THE RVATOR

THE LAST AND FINAL ISSUE ...EVER

THE HOBBS METER

7,150

COMPLETED RVS

Norm Taylor found that the paint job on Van's RV-7A demonstrator looked just as good on his RV-12.

AWARDS

KEN SCOTT

"START THEM OFF RIGHT" AWARD

Chase Ockuly successfully completed his checkride and was issued his Private Pilot license on August 18, 2010 at Medina, Ohio. Plenty of new pilots out there, but this one's remarkable because Chase, age 18, did all his flight training and took his checkride in the RV-7A (N914E) that he and his father built.

"NEVER SAY DIE" AWARD

On July 15, 1987, I drove my brown Saab 99 (a.k.a. The Road Drut) out to the fringes of civilization, found North Plains, and laid three quarters of my net cash worth on the tiny office counter at Van's Aircraft, Inc. In return for my $660.00 a couple of young guys (both of them still with Van's, but now sporting a few gray hairs – or, in Daryl's case, not much hair at all) helped me load a pile of aluminum parts and bags of hardware into the Saab's capacious trunk and branded my hand with my new identity: RV-6 builder 20207.

The very next day the mailman dropped another order for an RV-6 empennage kit into Van's P.O Box. This one was from ***Jeff Justis,*** of Oxford, Missisippi. He received builder number 20208.

I flew 20207 on December 26, 1993. By that time, I was working for Van's and as part of my job I sometimes talked to Jeff on the phone. I never failed to tease him about the time he was taking to finish his airplane, and always let him know just how many hours I had flying mine, which had left the factory just one day earlier. Gentleman that he is, Jeff always took the ribbing in the spirit it was intended.

I am now extremely pleased to report that 20208 is a flying airplane! Jeff made the first flight on November 9, a mere 23.5 years after placing his order (or, sixteen years and ten months after the first flight of 20207.)

So, the teasing officially ends here, Jeff. Goodonya, as the Aussies say, and congratulations on never letting go of the dream. I hope you enjoy yours as much as I've enjoyed mine!

Now, if we can just gang up on Jeff Hedrick (builder number 20002 – the first RV-6 kit to ship, ever --) and get him to finish his….

BEHAVIOR MODIFICATION, PT. 2

STICK & RUDDER SKILLS

VAN

I took this photo of Van landing the original RV-9A about fifteen years ago and I still remember the exact moment. The airplane was going very slow, his head was up looking over the nose and the touchdown was gentle. He had the airplane under complete control during the approach, the touchdown and the roll out. It was pretty to watch.

For what it's worth, this is only one of many thousands of landings on grass we've made in the company nosewheel airplanes without a single incident.

In the last RVator I published a very pointed safety article by Doug Rozendaal, along with a few comments of my own. The theme of my comments were that a high percentage of GA accidents, homebuilt or otherwise, result from low-speed loss of control. Another article entitled "Stay Ahead" by Tom Benenson in the Jan. '11 issue of ***Flying*** *lists fifteen suggestions for improving flying skills. Thought-provoking and well worth reading. Now, I'd like to expand on my comments a bit. Below are several examples of common accident categories usually involving low speed loss of control.*

TRAFFIC PATTERN AND APPROACH TO LAND

By its very nature, the termination portion of a flight is conducted at the lower end of the flight speed envelope. While the slowest portion of the flight should be at the moment of touchdown, it is not unusual to be near stall speed while anywhere on the landing approach, up to traffic pattern altitude. Traffic pattern conflicts and wind shear factors can result in loss of airspeed and accidental stalls. In high wind conditions, visual misperceptions of ground speed vs. airspeed can lead to stalls, including uncoordinated stalls because of excessive rudder use in an attempt to "make the plane turn faster". Regardless of the contributing factors, loss of control is the result.

LANDING/TOUCHDOWN

I find it difficult to imagine how anyone can consistently land safely without a mastery of low speed control. While this point may be argued, the traditional landing objective is that of contacting the ground at or near minimum air speed. (A survey in the October 2010 issue of *Sport Aviation* showed a 52/48 percent preference for wheel landings over three-point landing. This would contradict my above statement of the "accepted" preferred landing technique. It could mean that while the textbook dictate is the 3-point landing, user preference is a higher touch down speed "wheel" landing. If so, one explanation could be that most pilots prefer the wheel landing because it is smoother for them, or it could mean that they lack the skills or confidence to do 3-point landings. I'll discuss this in a future article.)

To do so requires a mastery of speed/attitude/altitude control. While landing accidents are usually not fatal, they can involve injury and costly repairs. The fact that landing gears "fail" during landings and that even tri-gear airplanes "depart the edge of the runway", indicates that lack of control is probably a contributing factor.

Formation flying is always a demanding job, but when you're flying an RV-8 in formation with a Cub, it also becomes an exercise in low speed control. Notice the attitude of the nose and the position of the flaps… not a job for the inattentive or unpracticed pilot.

TOO SLOW & TOO HIGH

A landing approach where the pilot slows to stall speed while too high for a safe touch down yet too low to recover. Can result in aircraft damage or worse.

TOO FAST, TOO LOW

A landing approach where the pilot fails to arrest his landing descent rate before contacting the runway. Possible damaged to the landing gear/aircraft on initial contact, or a dramatic rebound during which the pilot may find himself "too high and too slow".

MANEUVERING

Maneuvering basically refers to almost anything other than straight and level X-C flying. Obviously, aerobatic flight is maneuvering (aggressive), but lets exclude that for now. Difficult as it may be to believe, many fatal accidents have resulted from seemingly normal turning and circling at moderately low altitudes, 500 to 1000 ft. or so. A common scenarios might be circling over a point of interest, a country home, airport, fishing spot, etc. at a reduced airspeed, to extend observation time. Couple this with distraction caused by power and airspeed management duties, and we have the ingredients for a stall/spin. Again, our old nemesis: LSLOC.

AEROBATICS

Aerobatic flight accidents most generally result from either impacting the ground because of insufficient altitude, or from loss of control (stall/spin). Both are classified as pilot error. Loss of control through entry into a stall or spin is perhaps more likely to happen in aerobatic flight because of the aggressive maneuvering and widely varying airspeeds and flight attitudes which accompany most aerobatics. Never the less, here again low speed control is a pivotal factor. Stalls occurring while in unusual attitudes are more difficult to recognize and recover from because of sensory overload and spatial confusion.

LOW FLYING-BUZZING

"Buzz Jobs" are not usually considered aerobatics, but may or may not qualify as such under strict interpretation of FAA rules. Low altitude, high speed flight would not likely result in loss of control other than from misjudgments causing impact with the ground or ground based obstacles. However, accident statistics show that LOC is a dominant factor because a steep climb seems to be a requisite component of a classic Buzz Job. The more abrupt and steeper, the better! Right? "Hey, watch this."

The steep climb itself is rather benign, but by its very nature will result in a rapid loss of airspeed and this unusual attitude can easily result in a stall and spin. It is undeniably an exhilarating flight experience, and this state of mind can easily distract the exuberant pilot from the prospect of an impending stall. Actually, because of the steep pitch attitude and rapid speed loss, a stall can occur at well below level flight stall speed and thus require more time and effort to recover. Lowering the nose "a bit" probably won't be enough. Full power (torque), sub-stall airspeed, unusual attitude, and preoccupation are a formula for--- loss of control.

POWER FAILURE

Accidents resulting from engine failures are categorized as "Mechanical Failures", right? In that the accident was precipitated by a mechanical failure, this is true. But, often the severity of the accident is the result of pilot error; losing control through flight control misuse. Yup, our old nemesis, Loss of Control. This can happen because of inattention to flight control while concentrating on fuel and engine management details. When the airplane becomes a glider, the pilot's new, immediate, and demanding task becomes that of directing the airplane toward the best landing or crash landing site available. Maintaining controlled (non-stalled) flight is crucial to the most favorable outcome of an unfortunate circumstance.

TAKE OFF AND DEPARTURE

Other than for power failure, the departure phase of flight should be safe and uneventful. Yet, fatal accidents occur even when the engine is operating perfectly. Why? Loss of airspeed and stalls can result from wind shear, attempting to climb at a too steep angle, or perhaps some form of distraction. Recovery from a climbing stall should be easily and safely done because the engine is producing more than enough power to sustain a climb. However, rudder misuse can cause a stall to degenerate into a spin, causing recov-

If you want to fly into tight strips in the bottom of mountain canyons, better hone your slow-flight skills...

ery time and height to escalate. In climb mode, too many pilots use opposite aileron rather than rudder to compensate for P-factor (torque). This means that the aircraft is flying in a cross-control mode, and when a stall occurs, the resulting abrupt wing-drop and nose-down attitude changes can precipitate further confusion and control misuse. Verdict: Loss of Control!

BALKED LANDING

Gusty crosswind, bad bounce, runway overshoot, are all reasons for initiating a go-around. At low speed, full power is applied. If the pilot is rudder-shy, he might apply right aileron to counter the P-factor, as he usually does for climb out. Now, with the nose-up trim which was set for landing, the airplane will tend to climb at a steep angle. If a stall should occur as a result of the pitch trim or the need to clear an obstacle, the plane is in an ideal condition to enter a spin.

REALITY CHECK: STICK & RUDDER 101

A common thread running through all of the above time-honored means of killing yourself in an airplane is the loss of control during low speed flight. Not only the loss of airspeed which results in a stall, but the misuse of rudder control which precipitates a spin. These are skills taught to every pilot early in their flight training. Pilots during their flying careers ideally would continually hone these skills. Sure, even with good basic flying skills, pilots can fail in emergency situations -- but the factual reports of many accidents indicate that poor skills were exhibited. Since fatal accidents happen to only a very small percentage of pilots, we might assume that you readers are all “members of the choir” and don’t need to be preached to. Not necessarily. RV Transition Training instructors tell us that many of their students exhibit poor basic stick and rudder skills.

Nobody is immune. A couple months ago I took a glider flight, with an instructor, for a required log book endorsement. I usually fly more than 250 hrs/year in my single seat glider, so am generally quite proficient and thus viewed this flight as a formality. The flight was in the two seat L-23 Blanik, a much lower performance glider than I am accustomed to, but easy to fly. Anyway, during the flight the instructor, a long time friend who also viewed this flight somewhat as a formality, asked me to demonstrate a Dutch Roll. This training exercise maneuver is done by holding the nose on a fixed heading while rolling into and out of banks in both directions, maintaining a steady airspeed all the while. It requires that the pilot use proper amounts of opposite rudder and ailerons control to achieve the desired flight attitude. Well, what resulted was not pretty. I had not recently practiced this maneuver in any airplane, let alone an unfamiliar one. I have accumulated many thousands of hours in tailwheel airplanes, and over 4000 in gliders, which require much more rudder use than power planes (particularly RVs). Despite this, I was not able to immediately command the Blanik to do what I wanted. After several attempts, the Blanik became a little more obedient, but not totally submissive. The lesson learned is that I did not have the required skills at my command and that I needed practice. Another lesson re-learned: every flight, no matter how routine it may seem, can be, (and should be) a learning experience.

I firmly believe that we all need to re-assess and upgrade ourselves, and that our fatal accident rate can be drastically lowered if all pilots did so. I find it probable that if these accident victims had received better training or recurrence practice, many would still be with us. You can look at a specific accident and realize that with just a little more skilled control application for a few seconds, the accident wouldn’t have happened or would have been survivable. When you think of how little additional training or practice could have changed the outcome, it is both sad and encouraging. Sad because of the tragedy and loss; encouraging because the overall GA accident rate could be dramatically better if all pilots improved this one simple skill. As a fringe benefit, a HUGE benefit, on a daily basis pilots would fly and land with more precision and confidence. There would be less “fender bender” accidents and passenger confidence and comfort would escalate.

We’ve got everything to gain and nothing to lose. It is my intent is to use my bully pulpit for further discussion and instruction. Future issues will include more specifics about practice maneuvers useful in developing and refining stick & rudder skills. Toward this end, I am reaching out for help from Flight Instructors or others with wisdom to pass on. Please write and share descriptions of training maneuver and experiences which you know to be beneficial and effective. My personal experience given above is only one example of the type of training maneuver which might be suggested.

AVIATION COMMITTED

A NEW RV-12 FLIES

KEN SCOTT

So, my RV-12 was done. It was sitting in the hangar, paperwork at the ready, and the DAR was on the way. I swept the hangar floor for the fifth time, wondering just what I've forgotten and what he'd make me do to make up for it.

Two hours and $300.00 later, I velcroed the pink slip onto the baggage bulkhead and N68CK was an official, government-approved aeroplane. Now, if I only had some pilot-approved weather…

The plan was to take off from the grass strip behind my home, climb to 2500', check all the temps, pressures and rigging while circling, then take the airplane the seven miles or so to Aurora, where it would stay for the flight test period. I hadn't installed the wheel pants, so the paved runway at Aurora meant a lot less mess than the muddy one at home. So I watched the sky and waited. And waited some more. Days, I waited.

Finally, I looked up from my desk at work midmorning on November 16, and realized I had a few sunny hours before the next storm arrived. True, the wind was gusting up to 22 knots, but it was right down the runway and given the new airplane and soft field, it could actually be considered an advantage. The airplane would leave the ground quickly and the headwind would steepen the climb angle and keep me over the runway while I gained altitude. So, I went home and pulled the RV-12 out of the hangar. With no one in attendance except The Violinist, I taxied the airplane down to the far end of the runway and taxied back. Ground handling was completely normal, and when I peered up into the cowling, I could find no leaks or drips or loose ends. I taxied back through the neighborhood, past the mailboxes and onto the runway. The Dynon said all was well under the hood, and the airspeed was actually flickering in the wind gusts. I took a deep breath, re-checked the trim setting and pushed the throttle to the stop. A few seconds later the airplane was climbing away and flying, well, just like the RV-12 at work.

After a couple of circuits I was at 2500' and finding that the winds at that altitude could really move a 715 lb airplane around. It seemed to have a slight tendency to turn left, but it was too bumpy to really quantify the amount of imbalance. It seemed to roll more quickly than the prototype, but the airspeed numbers vs rpm were right in the ballpark, and the fuel flow numbers looked reasonable. There really wasn't much more to be learned by bouncing around the sky, so I set sail for Aurora, landed, and went back to my desk. So much for first-flight drama. We never even took a photo.

Between illness, Thanksgiving travel and weather it took three weeks to accumulate three flights and about 1.1 total hours on the airplane. I have yet to fly it in winds less than 15 knots. Once I get the airplane trimmed up, I'll start on the test cards and try to act like a more professional test pilot.

It really is a neat little craft – a roll rate that's not far behind that of my RV-6, wonderful visibility and that beautifully balanced fingertip feel that all RVs seem to have.

Fast forward a month

The airplane now has 3.5 hours on the Dynon, which equates to about one tank of E-10. The weather has remained almost uniformly atrocious, with storm after storm sailing in from the Pacific, on the way toward causing more misery off to the east. Finally an opening appeared and I took off and made the required climb to 10,000', followed by full power runs in cardinal directions. I didn't bother with the kneepad, because the Dynon was logging all the flight and engine data at one second intervals.

Somewhere in the back of my mind, I was a bit intimidated by that. I've never been completely at home with computers. For me, they've always been a glorified typewriter and a communications tool. I've never had the need to get conversant with spreadsheets and data downloads. Would I be able to get the stored information out of the Dynon, into my laptop and formatted in a way that it actually made sense?

Not on the first try, no. I'd loaded Dynon's 5.4 software into the D-180 panel display with no problem, using a six year old laptop running Windows XP. Before the airplane flew, that laptop died and I acquired a modern one running Windows 7. I loaded the Dynon program onto the new computer, hooked it up to the D-180, selected "download data" and immediately got an error message telling me that the computer could not find the serial port. I grumped around for an hour, but couldn't get by that error message. It had to be something different about Windows 7 and why couldn't Microsoft just leave well enough alone when they finally got something to work or at least make their stuff backwards compatible…mumble, grumble, mumble.

Of course, it wasn't Microsoft after all. The Dynon comes with a mini-CD that has drivers to support using an USB port. I'd installed it in the old laptop and completely forgot about it in the new one. When the CD was not immediately "findable" amongst holiday preparations (try finding anything in your office after a three-year-old has used it for her bedroom for two days!) I downloaded it off the Dynon website, where it sits in plain sight. With that installed, the data poured out of the D-180 and into the computer without a hitch.

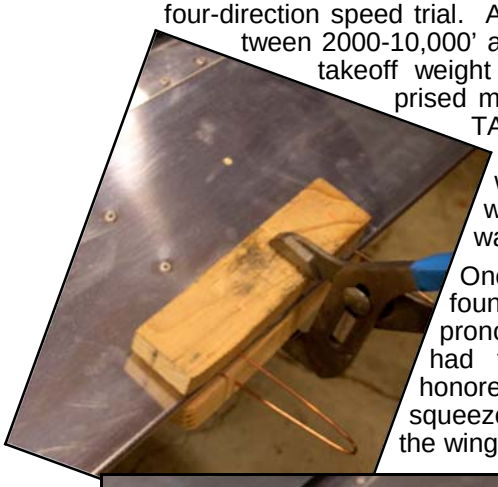
I opened the comma-delineated files in the RV-12 template I'd downloaded from Van's website. Boy, there's a lot of numbers when you're recording data in one-second intervals and have almost three hours

The simpler the tool, the better I like it: Above and right: a simple computer tray that clips to the longeron allows the cable in the avionics kit to reach the laptop, and puts the computer on steady ground. Way better than trying to balance it on the glare shield!

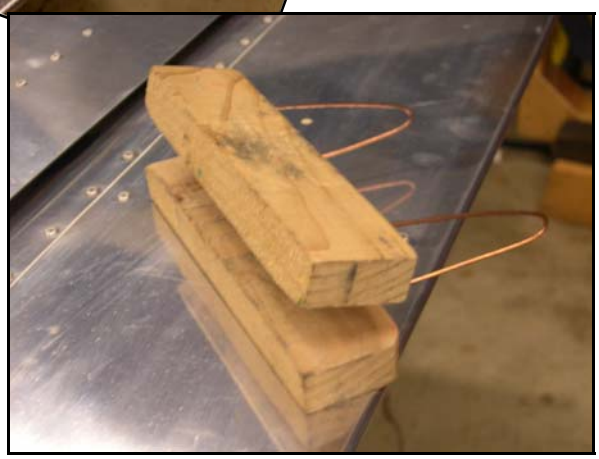
Below: the dirt-simple but highly effective roll-adjuster, thought up by the guys in our prototype shop. Easy on those channel-locks!

stored. It took almost twenty minutes to make the transfer.

After a five-minute tutorial on Excel from Scott Risan I was able to extract the time-to-climb data, and the speeds for the four-direction speed trial. Averaged about 746 fpm between 2000-10,000' at 75 knots, full power and a takeoff weight of 1055 lbs. Speed surprised me: an average of 121 knots TAS at a density altitude of 10,300' (indicated 8000' with OAT of 19 C) with no wheelpants. Just in case you wanted to know.



Once I could fly in calm air, I found the left roll tendency quite pronounced – something really had to be done. The time-honored method on other RVs is to squeeze the aileron trailing edge on the wing going up. I didn't know how this would work on the RV-12 flaperon. When I asked the protoshop guys, the produced a tool consisting of a couple 6" lengths of 1x3 pine, "hinged" with bits of bent wire. "It's the same idea. Use this and channel-lock pliers to squeeze the trailing edge," Scott McDaniels told me. "And use it gently."



Scared of over-doing the job, I tried tightening the trailing edge radius with just my hand, squeezing it as tightly as I could and drawing my hand the length of the flaperon. A test flight revealed almost no change, so it was time to crank up the channel-locks. Delicately, ever so delicately, I squoze the right flaperon.

Now the airplane, instead of rolling briskly left, rolled very gently right. After a couple more tweaks, it flies straight at cruise. There's still a very slight right roll with full flaps, but I figure that's why Ken Krueger put a stick in it.

Fast forward another two weeks

The Dynon says 7.4 hours total time and I'm working on the wheel fairings. Here's a little builders tip: If you plan to install wheel fairings, do it as part of the original build. It's just no fun at all lying under the airplane on a 25 degree floor, removing the wheels and brakes, fitting up brackets and sanding, sanding, sanding fiberglass. The fairing kit is very good, but it still requires a significant amount of work — I know I could build an RV-12 wing in the time it's taken to retro-fit these fairings. If I'd been able to put them on as part of the original build, it probably would have saved several uncomfortable hours.

AVIATION NATION AIRSHOW

RAVENS and FALCON FLIGHT put up a 22-SHIP RVFORMATION at NELLIS AIRFORCE BASE

JOE BLANK

About mid-November, I embarked on a trip to Nellis Air Force Base, located just north east of Las Vegas, NV. The primary reason for the trip was to fly as part of the West Coast Ravens formation demonstration team performing at the annual Aviation Nation airshow held at Nellis AFB on November 12-14. The West Coast Ravens is a group of FFI (Formation Flight Inc) rated pilots from all over the west coast (CA, OR, WA, NV) who fly their RV-3, 4, 6/6A, 7/7A, and 8/8A aircraft in formations at air shows and various other aviation events. While we are not affiliated with the military (although some of our pilots are former military pilots) all of our pilots are trained and evaluated according to strict FFI formation flying standards. Aviation Nation celebrates the work of America's military and its achievements. The U.S. Air Force Thunderbirds headline the three-day event and are joined by several military air demonstration teams and some of the nation's top civilian air performers.

In order to escape the typical Pacific Northwest cold fronts pummeling the area, I elected to depart from my home airport near Molalla, OR on Wednesday during a brief but fortunate break in the weather. Flying in improving VFR conditions, my route took me over Southern Oregon/Northern California, past Mt. Shasta, into the Central Sacramento Valley stopping at Los Banos, CA for some cheap fuel. Once topped off, I continued on in dusk conditions for a short hop over to the beautiful Sierra Sky Park in the Fresno suburbs. I had a previously offered, open invitation for a place to overnight from my good friend Tim Cone. Tim is a corporate pilot and RV-8 builder who I had met back at the 2009 SQI-OSH clinic where we both were participants in the 37-ship flights. If you've ever met Tim, you'll quickly recognize the reason for his call sign "Slick".

Early the next morning, Tim and I (Slick Flight) launched east as a 2-ship heading for the Beatty VORTAC (BTY) in Nevada to 'Air Meet' with Bob Mills in his

RAVENS

B1- Tim Cone, RV-8

B2- Brad Ransom, RV-6A
B3- Dave Richardson, RV-7
B4- Scott Randolph, RV-6A

A1- Mark Dulaney, RV-6A

A2- Bill Rambo, RV-7A
A3- Mike Smith, RV-7A
A4- Trish Russell, RV-6A

C1- Joe Blank, RV-6

C2- Eddie Tohikian, RV-8
C3- Dave Klages, RV-8
C4- Brad Peacock, RV-4

D1- Gary Sobek, RV-6

D2 - Bob Mills, RV-6

D3- Dave Leonard, RV-6

D4- Paul Rosales, RV-6A

FALCON FLIGHT

F1- Stu McCurdy, RV-8
F2- Bill Gunn, RV-4
F3- Lowell LeMay, RV-7
F4- Roy Geer, RV-6

F5- Pat Tuckey, RV-8

F6- Steve Grace, RV-8

RV-6. Bob, a former F-14 pilot who now flies 737's for SouthWest Airlines, had launched from Stead Airport near Reno. His plan was to intercept and join us at a predetermined time over BTY, where we would then continue down to our planned destination of Boulder City, NV. Our initial flight route took us over the spectacular Kings Canyon National Park in the Sierra Nevada range and just north of Mt. Whitney (+14,505' MSL) and Death Valley (-282' MSL). As you may remember from your grade school studies, this is the highest and lowest geographical elevation points in the contiguous 48 states; and only roughly 70 NM apart. It was an amazing "Moving Map" geography lesson…!

We joined up as a 3-ship over BTY as planned then decided to stay high and navigate over the top of the Las Vegas 'Class Bravo' airspace and descend on into Boulder City airport. This route gave us a smooth ride and a good look at the Las Vegas strip, Hoover Dam and of course our eventual destination of Nellis AFB. Once on the ground, we met up with another 17 RV pilots, ate lunch, fueled, and briefed for the 20-ship flight over to Nellis.

Most pilots never get the opportunity to fly into a live operational Air Force Base, as they are strictly off-limits to civilian arrivals. Since we were participants in the airshow, each pilot had to complete a number of DOD forms, arrange insurance waivers, and retain special 'arrangements' for landing at the base. We would be arriving as a 'flight' of 20 RV aircraft and were assigned a specific time window for arrival. The airfield would then be closed as soon as we were down and clear, for the USAF Thunderbirds practice session. We launched, formed up as a 20-ship, made an overflight at Boulder City Veterans Day services and headed to Nellis. Inbound for Nellis we received information that we needed to divert to North Las Vegas airport due to a 'issue' with our clearance. A few, well-placed, explanations from our flight lead, Lt. Col. Mark "Dula" Dulaney (USAF Ret.) sorted this all out with Nellis Tower and we were quickly cleared for the 'Initial' and a right 'Break' into the downwind for "Zero Three Left". We were also advised that the 'BAK-12' was down.

The BAK-12 arresting gear is an array of several 1" cables suspended several inches above and across the runway at the approach and departure ends for military aircraft emergency use. This is something that we definitely DID NOT want to roll over on landing, lest we win the short field-landing contest! The arresting gear can be stowed or deployed from the tower at the flick of a switch.

The Thunderbirds were already taxiing, so we were advised to expedite our landings. The overhead arrival is simply the fastest way to expedite any formation of aircraft from cruise speeds to landing. Pitchout, Land, Fade cold, and taxi in trail to our hanger. 20 aircraft out of the air and on the ground in less that about 90 seconds! Now, rather than shut down and tow or push our aircraft into the large hanger (which normally houses several F-15 or F-16s), we were allowed to taxi into it. Air Force personnel carefully directed us into the hangar where we shut down in 5 rows of 4 aircraft. Two more RV's were expected to arrive later that evening bringing our strength to 22 aircraft. Debrief, grab rental cars, and off to the hotel.

All airshow performers were required to attend the airshow brief early Friday morning. This was a pretty impressive group of military, ex-military, and civilian pilots, FAA, and Nellis base staff and brass. F-16 Instructor and Airboss Ron 'Lips' Hertberg runs a very professional show and it's all business. The course of information included all facets and aspects of pilot operations, show schedule, emergency procedures & divert airports, airfield information, FAA requirements, etc. By the end of the brief all I's were dotted, all 'T's' were crossed, and all questions were answered. You needed to take notes if you were there.

Friday, Saturday, and Sundays shows were essen-

Above: One of the perks of Nellis — room to park a whole lot of RVs out of the sun.
Below: Despite some lengthy and in-depth negotiations, no ride-swap was arranged.

tially the same performance with some minor changes. We were to follow the B-25 Doolittle re-enactment performance, and had 15 minutes to fly our show and land 22 aircraft. It was pretty aggressive timing, but we were up to it. Our call sign, for the Airboss's ease of use, was "RV Flight". We were a combination of the 16-Ship "West Coast Ravens" and the 6-Ship "Falcon Flight" from Texas. The first pass of our performance would be as a 22-Ship "Airplane" formation. As we completed the first pass, Falcon Flight was 'cleared off' to begin their 6-Ship maneuvering routine keeping that formation in a tight, constantly changing 6-Ship, and in front of the crowd. The WCR 16-Ship flew orbiting passes at 1,000', consisting of the first 22-Ship Airplane pass, 16-Ship Diamond, and 16-Ship Diamond Trail formations. About 6-7 aircraft had smoke systems, which really added a professional look to the demonstration.

Since our 'show passes' were down runway 21R, we needed to quickly reverse our direction so that we could recover on 3L to keep the show on schedule. "Dula" had engineered this last pass to accomplish this, which consisted of a challenging formation break-up maneuver out of the 16-Ship Diamond Trail. Each 4-Ship element would make a slight 30* left turn and separate into four 4-Ship Diamonds. From there, a quick set of cross-unders would put each element in a left echelon. We were now configured on a right downwind for 3L. A right 180* turn to initial, pitchout, and land. Meanwhile, Falcon Flight would perform a 'Pitch-Up' maneuver out of their 6-Ship following the last 4-Ship element from the WCR flight. Once off the runway, we were to taxi by the throngs of waving airshow fans to our parking area on the ramp.

It was a pleasure and a privilege flying in such a celebrated airshow. Many thanks to all of the sponsors, organizers, and especially the US Air Force for hosting such a great event. This show is a 'must see' for those that have never seen a military hosted airshow….

Epilogue

Since aviation photography and videography have always been an interest of mine, I had recently acquired a GoPro HD video camera to mount in a number of locations on my RV-6. The image quality of this camera was superb and exactly what I was hoping for. After trying it out on several previous test flights, it was time to try it out on some large formation video. I had mounted the camera in various locations on the aircraft but found it worked best on the top of the vertical stab pointed forward and also under the wing pointed aft. This would give a couple of "interesting" points of view. We flew the camera in the Nellis airshow over 3 different performances on 2 different aircraft. The final results of this video can be viewed on "YouTube" by searching for "West Coast Ravens" or directly at:

http://www.youtube.com/watch?v=sRa8ghEsGZ4

For more information on formation flying and the West Coast Ravens, visit our website at:

www.westcoastravens.com

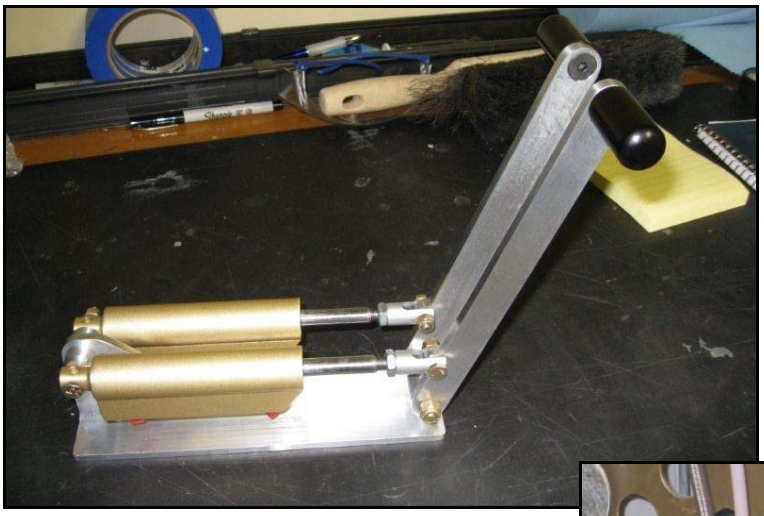
SODA PILOT

CARL BELL

In my younger years I always thought I would be a pilot. I loved model airplanes and graduated into radio control in my teens. After a stint in Vietnam, it was back to the real world, getting an education and finding a job to support a new family. While doing this, I started pilot training earning my Private, Commercial and Instrument ratings. I figured I could eventually get out of the hi-tech computer industry and move on to the fun stuff of flying for a living. What I didn't realize was how little a rookie pilot got paid, especially compared to the computer industry, nor how long it really took to turn flying into a viable career. This didn't play well for a family with our first baby in the hangar and accustomed to a reasonable cash flow.

I became successful in my computer career, but never lost my dream of building an airplane and flying again. I started building a Skybolt , a Sonerai, and a 2-seater of my own design, but my company moved me around and all these projects had to be sold before they were finished. Would I ever have an airplane or would life always get in the way? After many trips to Oshkosh and a trip to Oregon to see and fly the RV-7, I made up my mind to get a QuickBuild and see it through, no matter what.

This time, something more drastic than a company move got in the way. While in my late forties I was playing golf at my home course. A sudden storm developed and I ended up with a large tree on top of both me and my new golf cart on the 13th hole. Yeah, I know this seems like a tall tale, but it's the truth. The tree almost took me out, but some great doctors brought me back from near death. They managed to save most of my body parts except for my left leg.

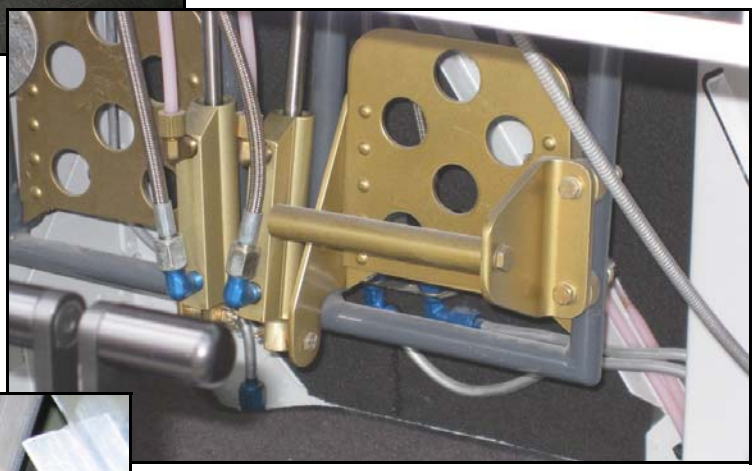


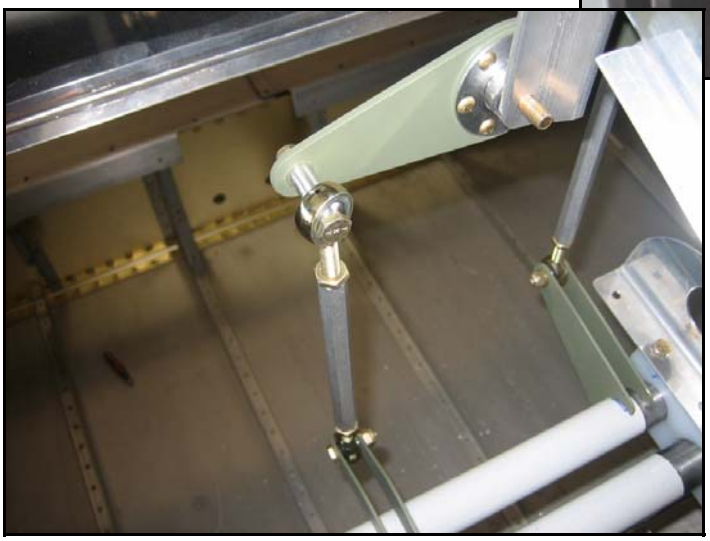
So here I am, years later, with 2 million miles logged in airplanes. Unfortunately they were all airplanes that said Delta, United or US Airlines on the fuselage. No leg, no airplane of my own, and a few years from retirement. Crap, this is just not working out.

Not one to let a few inconveniences get me down I went to the local FBO and hooked up with an experienced and patient flight instructor to see if I could fly Cherokees safely and reinstate my ratings. I became comfortable with my skills and the instructor signed off on a flight test with an FAA examiner to get a SODA (Statement of Demonstrated Ability) waiver on my medical. I passed after a pretty rigorous flight test, but I wasn't totally happy with my rudder and braking authority using my prosthetic leg which is attached above the knee.

On top of this, my plan was to build (if you're counting this is the 4th build attempt) an RV-7A. My objective was to fly a high performance homebuilt as well as a fully able person. To me that meant full rudder authority for gentleman's aerobatics and crosswind landings and no compromises flying, braking or taxi operations. I was not going to take my wife Cheryl up or any passengers unless I was positive my skills were not compromised. The plan was straight-forward; add differential hand brakes between the seats and a push-pull rudder that would allow me to fly with my good right leg.

Now that you have the background, let's look at the modifications I made to N947CB "Redhawk", my beloved handicapped facilitated RV 7A.





The Handbrakes

Let's start with the modifications for the brakes. I wanted this design to be simple and also easily removable in case I needed to sell the plane. After all, I'm on the "back nine" and medicals are still required for your Private and Instrument ticket.

I zeroed in on dual hand brakes between the seats leaving the toe brakes and rudder pedals per Van's plans. I knew from previous experience, and Vans preaching, that departing from the from the plans meant added time, complexity, weight and introduced other possibly bad or unknown factors. Still, I reasoned that adding two master cylinders, some extra brake lines and handles should be straight forward and get the job done.

Construction of the handbrakes

I used the same Matco master cylinders as those in the kit, but with the adjustable clevis ends (MCMC-4A). I consulted with Matco and they told me adding two more cylinders in line with the other four was not a problem, except perhaps for bleeding. They were also kind enough to send the leverage design data so I could figure out the mechanical advantage required for the hand lever design. I constructed the finished system out of 2024-T4 x ¼" aluminum angle and bar stock. I also added a .063 doubler with 3/16" nut plates to the

seat pans for strength and so I could easily remove them if need be for maintenance or removal. If anyone needs hand brakes, I would be happy to share my design and dimensions.

The Push –Pull Rudder System

I dreamed up a number of designs for the push/pull rudder. The simplest used pulleys and a cable between the left and right pedals. This design seemed prone to issues and would require a "U" turn in the cable. Then I saw an elegant design used for nose wheel steering on a GP-4 and reasoned it would give the push-pull needed. I would just drop out the nose wheel steering part of the linkage. After many revisions on the drafting board with the pedals shown in full deflection, I came up with a fairly simple design, using a bell crank under the front deck and two adjustable rods similar to the flap linkage.

Building the Push-Pull Rudder System

Modifying the rudder pedals during construction was easy. The basic design is two levers welded to the horizontal rudder pedal tubes, attached to a bearing bell crank mounted to the middle rib under the instrument panel. There are doublers in the panel rib similar to those used for the canopy support tube. As mentioned, two control rods attached from the bell crank to the left and right horizontal rudder pedal tubes levers. The adjustable control rods are also used for tensioning the cables. The last part of this design is a foot yoke the goes over the top of my right foot so I can pull the right rudder pedal moving the rudder left. The yoke is attached with two AN 3 bolts through welded bosses in the right rudder pedal tube. If you happen to be a right leg amputee you would mount the foot yoke on the left pedal. The neat part is I can remove the two bolts, the bell crank and push rods and the plane reverts to a standard RV.

Conclusions

The hand brake design works really well. I don't have the issues that some pilots have with riding the toe brakes and I can turn on a dime. In crosswind conditions it adds to controllability without excessive brake drag. The only change that might be useful for smaller/weaker pilots would to add a little more mechanical advantage to reduce application force. Bleeding the brakes was not a problem, and after solving a couple leaking fittings, I was good to go. I also would recommend using a Matco parking brake for additional safety. I plan to add one during the first annual. The system wasn't cheap: it added almost $350 in cost and about 4 pounds in weight!

While the hand brake system scores of 9.5 out of 10, the push-pull rudder system only scores a 7 out of 10. Why? Well, it's that big rudder Van designed for the RV-7A. For taxi and crosswind landings up to 10 or 15 mph it works well. For anything more than that, I do not have enough pull strength in my right leg to get full deflection. I still tend to use my left prosthetic leg on windy days to get more left rudder as needed, but for now I also carefully plan my trips and if the wind or weather exceeds my comfort zone, I don't fly. I am getting more skilled at flying in adverse conditions, but I'm expanding the envelope carefully. Again, nothing is free and this revision added about $200 in cost and 4 pounds in weight, not to mention many additional hours in build time.

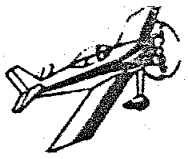
There are many pilots before me that have overcome serious handicaps, and they were a great inspiration to me. I remember an article about a paraplegic builder that converted his RV-6 to all-hand controls – throttle, rudder, brakes and control stick. And a taildragger to boot -- amazing. If he can do it, I can do it.

My point is, if there is something getting in the way of your dream, just keep working toward it with determination and it will happen. Every day that I fly "Redhawk", I am truly amazed with the harmony and design of this beautiful airplane. The only issue I have now is I can't get rid of this huge grin on my face.

If you want to see more pictures on the build they are at: www.mykitlog.com/carlbell

KEN SCOTT

The RVator



As you might have noticed on the cover, this will be the last issue *of* the *RVator*.

"Transmogrification" is one of Tom Green's favorite words, and I'm thrilled to actually be able use it the way it was meant to be used (Tom never does!). My Random House dictionary defines it as "to transform, change in appearance." Transmogrification's about to happen here.

For most of its life the *RVator* has been the company's main communicative format -- a place where we could inform, enlighten, inspire and occasionally lecture our customers and where they could submit stories, ideas and tips derived from building our product. (We shamelessly stole a lot of these ideas and used them to improve our kits and instructions.) The first issue I have in my files is Number 2, dated December, 1981. From there, issues came out at various intervals (a majority started with an apology for being late…) throughout the 80s. During those years, Van was running the company almost single-handed. He was management, chief engineer, tech help, and *RVator* editor all rolled into one. About 1990 he realized he had an English Major in the shop. He decided he could ease his burden slightly and handed the *RVator* off to me.

I was happy to get the job. For my first year as an RV builder, before I came to work for Van's, I'd always enjoyed getting the *RVator*. I expect I was like the majority of other builders – when I saw it in my mailbox, everything else stopped until I'd read it two or three times. Now the responsibility for getting it out and making it useful was mine, and I had a chance to contribute to something useful and fun to the RV world. I could also work on my eventual epitaph:

Here Lies the Man Who Taught Dick VanGrunsven: one "n" in 'panel', two "n"s in 'channel'.

For almost twenty years, I've assembled, edited, and written the publication – at first four issues a year, and then six. I've enjoyed it. I like writing and I certainly learned more than I taught, trying to wrap my brain around articles submitted by people far smarter than I.

I started on a small desk in Van's office, cropping printed photos with a paper cutter, printing text on a dot-matrix printer and pasting up pages with rubber cement. The finished copy was trundled down to Ralph at his tiny print shop in Hillsboro. Ralph was right next to a Norman Rockwell drug store, with a checkerboard floor and sixteen worn stools at a lunch counter where you could get home-made soup and pie. Taking the *RVator* to the printer and having a piece of celebratory pie became one of my personal traditions.

In the beginning, computerized layout and graphics wasn't even a dream…after all, the company only had one computer (a Texas Instruments T.I. Pro, if you're into the history of personal computing) and we all had to share it. Eventually, I was given my very own computer, learned the basics of desktop publishing and the *RVator* assumed a more polished appearance. The "RV Grin" started, I wrote a few "Dummy" articles that readers seemed to enjoy, while Van, and later Ken Krueger contributed really meaty safety, engineering and flight test articles. We had our share of fun, too, with spoofs like the original RV-8 story (two RV-4s joined at the hip) and fly-in tales, including the story wherein Tom convinced Daryl that they'd stolen a car to go to breakfast.

Then the phenomena of the internet exploded, maturing almost overnight from an arcane communication between technical nerds to a full-fledged business tool. With it came a new set of expectations. Immediacy became king, something that was difficult to do in a publication that came out – at best -- every other month. Doug Reeves started vansairforce.net, with our blessing and cooperation, and it rapidly became the preferred builder-to-builder platform. Builders could post building tips, trip diaries, opinions and diatribes – all the stuff that had filled *RVator* pages for years – whenever they liked without even buying a stamp.

Three years ago we began to take advantage of electronic publication, which allowed better graphics, color, and much less expensive delivery costs. This improved the publication but couldn't address the basic issue – a small printed bi-monthly newsletter with a fixed number of pages was more like a straightjacket than a useful tool, especially in an internet world.

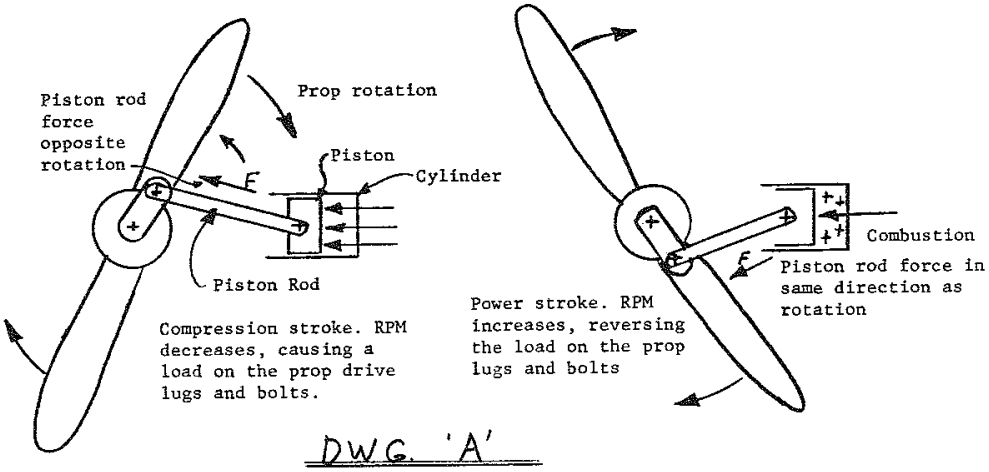
In the coming months you'll see improvements to Van's website, itself a child of the 90s. The functions of the *RVator* will be handled through our website and the brave new world of Facebook. We will continue to publish articles of interest – all the things the *RVator* did – but without the restrictions of space and time. Exactly how this will look and work is still being developed. (Those who have already re-subscribed to the printed version of the *RVator* for 2011 will have the amount credited to their account, or, upon request, refunded.)

It's a bit sad to see something that's been part of the RV world almost as long as there has *been* an RV world laid to rest.

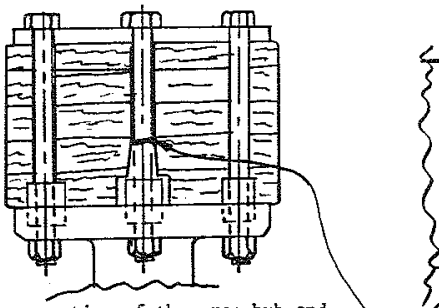
It's been a good run. Hope you enjoyed it.

Here's a little look back — a sample page from a 1982 *RVator*: Drawn by hand, printed on a dot-matrix printer, and laid up with glue brush. Van himself drew the illustration, after having several prop bolts loosen and actually break in his original wood-prop RV-4.

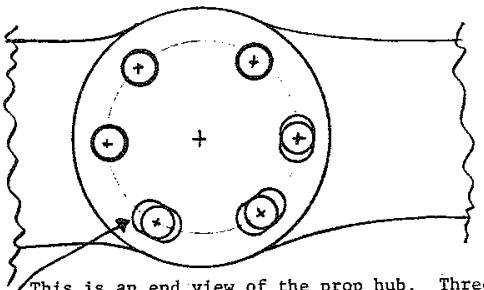
One builder suggested an alternate method of checking torque which is to modify a box-end wrench so that it has a long handle with a hole 1 ft. from the center of the nut. A small tension scales is hooked through this hole and its reading in lbs. will then be the torque in ft-lbs. One builder recently called and stated that he had initially torqued his prop bolts at 25 ft.-lbs, 5 ft.-lbs. over the 20 lbs. recommended by the prop manufacturer to allow for the tightness of the bolts in the wood. He later checked with this homemade scales/torque wrench and found nuts as low as 12 ft. lbs. Thus, it would seem wise to use this or some other means of checking the torque at the nut end rather than relying on the easier method of torquing the head of the bolts.



DWG. 'A'

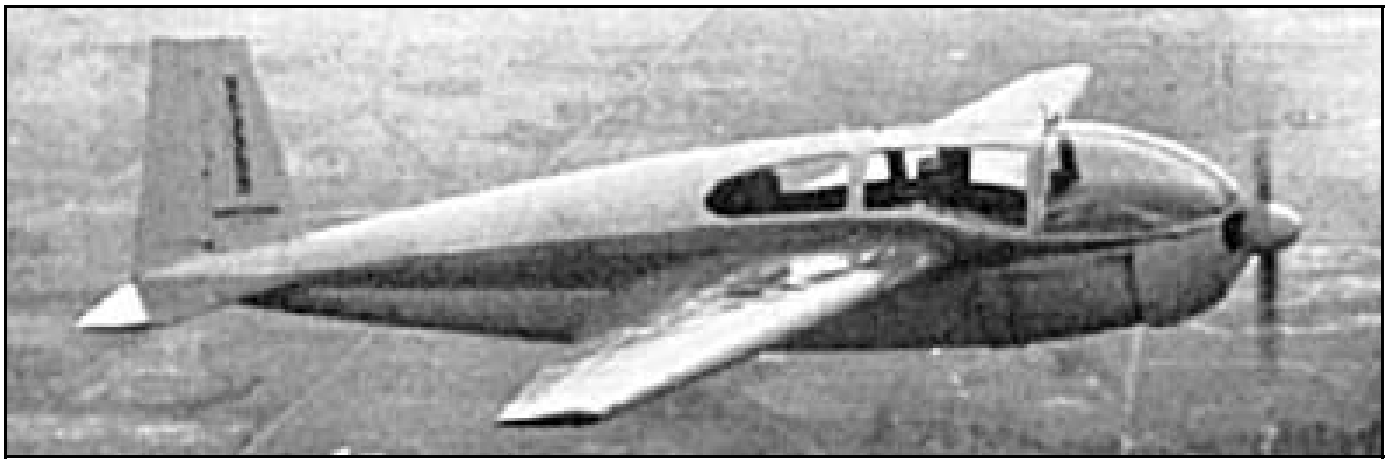


Cross section of the prop hub and front flange of the prop extension. The bolts on the side are normal, but the center bolt illustrates elongation of the bolt and bushing hole in the wood. Note the point where the bolts broke.

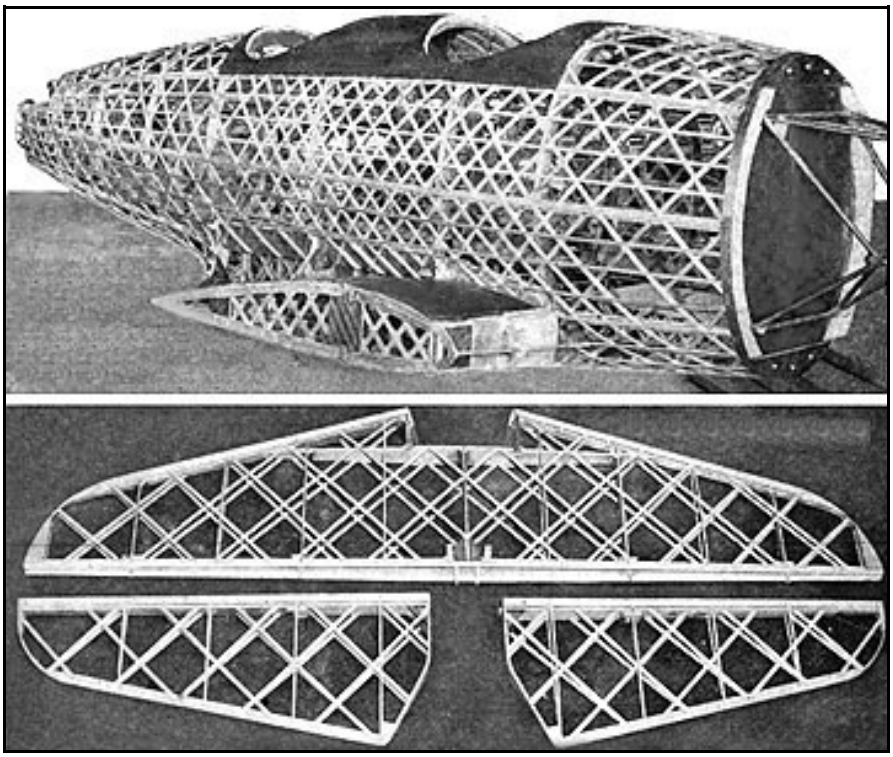


This is an end view of the prop hub. Three holes are shown normal, whereas the other three show elongation resulting from looseness.

DWG. 'B'



THE THALMAN T-4 Van



So far, we've had little response to our request for info on the Thalman T-4 we described in the last newsletter. What happened to all the aviation historians out there?

From the historic information available, the T-4 would appear to have been a superior aircraft. I was obviously aware of the T-4 before I began configuring the RV-10. But, the RV-10 does not look at all like the T-4. Why not?

I intentionally highlighted only the slick appearance and published performance numbers of the T-4. These qualities alone do not predispose an airplane to commercial success.

That the T-4 was ever considered for production could easily be questioned. It was an all-wood airplane at a time when aluminum had already been well established as the preferred material for light aircraft. The geodetic structure concept had never been demonstrated practical in production, and seems far too labor-intensive for economic success. The beautifully symmetrical midwing configuration would probably have posed problems for cabin ingress/egress. The field of view (at least for rear seat passengers) was limited, and it is possible that there were cabin space constraints because of the spar center section running right through the cabin. These are shortcomings of the aerodynamically ideal midwing configuration. But how much aerodynamically better is the midwing when measure in percentage of overall drag vs. a typical high or low wing light aircraft design? How many MPH difference would it make for an airplane in the 180 mph speed range? Maybe 2-5 mph? Probably not enough to offset poor passenger ergonomics and other utilitarian considerations. Unfortunately, the fastest airplanes are not necessarily the most functional.

Van's airplanes are a compromise favoring functionality. Yet, I greatly admire Mr. Thalman for the way he directed his ingenuity and talent toward advancing light aircraft design and performance. He made very good use of the materials and knowledge at his disposal.

Studying the history of aircraft development is fascinating in that somewhere, sometime, almost everything conceivable has already been tried.

But that doesn't mean we're not still interested. If you know, or know anybody who knows, anything about Mr. Thalman and his intriguing airplane, please send us the details.