dumb!), one should check his own aircraft for its susceptibility to spiraling, as we did.

The Wright Flyer, a canard, was horribly unstable. One must stand in awe of the nerves and reaction times of those men. They taught themselves to fly an unstable airplane in the space of a few seconds, when it takes the rest of us hours to learn to fly a C150, an airplane that will fly itself if left entirely alone!

THE PERNICIOUS INFLUENCE OF IGNORANT COMPUTER PROGRAMMERS:

Among the thousands of games on the Internet are several purporting to let the player "fly an airplane" with virtual stick and rudder pedals. One such game has you steer the airplane using rudder only, with no influence whatever from the ailerons or flippers. The programmer did not understand that turning involves control of all three axes plus the throttle: ailerons to roll, elevator to increase the angle of attack hence lift, rudder to offset adverse yaw, and throttle to give the extra thrust needed to offset the drag and loss of vertical lift effects of the first three. The game's lesson has to be unlearned if the gamer ever progresses to his obvious interest, flying an airplane. (One reservation: a turn in most aircraft can be done with rudder only or ailerons only; they'll just be sloppy, skidding, height-losing turns.)

THE DREADED "DOWNWIND TURN"

There are several versions of this one, because it is much more complex than it might seem. The most dangerous version is: You pick up speed when you turn downwind. Be prepared to reduce speed.

Wrong. Groundspeed does, indeed, increase; because the wind is now on our tail, not on our nose; and, since we are now relatively close to the ground, there is the illusion that airspeed has increased. But the airplane flies relative to the air mass, not relative to the ground to which all our human-animal instincts tell us to relate. In wind, the aircraft is flying at exactly the same airspeed upwind as downwind. Reducing speed risks a stall at low altitude. We must believe our ASI, not our eyes, for our airspeed information.

But we're not usually in calm air. We land in a headwind, usually with a cross component. We have to deal with wind shear, which is where some complexity comes in.

Wind encounters friction near the ground and slows down, and the stronger the wind the greater the slowing; which is to say that, descending on final in a strong wind, we will lose significant airspeed because our headwind dies down somewhat due to this friction with the ground. So, while we may have been told we pick up airspeed downwind, we most often lose it; deadly combination!

A further complication is that, near an advancing front, we may have a vertical (downward) component of the wind, in the extreme case a "downburst" that has crashed airliners. We recreational pilots don't usually have to cope with this vertical shear, because (hopefully) we're not flying in weather that violent; that's for ATPs to cope with.

That said, it may be worthwhile to select a day with a good breeze that is a bit bumpy and weather-ish and do a few touch-and-goes with an instructor to see what all the above means to you and your airplane. You will learn a lot you will need on that inevitable day that you have a somewhat hairy landing to make.

Summarizing this "downwind" thing: We must be aware of the excess speed illusion, the wind profile fact, must monitor the ASI frequently, and be prepared to add power promptly if airspeed drops unexpectedly.

The overall lessons: we must -

- use our airplanes as learning tools, to know their habits good and bad.
- think twice and get advice before doing anything contrary to what is in the kit supplier's manual or the POH.
- whether night- or instrument-rated or not, learn the instruments, read them and believe them.

take an interest in and study the theory of these marvelous machines we fly; knowledge can save lives, perhaps yours.

CAVOK to you!

Frank Gue *is a Registered Professional Engineer living in Burlington. He is a published author on factory management, education, politics, and economics. He flies a C150, which he uses better to understand the theoretical basics of flight. He uses R/C models to test outrageous designs that would be too expensive for a human to test. One result is a patented hydrofoil landing gear for waterplanes.*

Small Airplane Revitalization Act Passed in U.S.

In aviation this week, some potentially good news came from Washington. On November 14th, The Small Airplane Revitalization Act of 2013 was approved by Congress. This bill modifies the Part 23 standards that govern how parts are certified for general aviation use. The re-write reduces the level of design criteria for aircraft that weigh under 12,500 lbs. Formerly, all equipment designed for use, in say, a Cessna 172, would have to be designed to the same specifications as a Bombardier Q-400. While nice, it sure added lots to the cost of products. The hope is that general aviation aircraft may take advantage of modern developments without having to go through such restrictive procedures, thus costing less.

Who knows, perhaps general aviation can get to use some of the great tools that are available to the Experimental gang (cheap angle of attack indicators, inexpensive glass panels etc.) Greg Bowles, director of engineering and manufacturing at GAMA, said "By being able to add a standard to a lot of the products that are in the experimental marketplace and kind of raising that bar a little bit, we end up with the ability to bring them into the bottom end of 23 to where the highest level of their marketplace is actually the bottom end of 23 and so we have more products in the marketplace that are available for your airplanes."

What this means in Canada remains to be seen. Anything that reduces our costs is a good thing.

- as reported in the Slipstream

finding your way

by Mike Wiebe

This is the story of an RV6...

that was 25+ years in the making. It's a bit of a sad story. It contains two main protagonists (the good guys), one *really* bad antagonist, and more than a couple of plot twists. But it has a happy ending.

The story starts in the early 70's at a chapter meeting in Hamilton. Enter one of our protagonists, Ray Bryk. Ray was a drop-in guest at the meeting, and was probably age 25 at the time. I was 10 or 12, which would make my dad (another of our story's protagonists) mid forties.

Mike and Jack : it flies! Watching the RV's first flight. Opposite: the starboard wing with the leading edge skinned; below, the RV features an up-to-date EFIS. Lots of bells and whistles for what's a premium aircraft.

AS CHAPTER EVENTS ARE APT TO DO, there was much "one upping" going on, and not just a little of it based on cow dung. In the middle of this, business came to order, and Ray – as a guest – was asked to introduce himself. Like many such guests, he expressed an interest in building an airplane. And in this fraternity we call recreational aviation, we know how few such speeches become reality.

But Ray was different. Maybe it was because he was a family farmer, which mirrors my Dad's heritage. Perhaps it was the conviction with which he expressed his intent. Maybe it was the physical similarity between them. Whatever the reason, Dad chose to help him. And I got an older brother – sort of.

There are many years after that where Dad's and my memory of the details are poor. However, there are a few telling points along the way that help to – as the movie writers would say – set the stage for the ultimate tragedy and climax. Ray bought and started to build the RV-6. Kit number 20385, which for you fanatics will clearly indicate that these were the days before fast build or pre-punched anything.

I remember the visits to the basement of Ray's small home on the farm in Jordan Ontario, near St. Catharines. It was a great afternoon spent with Dad, and also with Ray, having a soft drink, talking airplanes and critiquing Ray's progress to date. I didn't think much about it at the time, but for all their common interests, their personalities were quite different. Dad was – still is – a practical 'git er dun' kind of guy. Ray was a thinker. A planner. Dad was sometimes frustrated with Ray's lack of progress, while Ray was frustrated by Dad not having considered three or four alternative approaches before diving in. Nevertheless, the work continued, and there was never any doubt in my mind that Ray would finish the airplane. But to him, the journey was at least as important as the destination.

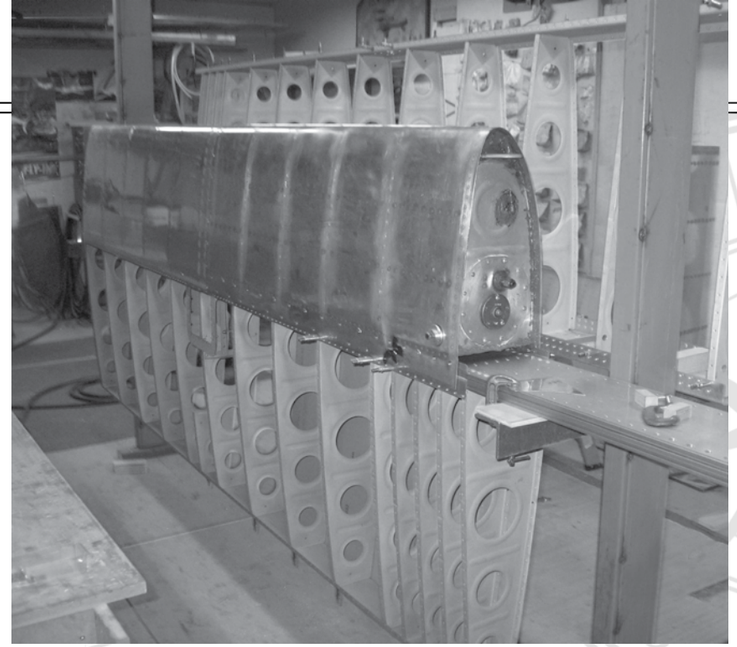
Ray did very nice work. But it was often interrupted by a fruit farmer's life, requiring heavy work in the summer, and the trimming of trees in the winter. So the project continued to progress, though slowly, with Ray having plenty of time to think about his 'alternatives' before committing to one approach. Once at an annual chapter meeting, each of us was describing our projects for the past year – building, flying, whatever. When Ray described the RV-6, he said "I wish I could fly it in clecoes first, just to iron out the bugs". No phrase I can remember describes Ray better than that.

I should note that during this time, three and a half airplanes came out of the Wiebe skunkworks, including a Rans project for a friend. In fairness to Ray, he had bought an airplane by this point, and that always gets in the way of building.

It's about this time that our antagonist enters the picture. Ray was diagnosed with cancer. Not good news, but to Ray, simply another setback in the hard life of a farmer. He took it in stride, and set out to beat it. Unfortunately in November 2004, Ray succumbed to the disease.

In early 2005, Dad bought the project from Ray's estate. He never intended to build an RV-6, particularly since his love was wood. However, it was the right thing to do, with the decision made easier by the fact that my parents had also gotten to know Ray's parents over those many years.

The project was placed in dry storage while we completed a Murphy Elite on Amphib floats.



In 2007, after cleaning up the shop one more time, Dad decided it was time to pick up where Ray had left off. So, jigs were built - or rebuilt, and the matching of parts to plans began. Picking up someone else's project part way through is never easy, and despite the fact that he knew the project, estate sales have a way of making the transition even more difficult.

During the building of this airplane my father turned 80 years old – quite the milestone for an active pilot. And since Dad has always been an avid fisherman (a trait that I too inherited), work progressed more slowly than expected, as the Elite was put in to service flying to various fishing destinations. I expect most readers of this article will be familiar with the construction of an RV, so I won't bore you with the details. Except that to say you can teach an old dog new tricks. In eight previous airplanes constructed, Dad had managed to all but avoid solid rivets. Not so with a Van's Aircraft project. So a new skill was developed, with even my mother being called into bucking the occasional rivet!

He is unofficial president of an unofficial company that is probably the fourth largest manufacturer of airplanes in Canada. Just don't ask him to buck rivets.

Three airplanes ago, when we had an engine failure in western Canada, we met Bart Lalonde of Aerosport Power. Since then, Bart has provided the engines for all of Dad's airplanes, and the RV was to be no exception. Since Dad wanted something simple, he had Bart build an O-360 Lycoming capable of autogas. Dad chose a fixed pitch Sensenich prop. But recognizing that at his age he needed to consider a 'next owner', he had Bart build the engine with a hollow crank for a constant speed prop. We both enjoyed the EFIS displays in our floatplane. Since I was the systems guy, Dad asked me to design and build a glass panel. So we now have dual Tru-Trak Efis (efises? Efii?) with full engine monitoring and a two axis autopilot coupled to a panel mounted Garmin 696. Sleek and light, it does everything we need it to do. There's a $50 option we added to that system. It's called a panic button. In any unusual attitude, hitting that button will return the plane to level flight. OK, I haven't tried it inverted, but still… It may never be needed, but the day it is, it will truly be priceless. Full engine monitoring and safety features like this are good reasons for any builder to consider the merits of an electronic panel. And the market continues to advance with prices coming down regularly.

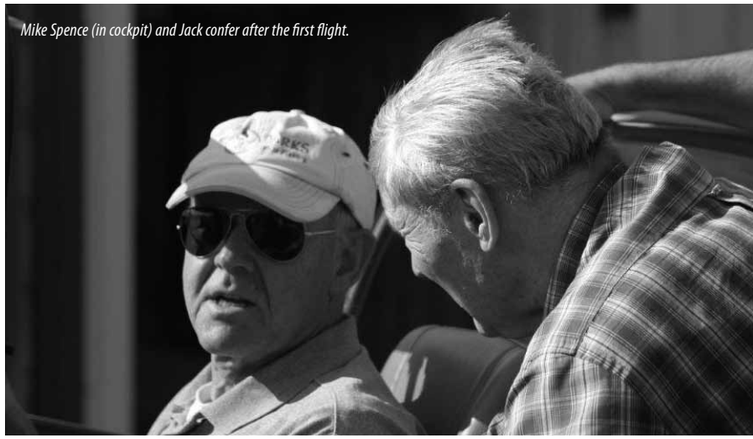
The plane first flew on Oct 4th, 2012. Something else happened between construction and first flight. Dad decided to give up flying. Sons and daughters are always conflicted about having 'the conversation' with aging parents about things as important as driving a car. I was beginning to dread that same conversation with Dad about flying. He beat me to it by declaring that it was becoming more work than fun, and that meant it was time to stop. I didn't have any recent high performance experience, and the amphib is a "shopping cart" not a taildragger, so the decision was made. Our local flying expert and recently retired Transport Canada guru Mike Spence did the first flight. On that day Ray's Dad and sister were there to witness the event. Ray's sister asked if we would mind if she said a prayer. It was moving, and I think the plane flew better as a result. Ray's mom was not well enough to come to the airport, but received the good news afterwards.

Mike checked me out and I flew off the test period. There were of course, a couple of occasions during testing where the builder was required on board to verify certain parameters, test a component or confirm a checklist sequence. The nice thing about building something like an RV-6 is that if you build it by the book, it will fly by the book. By all accounts this is a book RV. Fast, efficient, simple, cheap to operate and fun to fly. What more can we ask of an airplane?

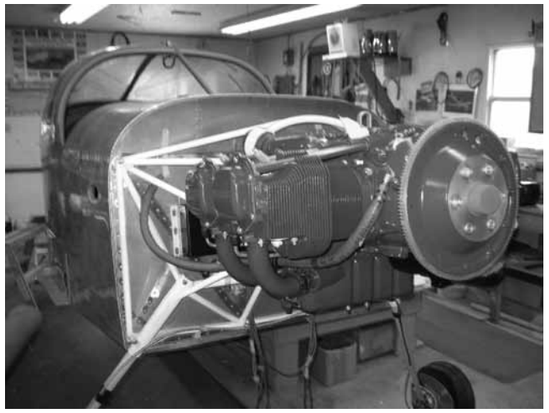
Yet with all that, Dad has still decided to sell the airplane. For years, with me as chapter president or Dad as local expert, we've answered the question a hundred times – "what kind of airplane should I build?" There are a thousand answers to that single question, but the starting point for a good conversation always seemed to be "if you want to go low and slow, build a Murphy. If you want to go cross country, build an RV". So after answering that question for others, we're now faced with that same decision ourselves. Not which airplane to build, but which airplane to keep! What a lucky circumstance! And the decision is still obvious – low and slow on floats, particularly for two fishermen, is the way to go.

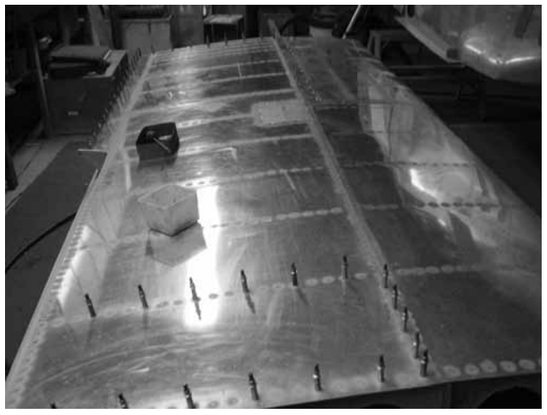
However, that leaves another dilemma. At age 85, Dad has a clean shop once again.

...we're now faced with that same decision ourselves. Not which airplane to build, but which airplane to keep!



Mike Spence (in cockpit) and Jack confer after the first flight.





Above: Builder, test pilot, and cobuilder/author: Jack Weibe, Mike Spence, and Mike Weibe. Top down, right: engine installation. Jack had Bart Lalonde of Aerosport Power include a hollow crank to all for the possible installation of a constant speed prop, but for now he's swinging a fixed pitch prop. Closing the port wing and below that, the canopy installation. Jack and Mike opted for the sliding canopy.

Now after nine airplanes he had decided that there won't be a 10th, which leaves Mom with a worse dilemma – a bored husband. So I finish this article with a request. If you need advice, help, or just someone to talk your ear off about homebuilt aircraft, contact Dad. He is unofficial president of an unofficial company that is probably the fourth largest manufacturer of airplanes in Canada. Just don't ask him to buck rivets.

Mike Wiebe *of Ancaster, Ontario is the son of prolific airplane builder Jack Wiebe of Stoney Creek, Ontario. In any given year, Mike spends probably five times as many hours as a passenger on Air Canada than he does in the front of his floatplane. Over his 30 years as a pilot and junior member of WiebeAero, he has been the lucky recipient of the right to fly a Piel Emeraude, a KR-2, a Cavalier and an RV-6. He has also been partner in the construction and ownership of a second Piel Emeraude, a Murphy Rebel on amphibs, a Sequoia Falco, and a Murphy Elite on amphibs. He only had the chance to heckle during construction of the Rans.*

Garmin GTR 225

Wayne Hadath reviews Garmin's Slimline replacement

Wayne's radio is mounted above his transponder.

The new Garmin GTR 225 replaces their SL slimline series that was derived from the Apollo. I bought the 225 because although the SL 40 com was still available, the wait time would have been long because it was being discontinued in favour of the GTR 225. Kitchener Aero recommended the 225 because it was available immediately and it was a better radio. The SL and the 225 are the only coms of which I am aware that have two receivers and one transmitter. This is different from the ICOM that says they have flipflop but this is accomplished with software.

On the 225 the pilot can choose one freq for the transmit and receive functions, and the other receiver can be set to a different freq. The first function overrides the second one, and this is very handy. For instance, you are on a flight plan so you are talking to Toronto Centre but you intend to land at Kitchener. You put the first function on the YYZ freq for flight following, and you put the Kitchener ATIS frequency on the second receiver. When receiving the ATIS it is slightly modulated so that you will know that this is the second frequency, and the arrow on the display confirms which receiver is doing the receiving.

If you are listening to the Kitchener ATIS and YYZ calls, their call automatically overrides the Kitchener ATIS so can transmit your response without having to twiddle any knobs, nor do you have to request a freq change from Toronto to be able to listen to Kitchener ATIS, and then come back and say to Toronto "I'm here again". This is the advantage of the SL and the 225 coms.

My understanding is that the 225 will plug into the SL tray. I have a SL 40 in another plane but I have not yet verified this.

I bought the 225 from the radio shop and had them wire it into the amateur-built Pitts S2E that I had just bought. The SL and the 225 both come with a built-in 2 place voice activated intercom. I had not used the intercom feature of the SL 40 in my other plane, but on the shop's recommendation I decided to try the intercom that is built into the 225 for this plane.

This Pitts has a full canopy but its cockpit environment proved to be too noisy for voice activation at rpms over 1500, at which time the squelch became overpowered and there could be no communication between passenger and pilot.

The radio shop then installed a push button switch for manual control of the 225's intercom. Instead of voice activation it became necessary for each crew member to push a button on the panel to communicate. This also proved to be ineffective. After a few words the squelch would delete the voice communication, and this is where we are currently.

In my estimation the cockpit of the Pitts is no noisier than that of my F-1 Rocket, but that plane has a separate intercom. My next step will be to install a separate voice activated intercom into the Pitts.

One other thing – the 225 has required software upgrades, one immediately, despite that it was brand new in May. In the past seven months there have been two upgrades, and these must be done at the radio shop. This unit has fewer adjustments available to the pilot. These are now handled by software, which of course means a trip to the radio shop. Also the "side tone" is very quiet and it is difficult for the pilot to hear his own words when transmitting on the radio.

In all of this testing I have been using high end Lightspeed Zulu headsets, and the radio shop confirms that these are not causing any problems. If anyone has tried the Garmin 225 and has had a different experience I would appreciate an email to whadath@rogers.com

30" BENCHTOP BRAKE SETUP

by Gary Wolf

PRINCESS AUTO AND OTHER SUPPLIERS sell a 30 steel benchtop brake, usually for $70 and as low as $45 on sale. This is a very handy and compact unit for anyone who needs to bend sheet metal. I clamp mine to the edge of the workbench using 5" shop clamps so that it can be removed quickly after the job is done.

The unit consists of a pair of wide steel angles hinged together, and clamping is by a ground steel bar with beveled edges to allow bending past 90 degrees. Clamping pressure is by C-clamps so you will need three or four, the 5" size being preferable for the throat depth.

One problem you will immediately encounter is that it takes a lot of time to set up for each bend. Setback of the clamp bar will determine the radius of the bend, and without a reference line the radius produced can vary for each part.

Member David Moore had the bright idea of welding a 30" length of ¼" round steel bar to one edge of the clamp bar. This then produced a consistent 1/8" inside radius for all bends, the radius commonly used for 6061 aluminum up to .040" thick.

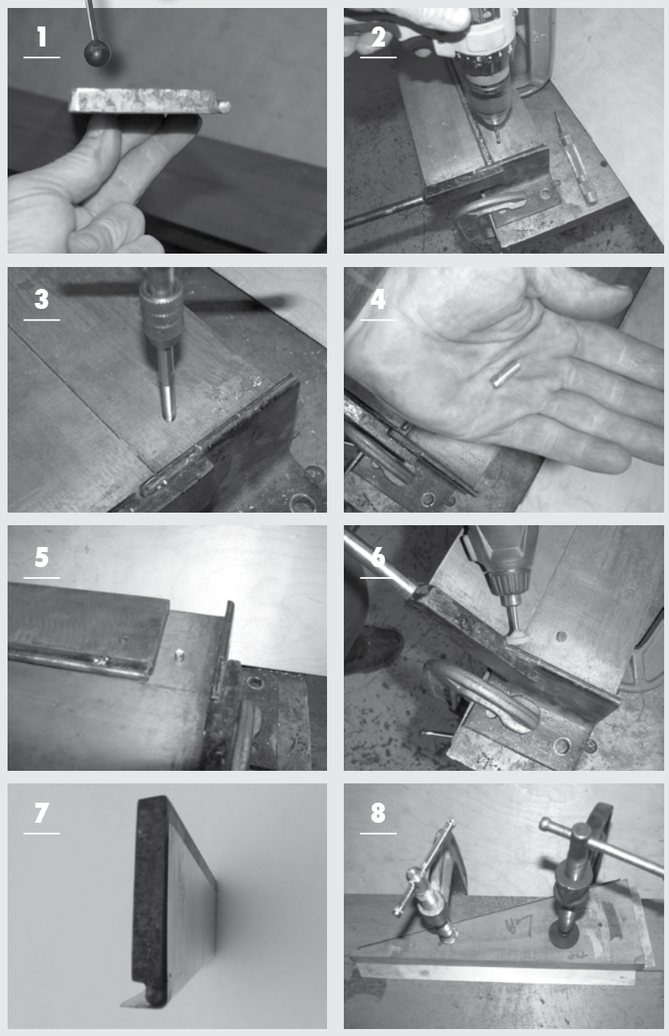
Another handy mod is to drill the bar and table to accept guide pins, so that location of the clamp bar will be consistent. I drilled mine with a #5 number drill (.0.205") to allow tapping the brake's table for ¼" UNF. AN-4 bolts were then cut down and screwed in to become guide pins. The clamp bar was then redrilled to ¼" to allow a slide fit over these guide pins.

Using the brake with the ¼" radius bar and the guide pins transformed the brake into something that can turn out consistent parts without a lot of wasted time.

There is one other useful mod to do to the brake – the leaf will go about 10 degrees past vertical but some materials have too much springback so a 90 degree bend cannot be achieved. The cure is to use a Dremel with a small stone to grind away the interference points until an extra10 degrees can be achieved.

Another use for the brake is to fold the flanges of trailing edge ribs, which usually have straight flanges. Instead of hammering with a leather mallet, a process that usually results in stretched flanges that then require fluting, a brake folds the entire flange at once.

Princess Auto part # 8008201 $69.99



TOP: The brake is essentially two 30" lengths of steel angle, hinged together. Picture1: Weld a length of 1/4" rod to one of the bevelled edges of the clamp bar, flush with its bottom edge. 2: Position the clamp bar so that the 1/4" rod is aligned with the parting line of the brake. Centre punch and drill for .205" holes at each end. 3: Tap the table for 1/4-28 and redrill the clamp bar for 1/4". 4: Two AN-4 bolts can be sawed short to make the guide pins. Chamfer their top edges. 5: Screw the pins in by hand and tighten with a vise grip. The clamp bar should now slide over the pins. If not, the vise grip probably scored their surfaces, so dress with a small file. 6: Relieve the touch points to gain a few more degrees of bend angle . 7: The result is a consistent radius with minimum setup time. 8: The brake can also be used to form the flanges of a rib. Bending a flange all at once means no fluting is necessary to bring the rib back to straight.

Across Canada: RAA Chapters In Action

RAA London St Thomas

Phil reported that that he has decided to use the fibreglass wingtips for his Sonex rather than to fabricate metal ones. Dave reported that Autotsru has upgraded the construction of the 350 reduction unit and it is his intention to go to Texas on Nov. 24th to see it run on the company's test stand. Dan reported his Highlander is at the 95.5% stage and he showed pictures to prove it.

Denny Knott reported that he has been unable to take off in the Skyhopper with a passenger. Some of the problem may have been due to its being a hot day with cross wind and the runway surrounded with tall corn. Mike Stoddard reported that his Sonex project is still in boxes in his garage. Hans showed a canopy frame of steel tubing that he had bent around an inflated tire. He had not filled the tube and the tube had not kinked.

Our member Tom Hawkins introduced his presentation by showing an interesting video of British Commonweath Air Training Plan (BCATP) student pilots undergoing training at Windsor Mills PQ during the 1940-45 period. Tom then introduced himself by saying he has never been a "builder" but that he has done lots of repairing involving ultralights at John Kvep's strip. He now owns a single place Rans S-4 Coyote, that is presently at Dave Fisher's strip. He then went on to relate his experiences in the RCAF, first while earning his wings and then as a flight instructor in the BCATP.

At the December meeting, President Phil Hick thanked Tom Hawkins for his presentation at the Chapter's November meeting and noted the report of J. Davis's first flight of his CH-750 in Slipstream and commended him on his accomplishment.

President Phil opened discussion with the observation that those of us who are Flyers, Aircraft builders, or Aviation enthusiasts are declining in number and as members of a RAA Chapter one of our mandates is to help to reverse this trend. Phil went on to present statistics acquired from the questionnaire completed by Chapter members.

Many members, as they answered their survey, suggest that Chapter outings by bus had been worthwhile and pleasant events and a visit to the Warplane Heritage Museum at Hamilton might be high on the list. This and other such undertakings consume a day rather than an evening and are forthcoming Chapter events.

General discussion centered on regular Chapter meetings and a tentative month by month agenda was established. The mechanics attended to these events engendered many events that the Chapter might enjoy. The relationship between Carl Pfister and his Pioneers Airstrip and the Chapter with regards the annual Chapter picnic is cause for soul

http://www.SmartPilot.ca

Here's a new web site to encourage better informed pilots, developed by CASARA (Civil Air Search and Rescue Association) to enhance flight safety in Canada, with support from the National Search and Rescue Secretariat. It supplies interesting and informative articles, videos, interactive programming, courses and tools, etc. It is free, and suitable for all levels of pilots.

searching. Hans suggested that the Chapter pay for introductory glider flights at the London Glider Club as a way to acknowledge Carl's generosity to the Chapter.

RAA Chapter 85 (Vancouver)

The year 2013 comes to a close. Years seem to go by so very fast but we were very productive this year.

The Remembrance Day ceremony came off successfully again due to the dedication of the participants. Air cadets from #655 (Richmond) Squadron performed magnificently under the command of Second Lieutenant Tim Novak and Captain La Vern Richards. The ceremony location was changed to the area in front of Mary's Place and everyone agreed this was a better location. The weather held and the event went off without a hitch. Trevor Skillen displayed his Boeing Stearman and the Harvard group performed a marvelous fly over right at 11:00 AM. Isabelle Hui Bon Hoa played Amazing Grace and sang our anthem beautifully. The Boundary Bay Flying club completed the event with their Fly Past.

At the November general meeting, our guest speaker, Trevor Skillen, presented a talk about his experience flying a P-51 Mustang, "Crazy Horse" accompanied with a video taken during the flight. Trevor has taken time to experience flying high performance warbirds such as the Mustang and lately a two seat Spitfire in England. He has recently purchased a Harvard to go along with his collection of other exotic aircraft. Trevor is the new DAPCOM chairman for the airpark and has been very busy with infrastructure projects such as the refurbishing of the barn and developing a system to supply Mo Gas for use on the field.

The Turbi has not sold, nor have there been any offers. It is advertised locally on posters and nationally and internationally on a number of web sites. We will wait till spring to see if we get any action. In the meantime we have moved it to the hangar for dry storage during the winter. John de Visser has constructed a pair of wheels to allow the aircraft to be moved easily if required.

The investigation into the crash of Zenith 601 C-GYNX has been completed. Peter Whittaker led the team and Rob Prior, Gerard Van Dyjk, Dave Rose, John de Visser, John Macready and Andy Pearson participated. The engine failure was determined to be due to a seizure of the distributor on the Subaru engine which stopped the engine abruptly on climb out. Miraculously the pilot was hurt but not fatally. The aircraft has been disassembled and all salvageable parts sold. The pilot is recovering slowly from the accident.

Dave Marsden has recovered his Skylark Kit from California and has moved it into the workshop. The chapter agreed to rent the workshop to David for a period of three months until the chapter determines if the aircraft kit is suitable for a chapter project. At present the owner, Dave Marsden and Dave Rose, our Aircraft Chairman, and the author, John Macready have been working on the aircraft to organize the building process.

The Annual Christmas Party was held on Tuesday December 3, 2013. Approximately 40 people were in attendance. Raymond and Jill Colley and set up the decorations, Peter Whittaker and Terry Johnson purchased the food and John de Visser prepared the clubhouse. The party was a success and a very enjoyable evening was had by all. Thanks to all the organizers.

Sadly, we had news that Charlie Longstaff had passed away in his hometown in Manitoba. He recently moved there to be closer to his family. Charlie was one of the founding members of Chapter 85 and a very accomplished airplane builder. He was a very fine person and we will miss him greatly.

Our Vice President, Peter Whittaker, has written an excellent article about building and flying his Zenith 601 HDS. The article has been published in the September- October issue of the Recreational Flyer. We intend to publish our report concerning the Zenith accident in the next issue.

At the last general meeting Tom Boulanger reported that we have approximately $36,700.00 in our bank account. Our expenses this year exceeded our income by about $2000.00 due to the failure of the Turbi project and damage repair earlier in the year.

Kitchener-Waterloo

Chapter Christmas Party: The nicely decorated dining room was filled to capacity. The buffet was beautifully presented and there was a lot of choice. The salads and choice of stuffed chicken breast or beef and too many kinds of deserts, were all delicious. The staff were very friendly and attentive.

Awards presentations:

The 'Larry Edwards Award' was presented to Clare Snyder, our current Club President, and web site administrator. Clare was recognized for his volunteering to help many builders in the Club as well as people in the community.

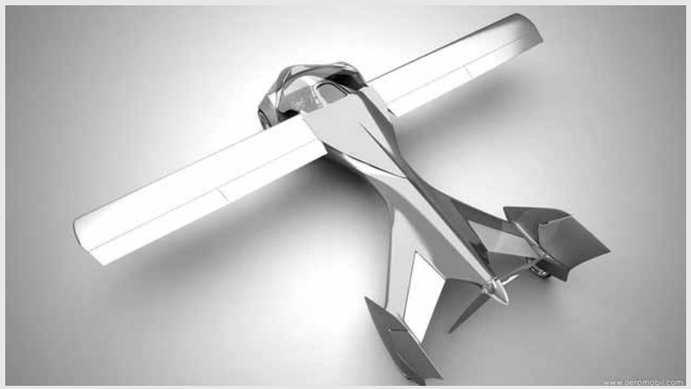
The 'Holy Golly' award was presented to Pat McCulloch the wife of our Mac McCulloch. She has been a significant contributor to the clubs continuing success.

A 50/50 draw was held and the winner of $38 was, Mike Shave's wife Cathy. Thank- you, to everyone who donated the many door prizes. Almost everyone walked away with a gift.

Keep Us In The Loop

Let your fellow members across the country know what your chapter is up to! Send your chapter happenings and coming events to George Gregory at gregdesign@telus.net and we'll see it gets in the magazine and on the website.

AEROMOBIL 2.5



Another roadable aircraft concept has surfaced, this time from Slovak designer Stefan Klein. While a few years behind Terrafugia's Transition, it has flown briefly and continues in development. The vehicle features seating for two and pushbutton conversion between modes. A video of the test hop may be viewed at http://www.aeromobil.com/#url-media.

Power is a Rotax 912 and projected performance includes a range of 430 miles, a top speeds in the Light Sport Aircraft range and capable of highway driving.

It's certainly one of the most style-conscious efforts so far. It's a very attractive vehicle, though the far aft placement of the wheels and oversized tail surfaces is unconventional; rather than rotate for takeoff, the aircraft seems to levitate off the ground with considerable flap deployment for takeoff. Whether this will be a practical method in production aircraft remains to be seen, but may represent a way of otherwise avoiding some of the compromises found in other designs. We wish Stefan and his team all success! For more, see http://www.aeromobil.com


fig 2


fig 3


fig 4


fig 5

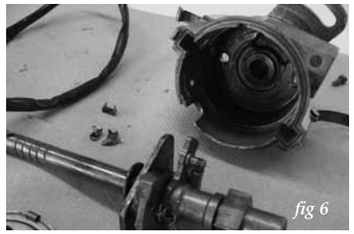


fig 6

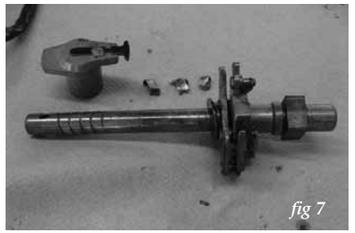


fig 7

Figure 2. The aircraft was raised and blocked to put the engine at a suitable height for inspection and allow a tray to be placed underneath to catch oil and any loose parts. Figure 3. The spark plugs each have normal gaps and have not been deformed by piston head impact.

Figure 4. Valves are undamaged and moved normally when the engine crank was rotated. Figure 5. The steel gear at the end of the distributor drive shaft is covered with aluminum shavings from the aluminum drive gear with which it meshed on the engine. Figure 6.The distributor housing and shaft assembly. The inside of the distributor housing is scratched which could result from damage caused by the metal fragments. Figure 7. Distributor shaft with brass and other metal fragments found when the distributor assembly was taken apart. The rotor is also damaged.

C-GNYX / continued from page 15

was lost and replaced with a new one

Inspection Procedure

The aircraft, a Zenith 601 HDS, was prepared for inspection by raising it with an engine hoist, placing blocks under the main gear attachment points and sawhorses under the wing spars (Fig.2). This allowed for cleaning and removal of leaves and debris from underneath.

After the aircraft was raised and blocked:

1. The crankshaft was rotated to check movement in both clockwise and counter clockwise directions
2. All four spark plugs were removed to check their condition and provide a view of the piston heads
3. The rocker covers were removed to observe valve movement when the crankshaft was rotated
4. The oil pan was removed to allow inspection of the lower crankcase
5. The distributor cap was removed to observe movement of the rotor with crankshaft rotation
6. The distributor assembly was removed from the engine
7. The distributor was disassembled

Inspection Findings:

1. One blade of the 3 blade propeller was broken
2. The throttle was found in the full on position, the throttle could be moved only with difficulty because of a kink in the cable caused by deformation of the firewall from the impact
3. Spark plugs were removed and all had normal gaps (Fig.3)
4. Left and right valve rocker covers were removed and no sign of damage was apparent, all valves operated normally when the crank was rotated (Fig.4) and all pistons moved
5. The engine crank was rotated and turned freely clockwise but jammed when turned counter clockwise
6. The pistons could be seen moving normally when observed through each spark plug hole
7. The oil dipstick indicated a normal oil level, the oil was thick and black
8. The oil was drained and the oil pan was removed, a few magnetic metallic pieces were seen in the oil
9. All starter motor and other electrical system connections were intact and normal
10. The distributor cap was removed to expose the rotor, which did not turn when the crank was rotated
11. The distributor was removed and the steel drive shaft end gear was found to be covered in aluminum shavings (Fig.5), the engine could be turned freely in both directions after removal of the distributor
12. A borescope examination of the aluminum engine drive gear to the distributor shaft gear showed that all aluminum teeth had been stripped off of the gear
13. The distributor was taken apart, the inside of the housing was found to be damaged (Fig.6) and several metallic fragments, including a brass fragment (the original rotor tip), were found jammed between the shaft (Fig.7) and the housing

Discussion

A series of circuits had been planned to allow for familiarization with the aircraft type. The circuit that led into the engine failure was planned as a touch and go leading into a short field take-off with its inherent steeper climb angle. It is not known if the steeper than usual climb angle was a contributing factor to the engine failure. The pilot brought the throttle back to idle over the threshold for touchdown and after ensuring that the aircraft was lined up with the runway centre, applied full power for take-off. The engine stopped approximately 150 to 200 feet above ground. The short field take-off procedure was carried out at the normal airspeed for this aircraft which is 70mph. A normal take-off with a higher airspeed and lower climb angle may have allowed for a more controlled landing with little or no damage. In this case, the steep climb angle resulted in a stall from which the pilot was able to recover just before impact. The pilot suffered injuries which were not life threatening, but the aircraft was damaged beyond repair.

The brass piece from the distributor rotor was lost during preparation for a fuel flow test. This test is required by MDRA as part of the inspection process for an imported aircraft. The distributor cap had been removed to ensure that the engine would not accidently fire during the fuel flow test. After the fuel flow test, the brass rotor piece was missing. After an unsuccessful search of both the engine compartment and the ground beneath the airplane, a new rotor was installed. An engine run-up was performed resulting in normal operation and no indication of any unusual sounds or symptoms.

After analysis of the distributor assembly the investigative team concluded that the missing brass piece from the rotor eventually worked its way between the distributor shaft and housing. A prior hard landing and steep climb angle may have caused it to move into a location where it jammed the shaft. The steel gear at the end of the seized shaft subsequently stripped the gear teeth off of the soft aluminum drive gear mounted at the engine. Since the original rotor tip was loose enough to fall off, it was concluded that it had come into contact with the inside of the distributor cap. It was concluded that the rotor tip had come into contact with something hard enough to jar it loose to the point that it fell off when the distributor cap and housing were removed for the fuel flow test. A possible cause would be if the cap had, at some point, been installed out of alignment. The rotor tip could then have contacted the inside of the cap and become loosened.

The aircraft and engine records provide no information on the service history of the distributor and it is not known if an aluminum gear on the engine to drive the distributor shaft is standard equipment. The inspection procedure and documentation was performed as required by MDRA and the details were recorded in the journey log. Full details of the import and inspection process are given at the MDRA website (www.md-ra.com).

Conclusions

The aircraft was flying normally during post import test flights. Several engine components were serviced prior to the test flight circuits including the distributor. Brass and other metallic fragments were found jammed between the distributor housing and the shaft. These jammed fragments stopped the shaft

continued on page 41

In normal operation a distributor rotor has an easy life. In the case of the Subaru EA81 it is keyed to the top of the distributor shaft and whirs around without anything to cause mechanical wear. High voltage electricity travels from the centre terminal of the distributor cap to the centre point of the contact surface of the rotor, a brass piece that in this case is plastic riveted (actually a moulded plastic pin) to the plastic rotor body. The perimeter of the contact whirs around and distributes the spark to the distributor cap's contacts that lead to the individual spark plug wires. These plug wire contacts are only a few thou away from the rotating rotor contact but they never touch. The spark jumps this gap, same as it jumps the gap of the spark plug.

The distributor cap is retained to the distributor body by a couple of spring clips (or on some distributors, a set of screws), and it is occasionally possible to mount the cap cocked at an angle or to bump the cap out of place while working under the cowl (particularly with clip mounted caps). It is then possible for the brass rotor to make physical contact with the inside of the distributor cap, and the plastic rivets can then fracture, leading to an eventual failure.

In this case it appears that the removal of the distributor cap allowed the compromised brass contact to separate and become lost, and a gravel or grass hangar floor made it impossible to find. In fact it had fallen into the distributor itself. A new rotor was installed and the engine ran well until the lost contact jammed between the advance mechanism and the housing of the distributor, stopping the engine in flight.

Clare Snyder, Tech Editor, RAA Canada

RAA Chapters and Meetings Across Canada

The following is a list of active RAA Chapters. New members and other interested people are encouraged to contact chapter presidents to confirm meetings as places and times may vary.

ATLANTIC REGION

HAVELOCK NB: Weekly Sunday morning get together year round, all aviation enthusiasts welcome. Havelock Flying Club - 25 mi west of Moncton. Contact Sterling Goddard 506-856-2211 sterling_goddard@hotmail.com

QUEBEC REGION

COTE NORD (BAIE COMEAU): Meeting times to be advised. Contact Pres.Gabriel Chouinard, 418-296-6180.

LES AILES FERMONTOISES (FERMONT): First Sunday 7:30 pm at 24 Iberville, Fermont. Contact Pres. Serge Mihelic, 418-287-3340.

MONTREAL (LONGUEUIL): Chapter 415, Meeting in French second Wednesday at 8 pm, at CEGEP Edouard Montpetit 5555 Place de la Savane, St. Hubert, PQ. Contact president Normand Rioux at NRIOUX@lapresse.ca

OUATOUAIS/GATINEAU: Every Saturday 9:00 am to noon at the restaurant l9Aileron in the airport terminal. Contact Ms N.C. Kroft, Gatineau Airport, 819-669-0164.

ASSOC DES CONSTRUCTUERS D'AVIONS EXPERIMENTAUX DE QUEBEC (QUEBEC): Third Monday 7:30 pm at Les Ailes Quebecoises, Quebec City Airport.

ASSOC AEROSPORTIVE DE RIMOUSKI: First Saturday at 9:00 am, La Cage aux Sports, Rimouski. Contact Pres. Bruno Albert, 418-735-5324.

ASSOC DES PILOTES ET CONSTRUCTEURS DU SAGUENAY-LAC ST JEAN: Third Wednesday 7:00 pm at Exact Air, St Honore Airport, CYRC. Contact Marc Tremblay, 418-548-3660

SHERBROOKE LES FAUCHEURS de MARGUERITES. Contact Real Paquette 819-878-3998 lesfaucheurs@hotmail.com

ONTARIO

BARRIE/ORILLIA CHAPTER Fourth Saturday (and second Sat. as well) each month 9:00 am at the restaurant at Lake Simcoe Regional Airport Contact Secretary Dave Evans 705 728 8742E-mail david.evans2@sympatico.ca

COBDEN: Third Thursday of the month at the Cobden airfield clubhouse 20:00 hrs. President - Grantley Este 613 432 0797 este@compmore.net

COLLINGWOOD AND DISTRICT; The Collingwood and District RAA, Chapter 4904, meets every first Thursday of every. month, at 7:30 PM except July and August, at the Collingwood Airport or at off-site locations as projects dictate. The January meeting is a club banquet held at a local establishment. For more information contact Pres. George Elliott gaelliott@sympatico.ca 705-445-7054

EXETER: Second Monday 7:30 pm at Summers-Sexsmith Airfield, Winters-Exeter Legion. Contact Pres. Ron Helm, ron.helm@sympatico.ca 519 235-2644

FLAMBOROUGH: Second Thursday 8:00 pm at Flamborough Airpark. Contact Pres. Karl Wettlaufer 905 876-2551 or lazykfarm@sympatico.ca

KENT FLYING MACHINES: First Tuesday 7:00 pm at various locations. Contact President Paul Perry 519-351-6251 pkperry@teksavvy.com

KITCHENER-WATERLOO: Meets the third Monday of each month in the upstairs meeting room of the cadet building at CYKF, except during the summer months when we have fly-ins instead. Please contact Clare Snyder clare@snyder.on.ca

LONDON/ST. THOMAS: First Tuesday 7:30 p.m. At the Air Force Association building at the London Airport. Contact President Phil Hicks p.hicks@tvdsb.on.ca 519-452-0986

MIDLAND/HURONIA

Meeting: First Tuesday, 7:30 pm at Midland/Huronia airport (CYEE) terminal building. Contacts: President Ian Reed – 705-549-0572, Secretary Ray McNally – 705-533-4998, E-mail – raa.midland@gmail.com .

NIAGARA REGION: Second Monday 7:30 pm at Niagara District Airport, CARES Building. Contact Pres. Elizabeth Murphy at murphage@cogeco.ca, http://www.raaniagara.ca/

OSHAWA DISTRICT: Last Monday at 7:30 PM at the Oshawa Airport, South side, 420 Wing RCAF Assoc. Contact President: Jim Morrison ,905 434 5638 jamesmorrison190@msn.com

OWEN SOUND Contact President Roger Foster 519-923-5183 rpfoster@bmts.com

OTTAWA/RIDEAU: Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-858-7333 bill@ncf.ca

SAUGEEN: Third Saturday for breakfast at Hanover Airport. President: Barry Tschirhart P.O. Box 1238 27 Ridout Street Walkerton, Ontario. Home: 519-881-0305 Cell: 519-881-6020. Meetings are held every second Tuesday evening, at 7:30pm. Location(s) Saugeen Municipal Airport, Kincardine or Port Elgin. All interested pilots are welcome. Email: barry.tschirhart@bell.net

YQG AMATEUR AVIATION GROUP (WINDSOR): Forth Monday, 7:30 pm Windsor Flying Club, Airport Road, Contact: Kris Browne e_kris_browne@hotmail.com

SCARBOROUGH/MARKHAM: Third Thursday 7:30 pm Buttonville Airport, Buttonville Flying Clubhouse. Contact Bob Stobie 416-497-2808 bstobie@pathcom.com

TORONTO: First Monday 7:30 pm at Hangar 41 on north end of Brampton Airport. Contact: President Fred Grootarz - Tel: (905) 212-9333, Cell: (647) 290-9170; e-mail: fred@acronav.com

TORONTO ROTORCRAFT CLUB: Meets 3rd. Friday except July, August, December and holiday weekends at 7:30 pm Etobicoke Civic Centre, 399 The West Mall (at Burnhamthorpe), Toronto. Contact Jerry Forest, Pres. 416 244-4122 or gyro_jerry@hotmail.com.

WIARTON: Bruce Peninsula Chapter #51 breakfast meetings start at 8:30am on the second Saturday of each month in the Gallery of Early CanadianFlight/Roof Top Cafe at Wiarton-Keppel Airport. As there are sometime changes, contact Brian Reis at 519-534-4090 or earlycanflight@symptico.ca

MANITOBA

BRANDON: Brandon Chapter RAA meets on the second Monday of each month at the Commonwealth Air Training Plan Museum at 7:30 PM except in the months of July and August. Contact Pres. John Robinson 204-728-1240.

WINNIPEG: Winnipeg Area Chapter: Third Thursday, 7:30 pm RAA Hangar, Lyncrest Airport or other location as arranged. Contact President Ben Toenders at 204-895-8779 or email raa@mts.net. No meetings June, July & Aug. RAA Winnipeg info also available at Springfield Flying Center website at http://www.lyncrest.org/sfcraac.html.

SASKATCHEWAN

Chapter 4901 North Saskatchewan. Meetings: Second Tuesday of the month 7:30pm Prairie Partners Aero Club Martensville, Sk. info at www.raa4901.com. Brian Caithcart is the chapter president. Contact email: president@raa4901.com.

ALBERTA

CALGARY chapter meets every 4th Monday each month with exception of holiday Mondays and July & August. Meetings from 19:00-22:00 are held at the Southern Alberta Institute of Technologies (SAIT) Training Hangar at the Calgary Airport. Join us for builder discussions, site visits, tech. tips, fly out weekends and more. Contact president Don Rennie drennie@hemisphere-eng.com 403-874-0876

EDMONTON HOMEBUILT AIRCRAFT ASSOC: First Tuesday 7:30 pm EAHS boardroom. Contact President Bill Boyes 780-485-7088

GRANDE PRAIRIE: Third Tuesday, Chandelle Aviation Hangar, contact Jordie Carlson at 780-538-3800 work. or 780-538-3979 evenings. Email: jcarlson@telusplanet.net

BRITISH COLUMBIA

ABBOTSFORD: Third Wednesday 7:30 pm Abbotsford Flying Club, Abbotsford Airport. Contact President, John Vlake 604-820-9088 email javlakeca@yahoo.ca

DUNCAN: Second Tuesday 7 pm members homes (rotating basis). Contact Pres. Howard Rolston, 250-246-3756.

OKANAGAN VALLEY: First Thursday of every month except July and August (no meetings) at the Mekong Restaurant.1030 Harvey Ave. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 moneypit@uniserve.net

QUESNEL: First Monday/Month 7:00 p.m. at Old Terminal Building, CYQZ Airport. Contact President Jerry Van Halderen 250-249-5151 email: jjwvanhalderen@shaw.ca

SUNCOAST RAA CHAPTER 580: Second Sunday 13:30 pm Sechelt Airport Clubhouse, sometimes members homes. Contact Pres. Gene Hogan, 604-886-7645

CHAPTER 85 RAA (DELTA): First Tuesday 7:30pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President President: John Macready jmacready@shaw.ca. Website www.raa85.ca.

VANCOUVER ISLAND AVIATION SOCIETY (VICTORIA): Third Monday 7:30 pm Victoria Flying Club Lounge. Contact Pres. Roger Damico, 250-744-7472.

THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President - zzALASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Gerry at 250-782-4707 or Heath at 250-785-4758.

Chapter executives, please advise of changes as they occur. For further information regarding chapter activities contact RAA Canada, Waterloo Airport, Breslau ON N0B 1M0 Telephone: 519-648-3030 *Member's Toll Free line: 1-800-387-1028*

Emails can be sent to President Gary Wolf at: **garywolf@rogers.com** *and George Gregory at* **gregdesign@telus.net.**

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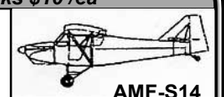

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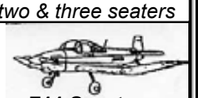

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The Recreational Flyer is pleased to offer you colour advertising within the magazine. Previously limited to the back cover, we have added 4 new colour pages which will be available with limited space for your advertising needs. Our rates for both black and white and colour ads remain very competitive and you reach a captive and qualified audience. Emails can be sent to President Gary Wolf at: **garywolf@rogers.com** *and George Gregory at* **gregdesign@telus.net**

Deadline for submissions *is the first of the month preceding date of issue.*
Artwork: Rates apply to camera ready artwork. Digital files are preferred and should be sent as email and in .txt format, PDF, JPEG, MS WORD, Photoshop or other common file types. Advertising is payable prior to printing of magazine unless other arrangements have been made. Payment is in Canadian funds. 10% Discount applies to one year (6 issues) insertion paid in advance. Commercial Classified ad rates 1/8 page minimum.
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Recreational Aircraft Association Canada
President: Gary Wolf / Treasurer: Wayne Hadath

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The Recreational Flyer is devoted to the aerospace sciences. The intention of the magazine is to promote education and safety through its members to the general public. Material in the Flyer is contributed by aerospace engineers, designers, builders and restorers of aviation devices and vehicles, used in an amateur capacity, as well as by other interested persons, publications and organizations. Contributions to the Recreational Flyer are voluntary and without remuneration. Opinions expressed in articles and letters do not necessarily reflect those of the Recreational Aircraft Association Canada. Accuracy of the material presented is solely the responsibility of the author or contributor. The Recreational Aircraft Association Canada does not guarantee or endorse any product offered through articles or advertising. The Flyer and its publisher welcomes constructive criticism and reports of inferior merchandise or services offered through advertising in the publication.

For Sale

FOR SALE: ZENITH CH601XL , airframe 80% complete, controls installed. Canopy mold. No landing gear. Subaru 2.2L no re-drive. $3000 or best offer. Call 705 279 4399 or 519 351 6251

1960 BELLANCA CRUISEMASTER 2555 TT 260 HP IO-470F A fast aircraft with good short field performance and triple tail style.Full size nosewheel suitable for grass fields.1000 mile range. Gami injectors, engine analyser,white polyurethane paint . Otherwise stock. Have paperwork to turn it into an amateur built.
$65,000.00 Richard 705-652-6307

ACEY DEUCY 2 seat open cockpit project. Fabric covering completed and painted. Engine Continental 0200A rebuilt with logs. New Warp Drive 3 blade ground adjustable prop. B and C Light weight starter and alternator. Full instruments and guages in rear cockpit basic flight instruments in front cockpit. Full electrics. Aluminum fuel tank. Radio included. ELT included. Gross weight 1230lbs. Estimated 50hours to final inspection. Asking $18000. Will sell only as a package. Many extras. 905-786-2482.

FOR SALE: Advanced Flight Systems Engine information system. Some probes, fuel flow. $750 OBO. Chris 1-866-733-8432

STINSON 108-3, a classic aircraft for sale. Airframe 2365TT. Franklin 165 hp engine 998 TT, 82 hours since top overhaul. Fabric in 2005, float kit, wheel pants, spare engine parts, 2 metal props - seaplane and cruise. 30K OBO. 250-991-7958 Quesnel BC.

FIBERGLASS FLOATS-1500 lb+, all bulkheads installed, just ends need finishing, can be finished as amphibs or straight floats- complete with aluminum streamline spreader bars, rigging tubing,fittings. 15' 2" L x 22"W at step- $1200, pictures available.- Also MA-4 SPA carb set up for 125 HP with new float and pump plunger. Includes aluminum airbox- $150. Bob 519-271-9575 trirmb@cyg.net. Stratford ON

BAKENG DUCE, built in 2001. Low time airframe with 180 hour O-290 D2 Lycoming. Good compression on all cylinders. Oil filter, oil separator, Cleveland main wheels, stainless exhaust. Aymar-Demuth wood prop 72 x 52. 100 mph at 2450 rpms. This is an easy flyer that is not aerobatic. Asking $15,500 or make an offer. david.evans2@sympatico.ca. Plane is in Barrie Ontario.

CAVALIER 102.5, "Aero Sport Power" O-320-B2B; 182 TTSN. Sensenich metal prop. Airframe was totally rebuilt in 1997; 1750# GW, 622 lb useful load; VFR instruments + Garman GTX 327 TXP Mode C & Val Radio; Trutrak Turn & Bank; Kept in heated hangar; 8/10 inside and out. $29,000 OBO. cavalier102@uniserve.com or 250-558-5551. Ask for Cameron.

O-290 G ENGINE converted to D with dual mags and O-290 cylinders. Includes starter, generator, carb, and Sensenich metal tractor prop. Rebuilt 12 hours ago, this is a very nice running engine. $7500 OBO. 250-768-2346 dgupton@shaw.ca Westbank BC

KR 2 TRIGEAR, 2180 cc Great Planes VW, 3.5 gph @ 130mph cruise, TTAE/TTAF 54 int/ext 10/10 $15000 call Ray Larson {905}892-6389 (SEE PIC)
McCauley metal prop, markings - DES 1 C60, DTM 7557 M1, sn# 735006 -history-unknown. Please contact JOHN SHYKULA 403-607-8539

Lycoming 0-235 C1BX 115 HP ZERO (0) HOUR SINCE (0M) OWNER MAINTENANCE 2013. 1456.1 SMOH 446.4 Stoh on tbo of 2 400 h. come with carburetor starter and mags it has flown 60.8 h. last summer 2012. Presently flyable on my PA 22-108. Also Sensenich 76 AM2-48 (74 x 48) never been repitched. Reason forsale: upgrading to 0-320A2B Price: $7,000 OBO. Paul Gagnon 819-429-6022

"NEW" 2011 CHALLENGER LIGHT SPORT XS50, only 21 hrs. For Sale $45,000 TTSN 21, TET 6 Built professionally by the late Rob Lake of Lake Aviation Wing tanks Brakes, Heater Upgrades include: Rotax 582 engine installed professionally September 2012 Flip-up nose cone hinge (Aeroloite Flight) for easy access to battery, panel wiring Custom fabric interior with pockets Hinged third door for easy entry and exit to cockpit Oil injection Strobe lights, wing tip lights from Kuntzleman Electronics upgraded Throttle assembly from light Engine Services. Avionics: BECKER CCX 175 COM/XPDR COMPAC FALCON VSI2FM-3 VERTICAL SPEED BANKINDICBALLTYPE20-20M2010-00700 Falcon Gauge Voltmeter, 6-16V, 2-1/4. Model number is VM16-2Q. AmeriKing AK-350 encoder. Avcomm AC-2EX intercom TED antenna for the transponder 11-17995 Miracle Air Whip Antenna 11-03018 for the radio additional ram mounts. Contact Bev 613 478-2923 or bevie01@ho mail.com

2006 ULTRAVIA PELICAN PL with Rotax 914 turbo 115 HP. 173 TT. Airmaster electric constant speed prop, Garmin GTX320A Mode C transponder, Icom AC200 VHF radio. Grand Rapids EIS, Lowrance 2000C GPS, Northern Airborne Technology [NAT] intercom, dual controls and brakes, electric rudder and elevator trim, plus extras. This a/c has always been hangared. Pictures and articles of Rupert's Pelican featured in past Recreational Flyer and Kitplanes Magazines, reside on the following website, http://www.ballardsportaircraft.com, under the "News" pull down menu - http://www.ballardsportaircraft.com/pages/bsa_news.html. $75000 OBO. Rupert - Kelowna BC. 250 763-9109 – rupertgruen@shaw.ca.

1974 WITTMAN TAILWIND W8, for sale because Transport does not want old pilots flying. C-FSNY has a C-90-14F Continental with compressions 80-70-74-76. Prop is a 3 blade IVO (great prop - easy to change pitch) This plane will fly at 150 mph at 5000 ft at 75% power (measured with a GPS 4 leg measure) Uses 4 imperial gallons per hour (18.24 litres) Capacity 20 imperial gallons.Fuselage was recovered in 2012. with Ceconite. Com transceiver and 1 transponder (not working at the moment). You must have tailwheel time. I will check you out but will NOT teach you to fly. $12,000. Jack Steele, Brockville ON 613-865-8107 jsteele@cogeco.ca

ONE PAIR OF AERONCA CHAMP WINGS with a fuel tank in each. They were briefly on a Volmer Sportsman and have been recovered in Ceconite. The wings include the ailerons and cabling. $3000. Located in Westbank BC. 250-768-2346 dgupton@shaw.ca

WANTED: CONTINENTAL A65 PARTS: Pistons, cylinders, carb, magnetos, rocker covers, spyder, cams, etc. Also interested in complete engines up to C90. Email Chris at

cphorsten@yahoo.ca or call 416-918-6569.

ZENAIR 750 STOL 13hrs TT Test flown, but not painted. Registered Advanced ultralight March 2013 Analog instrument panel. Ready to fly, $98,000.00
Serious inquiries only please contact Mac at macpat@live.ca cell, 519.831.0967

JABIRU 2200 ENGINE, 200 hours since new, 80 HP. 130 lbs all in. Has updates for flywheel, oil pump diffuser plate, rocker-box lubrication, starter, have (carburetor) improved linkage. Optimized cylinder cooling baffles. Comes with everything to make it run. Mount is for Sonerai II. Engine removed in good condition to install Jabiru 3300 for better performance. Mag drop 25 rpm. Runs strong. Static take-off rpm 2900, with climb prop. Reaches 3300 rpm in cruise. Log book available. Owned and Maintained by AME. Removed and inhibited fall 2012. $7500 or best offer. Photo is of Engine in Jabiru crate. Shipping at purchasers cost, but can take to Reimer truck terminal. Have engine stand if needed. $50 extra plus separate shipping. Call for list of Firewall forward items included. Would keep it as a running spare but need cash for my kid's tuition. Bill Evans 514-907-4919
Wanted - someone in southern Ontario to assemble a factory kit wing set for a member's Glasair. He has asked that responses be directed to RAA Canada, so please email to garywolf@rogers.com or call 1-800-387-1028.

Hangar For Sale at Sundridge Ontario, beside CPE6 airpark.Hangar is a wood framed building with steel siding, roof, and doors, with a gravel floor. 40x40x10 on 7.5 acres. Taxes this year were $352. Asking $50,000. Phone 705-386-9080.

TAILWIND W-10 $49,000 One of the best metal wing Tailwinds around. Time since new – 150 hours. Lycoming 0320 Engine, 160 HP, SMOH 650 hrs. Warnke prop. IFR, 2 King 170B, 2VOR, GS, King
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2012 RV6 35TT with slider canopy. Aerosport Power O-360 with hollow crank ready for constant speed. New Sensenich fixed pitch currently installed. TruTrak Dual EFIS and engine monitoring, connected to Garmin 696 and 2 axis autopilot with “panic button”. LED lights/strobes, HID landing light, Garmin Mode C, electronic breakers, hooker four point belts. $82,000. Call Mike 905-520-8500 or mwiebe@bell.net

CNC3 BRAMPTON, HANGAR SPACE FOR RENT. Suitable for high wing. Heating, electricity and bi-fold door. $335 monthly. 905-861-9535 Paul Horsten.

TURBI REPAIR-AND-FLY PROJECT
1967 Turbi Amateurbuilt. Built by C.R. Goguillot and hangared and maintained by RAA Chapter 85 for many years. Airframe 3840 TTSN, Lycoming O-235 2306 SMOH. New mags. No prop. Bendix KY97A Transceiver, Garmin GTX 320A Transponder and Sigtronics SPA-400 Intercom. All avionics are TSO'd and less than 5 years old. Recent wood prop strike and gear legs failure on takeoff. Needs new welded steel tube gear legs and repair of wood and fabric damage. Complete set of construction plans included. This is a great project for someone with some welding and wood and fabric work experience. $5,600 or best offer. Contact Dave Rose, (604) 434-1421, dave_rose@telus.net

GIPSY MOTH full scale replica , homebuilt project. 2/3 complete, built with many original parts. Fuselage, lower wings and ailerons, upper wings, tail plane, elevators, fin, and rudder MD-RA pre cover inspected and cleared for finishing. c/w. Gipsy engine. Price available on request. Phone 905-814-8391, e-mail; ken.ruetz@hotmail.com

AVID CATALINA complete Kit #148 and Engine. Excellent Condition. Very rare! The most complete Avid Catalina kit you will find. Includes All Parts, Covering material and AN hardware. Basic instruments, ENGINE Great Plains vw 2180 kit. All metal parts factory welded and powder coated. Has ALL factory Up Grades. Complete Assembly Manuals and Assembly dvd’s all factory newsletters. Always stored indoors. If interested, email for detailed information and photos.
Brian Berezowski tborthobrian@tbaytel.net

HANGAR FOR RENT at YKF (Kitchener-Waterloo) Available immediately 40 x 40 feet, concrete floor, Bi-fold door, unheated, with hydro for engine pre-heating and extra lighting. Good access to taxiway, close to RWY 32 The hangar is large enough to accommodate two small aircraft. Rent is $400.- per month plus HST For more info contact Rudy Hane at 519 648-3006 519 648-3006 FREE

Ads run for a maximum three issues depending on space available and then must be renewed for continued display. Please direct all classified inquiries and ad cancellations to: garywolf@rogers.com and place “RAA ad” in the subject line.

Mentor / continued from page 9

Back in 1986 I had finally got around to getting my private pilot's licence, then commercial and instructor's ratings. We bought a Cessna of our own in 1997 and owned it for 13 happy years. My kids grew up with that airplane and it lent a unique character to our family culture. We enjoyed a couple of holidays with her, but mostly it was pie runs to Chilliwack (great pie, by the way. Check it out if you're out there) and flying "up-downs" to see if we could make a pencil float of the dashboard. The kids loved it.

About 8 years after that, now with desktop publishing and design experience, I approached the RAA about helping out with the Recreational Flyer. That was 2001.

So here I am. That brief period - maybe a year and a half - of knowing Bill and his family altered my trajectory and made me aware of the entire homebuilding movement, of recreational flying, of the EAA and then the RAA.

Because of Bill I have a Zenith project in the barn, and because of Bill I have a hope of flying on wings I've built to great adventures and far away places. Because of Bill I got my pilot's license, spent a bucketloads of money on flying and had a ball flying countless kids and friends, maybe to start a journey towards their own set of wings. And I get to work on this magazine. Thanks, Bill. *You made a difference.*

Oh yeah. I'm flying Air Cadets. It's a chance to pay it forward, to encourage and mentor some young people just as I was myself.

Who knows? Maybe I'll change a life too.

***George Gregory** has been a member of Chapter 85 (Vancouver), holds commercial and instructor ratings and wants a flying car.*

C-GYNX / continued from page 41

and the attached steel gear. This action then stripped the teeth off of the aluminum drive gear at the engine with which it was engaged. Ignition was lost when the distributor rotor stopped turning and the engine then stopped. The single broken blade on the 3 bladed propeller indicates that the engine was stopped at the time of impact.

These findings and conclusions are based on the best efforts and interpretations of the investigating committee (Fig.8) and are intended to be impartial. The information and conclusions have been recorded for the benefit of other homebuilders and it is hoped that this information can be of use.

Although all actions were taken as prescribed during the importation of this aircraft and in preparing it for flight in Canada, an accident (fortunately not fatal) still occurred. Work on the aircraft and engine was planned and carried out as safely as possible and the aircraft successfully went through normal pre-flight checks and a full engine run-up. The one missing link was the lost distributor rotor piece which was not recovered and accounted for.

The lesson learned from this incident would be that all aircraft parts, bits and pieces lost during maintenance procedures involving the engine or any other moving parts such as control linkages, hinges, cables and control surfaces, must be accounted for prior to flying the aircraft.

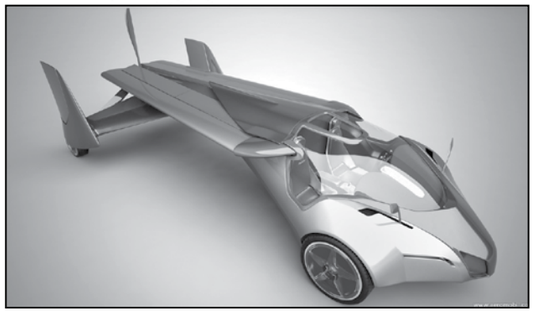
The investigating committee wishes to thank the pilot for sharing all of his thoughts and recollections in the events leading up to this accident and for his willingness to share this information with the aviation community.

Accident investigation team, left to right: John Macready, Peter Whittaker, Rob Prior (holding distributor), Gerard Van Dijk and Dave Rose. John de Visser and Andy Pearson were unavailable at the time of the photograph. Gerard Van Dijk and Andy Pearson dismantled the distributor. Bob Cutting, a former member of Chapter 85 was also in attendance for the disassembly process.

***Peter Whittaker** is vice president of RAA Chapter 85 (Vancouver). He has built and is flying a Zenith 601 HDS which was featured recently in the Recreational Flyer.*

Are you looking for lightweight, inexpensive fasteners for panels and such? Have a look at all the plastic fasteners in a modern car. The inner fenders, splash guards, all manner of engine compartment covers, and even the radiator are held in place with plastic fasteners. Some have push pins to expand the legs, some have a plastic screw, and some have ribs for friction fit. Colour choice is limited to black or white.

There is a wide range of sizes and types, and your local Part Source (CTC) has a display of these, with prices ranging from 50 cents to a couple dollars apiece.



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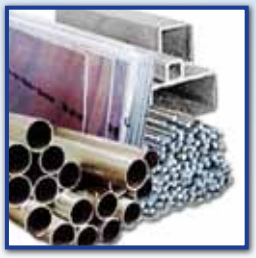
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