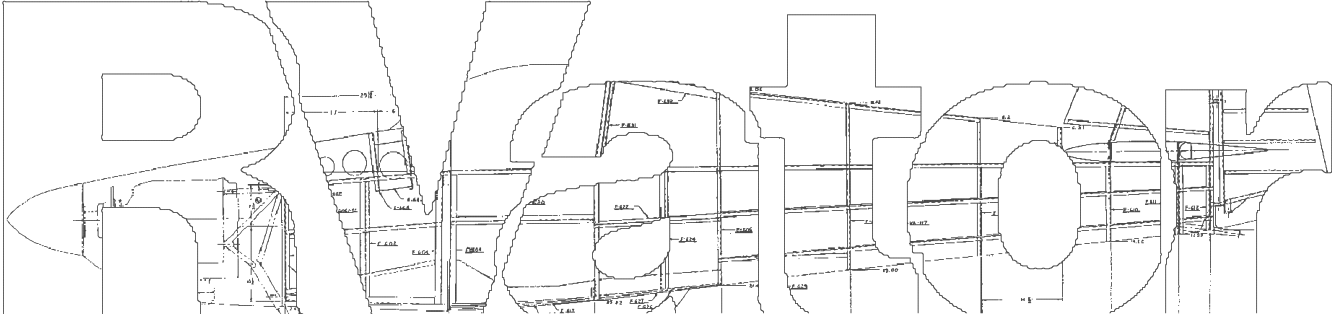


Western Canada



outboard of the flap. The main spar of the right wing was also fractured about the same location, but remained attached by the wing's outer skin. According to the kit designer, the wing design had previously been statically tested to failure, which had required in excess of 9 Gs.

**June 9:
Additional Comments**

The below [above] NTSB release contained one bit of mis-information. There WAS a throttle installed in the rear cockpit.

The NTSB investigation is ongoing. Airframe components containing fractures have been sent to a lab and are awaiting further examination. At this point, the NTSB is in control of the investigation and wreckage and they are progressing as their resources permit. Van's Aircraft will participate in the lab examination which is to address metallurgy and failure mode among other things. Testing should be performed within two weeks. We will post any pertinent findings when they are made.

This accident happened for as yet unexplained reasons. On one other hand, Van's has accumulated over 800 flight hours on its three RV-8 and RV-8A prototype aircraft, including limit testing and a reasonable amount of sport aerobatics and even airshow aerobatics in the #1 prototype, plus the static testing mentioned below [above]. The correlation between this level of design and testing, and an airplane breaking apart in reportedly level flight just isn't obvious. Thus, the lack of ready answers.

Van's Aircraft personnel are taking steps to review and verify design calculations and test data. In lieu of any clear evidence of cause of the accident, all possibilities are being considered. Where appropriate, outside consultants will be used in our search for answers. We are dedicated to finding answers.

June 12

Following the loss of their #2 RV-8 prototype/demonstrator aircraft, Van's Aircraft personnel inspected the wing and spar structures of their #1 RV-8 and their RV-8A aircraft. They found no signs of cracking, deformation, or distress. However, because of the yet undetermined cause of the accident, pending further investigation, Van's has imposed a voluntary flight precaution on these two aircraft, and has contacted operators of homebuilt RV-8s and requested they do likewise.

June 26

The NTSB investigation into the N58RV RV-8 accident continues. To date, some findings include:

A visual and microscopic study of a failed portion of the left wing spar indicated a break symptomatic of simple overload. These inspections and tests also indicated that airframe materials used were the specified alloys. No oxidation, cracking or prior distress was evident. No evidence of reverse load or other indicators of aerodynamic flutter were found. Breaks found at about the mid-span of the right wing showed signs of being caused by impacting the ground. NTSB testing of other components continues.

Van's Aircraft has, through independent consultants, begun a design review process, to assure design integrity.

**"In lieu of any clear evidence of cause of the accident, all possibilities are being considered."
—Van's**

**July 7:
Summary of known information**

Van's Aircraft Inc's number two RV-8 (N58RV, yellow tail-dragger) prototype crashed on May 24 near Blythe, CA. Both occupants, Van's Aircraft sales/demonstration pilot John Morgan and passenger Larry Hull, were killed in the crash. Eyewitness reports and the crash scene investigation revealed that the left wing had failed in flight, separating near mid span between the flap and aileron.

Inspections and tests conducted by the NTSB have thus far revealed the following:

1. The engine was running at the time of impact.
2. The flight duration was about 12 minutes and power setting was approximately that for max cruise.
3. A visual and microscopic study of the failed portion of the left wing spar indicated a break symptomatic of simple overload. This means, a load applied in one direction as opposed to reverse loading.
4. No evidence of oxidation, cracking, or prior distress was indicated.
5. Materials used were determined to be of correct alloy and temper.
6. No evidence of reverse loading or other indicators of aerodynamic flutter were found.
7. Breaks found at about the mid-point of the right spar showed signs of having been caused by ground impact rather than flight overload.
8. Eye witness reports indicate that the aircraft was in approximate level flight at perhaps 1000' altitude at the

more on page 3...

time of wing separation. One witness reported a pitch up attitude change concurrent with wing separation. There were no reports of the flight activity other than immediately before the accident.

9. Van's Aircraft had performed calculations and conducted static load testing on RV-8 wings up to a calculated 9 G positive strength level. A design and test review is now under way with the help of outside consultants to further assess the RV-8 wing strength.

This RV-8 had flown over 400 hours in the 13 months since its completion in April 1997. The number 1 prototype RV-8 has accumulated over 400 hours, the RV-8A prototype (same wing design) has now accumulated about 100 hours flight time. To our knowledge, four other kit built RV-8s are now flying. Because of this accident and because of the unanswered questions concerning it, Van's Aircraft Inc. has temporarily limited its RV-8 flight operations to those of utility category (4.4 Gs positive), and has on an individual basis, requested other RV-8 operators to do the same. Van's Aircraft has also carefully inspected the wing structures of its other RV-8 and RV-8A and found no evidence of distress. Operators of kit built RV-8s have been requested to perform similar inspections.

To date, from what has been reported, determined through investigation, and demonstrated through testing, there are no obvious reasons for this accident to have happened. Less obvious reasons; some possible small thing which could have triggered a fatal chain of events, remain pure speculation at this time. The NTSB investigation continues in an effort to determine causal factors. Van's Aircraft continues to cooperate with the NTSB and to search for design related answers. Over and above the NTSB findings, Van's Aircraft's goal is to assure that the RV-8 design is sound, and to make any corrections which may be found necessary.

We understand the anxiety of RV-8 builders over the future of their construction projects and ask their continued patience as we work our way through the design review process. We are endeavouring to make this process thorough and complete, and we expect that it will be several weeks yet before we see results from which we can make decisions or recommendations.

Concerned RV-4 and RV-6 builders should remember that

the RV-8 wing, while similar in overall dimensions, is considerably different internally. Over 1600 RV-4s, RV-6s, and RV-6As have flown hundreds of thousands of hours with no known wing structural problems. Thus, we feel that RV-4, 6, and 6A builders and pilots can continue to build and fly with confidence born of this extensive fleet experience.

July 23

Van's prepared a wing inspection procedure and sent an inspection form to all RV-8 operators. Inspection items included both materials and overstress details. The inspection procedure was performed visually and with simple straightness gauges. All RV-8 operators responded, and no defects or distress were noted.

July 23

An additional paragraph has been added to the bottom of the summary below [above].

August 14: Static load test results

On August 12, 1998, an amateur built RV-8 wing structure successfully passed a rigorous static load test. A complete load analysis was developed by an independent, FAA certified,

Designated Engineering Representative (DER). The wing was inspected by a Designated Airworthiness Representative (DAR), initially to verify structural compliance with RV-8 construction drawings. Then, during and after the testing, for structural deformation.

The test was conducted under the direct supervision of the DER to the standards required of an acrobatic, FAR Part 23 certified aircraft. The structure was tested at condition A and condition D, the two conditions that the DER found to be critical for this aircraft. The wing structure was loaded to, and successfully withstood with no objectionable deformation, simulated flight design limit loads of 6Gs positive. The wing structure was then loaded to 150% of the limit load, under both conditions, and withstood these loads for the required 3 seconds and did not fail. Both the DER and DAR personnel noted that the deformation sustained was minimal.

Van's Aircraft has commissioned a DER for a Flutter Analysis and GVT (Ground Vibration Test). While in-flight flutter testing has been successfully accomplished, and the visual and microscopic lab analysis of the RV-8 (N58RV) airframe wreckage showed no evidence of flutter, all possibilities are being investigated.

“Because of this accident and because of the unanswered questions concerning it, Van's Aircraft Inc. has temporarily limited its RV-8 flight operations to those of utility category (4.4 Gs positive), and has on an individual basis, requested other RV-8 operators to do the same.”

—Van's

How to fly an RV-6

A beginner's guide

This article was originally written as a post to the RV List by an RV builder who wishes to remain anonymous. WCRVator appreciates being allowed to reproduce it.—Ed.

What follows is an outline only for those who are still building and probably have low time, or none recently. The rest of you, don't even read this.

Like all other builders, I read all the magazine articles on how to handle an RV. Nothing really prepares you for an RV, so the best you can do is talk to those who have flown and try to get some rides and dual. Nobody is likely to let you take it off or land it.

Step 1: Take-off

Mounting up is fun in itself. You get comfortable and strap in and these surroundings make it self-evident that you are aboard something really different. After all the checks are done and you are ready to roll, feed in the throttle gradually and you will find the thrust to be fairly strong. You feel it in your back. With this will come the tendency to pull

left, which you will be prepared for, and you apply right rudder as needed. After I mastered this, I found I was dropping

right wing on lift-off. Others did the same. This is because I was so keen to get an arrow straight lift-off that I was holding in rudder too long. The aircraft will lift off by itself and if you have a tailwheel, raising the tail improves the view and makes you feel like a hot dog, but you don't have to do this unless you want to.

Step 2: Climb and cruise.

Once you are climbing out, you will find that the controls are light but not snaky and you can move them around gently while you decide when to level out, turn, or whatever. When you throttle back (you get to height quick-

ly), it gets quieter and you have time to do a scan and enjoy life a bit. Tooling around will let you feel how much response is there and what you feel you like to do. Not much else to say here.

Step 3: Landing

If you stay in the pattern, you may not get too much speed up, but if you fly away and come back to join up, you

need to think about slowing down. This you will get to learn quickly and easily and there is more than one way to do it.

Downwind

should be about 100 mph, base slower to 80, final to 75 and 70 and 65 once you get good. I only use one notch of flap because until I changed the flap handle, no way could I get the second notch on. (I had cut it down 2 inches—big mistake.) I am used to it now and it works for me. I use 2nd notch rarely and only if I am too high. I do not practice touch and goes because I want to save the wheels and brakes and I can make two good landings followed by a bummer, so I feel any landing is a keeper and that suits me.

When to turn final is the big question and depends on wind and traffic and your height. I try to get it slowed to

75, know I have the runway made. By 70 I am nearly there, and I quit looking at the airspeed and keep a steady descent. I round out gently at a height that tells me it is time now (I really don't know if it is 20, 15, or 10—sorry). Then I keep the spinner up **moderately**, no more, and she will settle on the mains. If I keep pulling back like a Cessna, she will rise up and drop in. If you are short, an addition of throttle will carry you to the numbers. If you are a bit high and chop the throttle, she will settle kind of quick. All this is a description of approach on a short runway. Ours is 2000'. I don't need the brakes until the end for turn off. The RV thankfully tracks very nicely and straight which is a big help for a novice. If you have a long runway, then life should be even easier for now you can keep power on all the way, settle as you like, and just let the tarmac come up to meet you and you roll out. No brakes needed. I just like to land as dead stick as I can because I was taught that way and I think it could be valuable. Pros can send their flames as they choose. This is only a guide for amateurs by an amateur. I was way out of date with my flying and was nervous more about the systems than about myself. I had 1.5 hours checkout in my RV then went solo thereafter. I am still learning of course. I just thought this would be of encouragement for those who hope to strap in and take the challenge sometime down the road. This is my last post. I apologize to Matt for the waste of bandwidth and for my posts that had no technical or other merit. I will leave the list and retire to the shop where I dream of bashing more rivets for another magic carpet.

Breeze through your inspections

Tedd McHenry, Editor

We were very fortunate to have Hank Horst, the RAA inspector for Kelowna region, give a presentation at the Salmon Arm RV builders's gathering. Hank spoke for more than an hour, in two sessions, telling us about common mistakes builders make, passing on many valuable tips, and clarifying the role of the RAA. New builders like me found the advice very helpful. I've tried to condense Hank's presentation into this short article. My apologies to Hank for any errors, or important points left out.

Rigging

Hank emphasized the importance of proper rigging. If the airplane isn't rigged right, it won't fly right. With many kits, the manufacturer's rigging procedure isn't adequate to give proper rigging. Van's rigging procedures are pretty thorough. But don't leave anything out!

Hank also strongly recommended checking your level for accuracy—as do the Van's construction manuals. Check it regularly, as in every time you use it for a critical measurement. The RV-6 manual gives a good procedure for checking your level in the Bulkhead Assembly subsection of Section 7 (Wing).

Don't use common string for aligning and rigging. Use 12# fishing line. It won't sag, and you can get a more precise measurement than with common string.

When plumbing, set a can of liquid—water is fine—on the floor, so that the plumb bob is in the liquid. That will dampen the oscillations of the plumb bob, the same way a shock absorber dampens the oscillations of your car's suspension.

Jigs

Hank emphasized the same point that Van has emphasized in the RVator: the jigs don't need to be accurate, only rigid and stable. Strictly speaking, what we use when building an RV are fixtures, not jigs. Jigs position tools for accurate machining and

forming, and so must be very accurate themselves. Fixtures, however, only hold parts in relation to each other. So the fixture must be rigid, to keep the parts aligned, but the fixture dimensions themselves are not at all critical. It might be nice to build a fuselage fixture so that each station is perfectly positioned and level. But, to be certain, you're going to have to measure and fine tune the position of each bulkhead anyway so, other than the satisfaction of doing it, there's no point getting that carried away with the fuselage fixture.

Fuel tanks

Fuel tank leaks are a vexing problem for many builders. You can test your tank many ways, but the bottom line is: does it hold gasoline? Hank recommends leak-testing your tanks with gasoline. Auto gas is fine. You can drain it into the family car when you're done.

Preliminary testing with air and a balloon is fine, says Hank, but you should still test with gasoline. He

related the story of one unfortunate builder whose tanks seemed to hold air just fine but, once filled with gasoline, had five small leaks.

Hank recommends PRC as a sealant, because it flows better than Pro Seal. With better flow, you're more likely to get good coverage in

“Fuel tank leaks are a vexing problem for many builders.”

more on page 10...



Builders listen intently as Hank Horst passes on some wisdom.

Salmon Arm Fly-In a success

Ken Hoshowski, Salmon Arm, BC

The weather cooperated—I had a pretty red neck and face Sunday night. This year I was working on aircraft parking. The past few years it was registration. We had about 50 aircraft register and I am sure a number that didn't. We had 10 RVs in attendance. I guess we can include Ken Fowler's Harmon Rocket as an RV. He put on a great aerobatic show complete with smoke.

It was nice to see George and Doug Worden in George's new RV4. His second and a beauty at that. It was also especially nice to see Bob Baldock whom I haven't seen in some time. Rob and Cheryl Snider from Kamloops in their beautiful RV-4 were also here. Not sure who is prettier, Cheryl or the RV-4, but they are both "10s".

Thanks to Dusty Veideman & Chris for leading the RV fly past. A

Grumman also tagged along hoping some of this RV stuff would rub off. Unfortunately an ultra light entered the circuit and disrupted the fly past. Shades of two years ago but that's another story.

Les and Carol Vaughn from Hixon were here Saturday morning and left Sunday morning. Les reluctantly borrowed Marge's MGB for a trip down town and his grin was almost as wide as the RV grin.

Gerhard Schauble from Westbank brought his different but nicely painted RV-4. We can't forget Eustace Bowhay's and my RV-6s, which remained in our hangers.

Our numbers were down a bit this year due to the COPA convention in Edmonton.

Our fly-ins would not be complete without Transport Canada's attendance. A few years ago they arrived in

their King Air about noon and for some unknown reason all activity almost ceased. This year they arrived Saturday night, and both Dave and Danielle were a pleasure to deal with. They were friendly, approachable, and helpful. I was impressed by their candor and hope we see them back next year.

Running a Fly-In such as ours requires much manpower. The three of us on aircraft parking didn't even get a lunch break and by 4:30, when everything was wrapped up, my feet hurt like hell! We did have a good day, our admission by donation took in \$3600.

My only regret is that I didn't have more time to visit with you RV pilots and co-pilots. Maybe next year. Thanks for coming.

Hank Horst...

the hard to reach places. Hard to reach places like the back sides of rivets—which you should inspect individually, to be sure they're covered. Dipping the rivets in sealant before setting them is also a good idea. Be sure to seal in warm conditions, too.

Fuel lines and filters

Fuel lines and filters often cause problems during inspections. Even worse, they too often cause problems in flight. Hank warned against using paper in-line fuel filters. Paper in-line filters are not acceptable. Regardless of your fuel system, you should still use a gascolator. You must use fuel lines with an inside diameter of at least 3/8 inch, for any homebuilt aircraft.

Role of the RAA

The role of the RAA has changed dramatically in the last couple of years, and many people (myself included) are confused about it. Hank puts it simply like this: the role of the RAA is to help builders meet Transport Canada's rules. One of the best things the RAA has done to help builders is to put all the critical rules and references in one Builder's Manual. You can order it directly through the RAA, and Hank strongly recommends that you do. I don't have mine yet but, after seeing what's in it, I'm certainly going to get one.

In a nutshell, the RAA provides inspectors (for a fee, to cover costs), who check your work at critical points during construction, to help you keep on track. Once the final inspection is completed, you still have to satisfy

Transport Canada. But with good inspections that won't be a problem.

In closing, Hank emphasized a couple of critical items in the regulations that are sometimes missed by builders.

- *You must use aircraft-standard materials.*
- *You must incorporate the AD on cabin heaters (details are in the RAA manual).*
- *In-line paper fuel filters are not acceptable.*
- *The fuel shut-off valve must be located such that the pilot can operate it while strapped in.*

Hank's presentation was the highlight of the event for me. I hope I've been successful in passing on some of what I learned from it.

Inspect your –6A nose gear leg

Fred Stucklen

N925RV RV-6A

E. Windsor, CT

Regarding the breakage of my front gear leg, I have the following to offer the RV community.

As to why the front gear leg broke, Van has not released to me the full metallurgy report, and does not plan to in the future. He has written me indicating that my "gear leg showed signs of metal fatigue" and that it "had some surface imperfections which could have lowered its fatigue life." He also indicated that my "new gear leg has been inspected and found to be free of surface imperfections," and that "the service life of this gear leg should be much longer than the first leg...However, we don't know exactly what this life might be." He further indicated that, while the prototype RV-6A nose gear leg had been replaced "at about 1600-1700 hours of use, we did not inspect it for the surface conditions we are now aware of—this gear had been replaced for other reasons." In closing, he stated, "...we

are confident that the current production, inspected gear legs will offer a long service life under normal use."

I have to say that I am very satisfied with Van's organization for the service and cost breaks he has offered to me in getting N925RV back into the air. During the past eight weeks, Tom Green and I got to hear from each [other] often, both on the phone and by email. Tom expedited the repair and refitting of the new front gear leg to my motor mount, which greatly lessened the time back into the air. He and his office personnel are to be commended for their efforts.

However, I am a bit more critical of Mr. Van Grunsven's decision to not share the metallurgy results with me. While his letter indicated that my gear leg "had some surface imperfections" that lead to "metal fatigue," I am still at a loss as to what these "imperfections" were, and where they came from. Where they self induced during the kit assembly process? Or where they introduced in the gear leg manufacturing process? If it was self induced,

how was that achieved (file marks?) and how might it be prevented next time (and with the next builder)? If it was a leg manufacturing process issue, are there any more out there that need to be found? (Even **one** should be too many if it's "surface conditions we are now aware of.") More importantly, if it is a manufacturing issue, why not communicate the findings to all builders as a warning so that possible problems might be found prior to another failure? (I guess that's what I'm doing...)

In my opinion, all RV-6A aircraft gear legs, especially older gear legs (mine was purchased in 1991), should be inspected for this "surface condition" to ensure against future failures. We all should periodically inspect this leg, especially after the occurrence of any front wheel shimmy condition. If a crack is found early enough, you won't be subjected to the repairs that I endured. My gear leg cracked in excess of 50% through the rod prior to breaking.

Letters and Updates

"I sure do like the newsletters and the input they give me while building my RV-6. I started my project five years ago and am at the point of installing the tip-up canopy. I have yet to find the engine and instruments, but am now looking more intently.

"I noticed a tip in the January issue that might be improved upon. In order to prevent smileys and speed up the work, I have found it easier to put a couple of pieces of masking tape over the rivet set rather than on the rivet head. If the tape is placed

glue-side-down over the rivet there is a tendency for the tape to really adhere to the project. However, if the tape is on the set the tape will move rivet-to-rivet quicker and it is easier to clean off the set."

Doug Murray (Mountain View, AB)

"My RV-6A (C-GYRV) should be airborne sometime this summer. I'll keep you informed."

Jack Dueck (Cremonia, AB)

"I am 2200 hours into an RV-6A. The

injected O-360 is installed, wiring done, tip-up canopy finished, wheel pants partially completed, no paint, prop, upholstery as yet. I have installed the Visions 100 engine monitor system, Lightspeed CD ignition in place of right mag, a pre-oiler, engine heater, dual cabin heater/defrosters, and other little touches (over 140 of them) for flying in the mountains of Revelstoke. I hope to install a Terra radio/transponder/encoder if it ever gets here."

Homer Rogers (Revelstoke, BC)



Rob Griesdale flies

Rob Griesdale, Cayley, AB

The first flight of C-GWPC was on March 2, 1998, from High River airport—elevation 3441 feet, temperature 0°C. The aircraft flew hands-off. The only problem was keeping the speed below the recommended 150 kt while maintaining a high power setting. I was climbing through 9500' before too

long.

Jack Dueck, a fellow RV builder and EAA flight advisor [*and WCRVator reader—Ed.*], was on the ground reading back the numbers. The EAA flight advisor program is very useful! I also recommend the dual time offered by Van's and Mike Seager. My 1.5 hours in the factory RV-6A was very encouraging.

I now have 25 hours on C-GWPC and no snags. The wheel fairings are on now, and improve cruise speed noticeably. I'm still recording the numbers at various power settings.

The A/C has an O-360 A1A from Progressive Air, a Hartzell C/S prop, and a pretty full cockpit of "necessary items." A real joy to fly.

Ken Hoshowski helped inspire me 5 years ago. He's a Very Bad Man.

Good Show

With mixed feelings, I present the first-ever WCRVator "Good Show" award, Good show to Kurt Kaminski (Kelowna, BC), who made a successful forced landing on a road in early September. Kurt was unhurt, but there was damage to the landing gear, engine mount, and one leading edge.

Practice those forced landings, everyone.

Classifieds

RV-6A 321 stainless exhaust for O^o320, for sale. Full-crossover, 1-3/4", forged stainless flanges. Cost US\$650 + GST, asking CDN\$700. Bob, 604/275-1603.

Western Canada RVator

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