

make my radio call to Madison unicom frequency and let them know of my intentions to land there. It seemed an eternity to the airport as my altitude was eroding away.

Madison Indiana is on the river and there are large power plants every so many miles dotted along its length. Each power plant has very tall stacks associated with it. One of these towers was on my powerless approach. I was not fearful of any collision hazard but it was unsettling to see that I was below the top of it as I chugged by. I applied a slight amount of power and entered a low right base to final for runway 03. I settled the plane down for what probably appeared to be a routine landing. I taxied up to the ramp and pulled the mixture and cut the mags. That's when it hit me and I began to worry. I somehow knew that I would never feel totally comfortable sitting behind a single propeller again. This was reinforced by the fact that the very night before I had flown from Meigs Field in Chicago to Greenwood. Had this failure occurred then I might be ringing a harp (or tending the fire) rather than writing this article. As for the Mooney, the bottom hold down studs on #3 cylinder had sheared away. That hammering sound was the base of the jug beating against the engine case as the piston moved in and out. I could have lost the whole cylinder if I had continued much longer.

That was it for me. My single engine days were history. I thought I had the most meticulous maintenance program possible on my airplanes. We must realize they are man made machines subject to man made errors. I was lucky.

My thoughts went immediately to a twin engine aircraft. Over the next few months I looked at several Barons, Twin Comanches and 310s. Out of a whim I decided to take a look at Ted Roger's Defiant N23TR. I was instantly mesmerized. It made so much sense. I was sold. Now after over 2 years and over 200 hours of great flying, I am still sold.

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Across my desk as Email

Have some epoxies been found that are better suited for use in making fuel tanks than others? I believe I read about some epoxy flaking off in fuel and causing a Cozy to crash.

All the suppliers claim their "structural resins" are suitable for fuel containment. And, they are - IF - the builder knows how to go about it and does everything correctly. I have always been adamant about "post curing" epoxies, especially the fuel tank. You can't buy cheaper insurance.

Safe-T-Poxy I or now EZ-Poxy 87 is probably by far the best in this category, with or without a post cure. Chemical resistance is one of the prime attributes of epoxies beyond homebuilding airplanes. They are used for building fiberglass chemical storage tanks and piping and for lining of steel tanks to prevent corrosion. In that industry the curing agent "type" governs the degree of chemical resistance. Aromatic amines are by far the best known curing agent type for overall chemical resistance - particularly in fuels, solvents and strong acids. EZ-Poxy 87 is the only aromatic amine curing agent available to the homebuilt world.

Next in line are "aliphatic amines". The original RAES & RAEF were "modified" aliphatic amines. However, according to my tests the RAES without a post cure was absolutely no good for fuel and marginal with. But, the RAEF without a post cure was marginal and did just fine with a post cure. Thus, the original Vari-Eze plans mandated RAEF for the fuel tanks.

Next in line are "cycloaliphatic" amines. Aeropoxy, MGS, Proset, and EZ-Poxy 83 & 84 are "blends of modified aliphatic and cycloaliphatic amine adducts". Modified - because the straight stuff has bad cure behavior. Some modifications work out better than others. A prime example is the Aeropoxy's sensitivity to temperature and

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moisture. I call these "quirky cure characteristics". However, even the "quirkiest" of these curing agents will resist fuel - IF - they are properly applied and fully post cured.

DO NOT simply brush the resin on the inside surface of the already cured fuel tank and expect it to cure like a 2 or 4 ply lay-up. This is where the screen plugging flakes of epoxy come from.

Your original layups for all the inside tank components should be "wet" so to be certain there are no dry spots, pinholes or voids. This is no place to be too concerned about weight. Even the BID tapes in the corners should be nice and wet. Peel ply only where secondary bonds will be needed. For those of you that like the smooth surface of peel plying - add an extra final ply of a fine

1999 Dues are now past due.

\$15

Please check now to see if you have sent in your 1999 dues (\$15). Please do not send payment for multiple years unless you are behind.

Your mailing label indicates the last year you have paid for the newsletter. Please let me know if you think you sent me a check and I do not have you marked as "dues paid thru 98". I am reluctant to drop builders from the newsletter when they forget to send in the dues, but.....

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weave light weight fiberglass deck cloth. It will give you a similar smooth surface without introducing or hiding voids. Warm shop temperatures and low humidity will reduce the curing agents "quirk" factor.

There are many ways to obtain a post cure on the tank. Before the tops are put on, you can use heat lamps to cure the inside surfaces. You can pre-post cure the inside surface of the top too. After the top is bonded in place you can post cure these bonds by heating the exterior surface with heat lamps. The heat will work its way to the bonds. OR, after the top of the tank is bonded on, you can circulate warm air through the tank for several hours. I did this with the outlet end of my vacuum cleaner inserted in to the fuel cap opening. About 140F is sufficient.

RULE OF THUMB - If you can hold your hand on the surface to the count of 10 the temperature is 140F or below.

Hope this helps.

Gary Hunter
EAA Technical Counselor
Vari-Eze N235GH

Richard MacArthur

I recently put one of Jeff Roses' electronic ignitions on my front engine. On a recent trip to Florida, I noted that I saved about a gallon per hour over the fuel burn of the back engine. It worked so well, I have bought one now for the rear engine and will be installing it shortly.

Incidentally, I read some of the speeds predicted for the Defiant and I am amazed. Mine routinely flies at a 155 knots. I have PAC propellers and I am not sure that I am getting full power from the engine. I seem to be showing about 19 inches of manifold pressure at 2450 RPM at around 6-7000 feet. These are 160 Lycomin engines so it seems to me that I should be able to get a higher manifold pressure than that.

Also on my trip to Florida I found that I was burning only between 13 to 14 gallons per hour. It seems low even with one electronic ignition. What I am saying is that I may not be running these engines at full power. Generally, I would say that I probably have climb props as opposed to cruise props, but I note that I am only getting about 2200 RPM at full power at climbout on the front engine. The rear engine winds up a little more than that, but that still indicates that the props are not taking a very big bite. I have Defiant #4. At least that is the number on the plans, I believe. I have the side opening hatch as opposed to the whole cockpit cover lifting

Thank You to Jerry Chasteen

If you did not notice, Jerry contributed more than half of the content of this issue of the newsletter. I am very grateful for this. After doing the newsletter for all these years, my brain is almost picked clean of Defiant stuff. I can use all the help I can get. So.. thanks again Jerry. John Steichen

up. Also, my plane has the large scoop below the fuselage on the rear engine. the rear engine cools very well, but I am wondering if that is more drag. It would be great if there were some way to close the nose gear well when the gear is retracted. I have thought about using an IVO prop to get a changable pitch prop on the front engine. However, I understand that you have to put a thin steel tape at the base of each blade and check it before each flight for any possible tearing which would indicate too much movement in the hub. that does not sound too reliable to me. Also the bolts in the hub have to be retorqued every 10 hours. I wonder if there is a better changable prop for experimental airplanes out there somewhere.

Editor's very biased opinions.

1. Don't experiment with controllable pitch propellers that are not manufactured by Hartzell, McCauley, MT or Hoffman. Experiment all you want with reputable wood prop makers.
 2. Forget gear doors. Someone did it and it is more trouble than it is worth.
 3. If your rear engine is cooling, leave it alone. Most of the drag comes from the poor airflow around the rear engine and wing junction.
 4. You need to find someone smarter than me to figure out what the normal standard barometric pressure is at 7000 feet. This is a good comparison for your manifold pressure. It should be within 1-2 inches of the normal pressure at that altitude I think.
- John Steichen

Bayard Dupont

Charley Airesman thought that the boat tail would help the defiant a lot. He came and looked at my Defiant and the work that I have been doing is mostly a result of his input. Incidentally, Harry Riblett (who has written extensively about airfoils came and looked at my airplane this week and agreed with Charley. Big day tomorrow! I am going to break my airplane out of hibernation in the hangar. Finishing up the little stuff. Hope to have it in the air soon! Bayard

John Toelear Update

I have never bought a new car in my life because I spent that money on my homebuilt aircraft instead, but now find I myself buying a brand new pickup as a support vehicle for my defiant N138EZ (60 hours total flight time). The first job for the truck is to transport the defiant piece by piece from St. Louis to Alabama. Then I can get started rebuilding the wings canard and fuselage damaged by the tornado. I figure 1 trip for the two engines one for the wings and the hard trip to trailer the fuselage. I am planning to build a jig or fixture to hold the fuselage sideways (90degrees angle of bank). This is because it would be a "wide load" at any other angle. I plan to support the fuselage by the 3 main wing hardpoints in the rear and the two canard (AN-8) hardpoints in the front. Any ideas or brainstorming from the newsletter would be appreciated and I will try to post this on the club website if I can get in.

John T.

DEFIANT FLYER CD-ROM COLLECTION

The CD collection is now complete and available.

I will no longer supply back issues in paper form for any previous Flyers. It took a good bit of time to go back and scan and reformat some of the back issues. While I was at it, I scanned my paper copy of the Texas Defiant newsletters as prepared by Gino Barbarini. These do not include many photos and only some of the drawings.

I also scanned the owners manual for your own use; and selected plans pages. The complete plans are not included.

I will also include an editable version of the owners manual for your own use in constructing a manual specific to your aircraft. It will be in text version and in Microsoft version.

Until June 31st, I want to make this CD collection available to current builders who have been loyal subscribers to the newsletter at a reduced price.

I will ship out this CD to current subscribers who order prior to June 31st for \$39.

After the end of June, the collection will be available to new subscribers who wish back copies for \$79

Please order by mailing a check prior to June 31st for \$39 if you wish a copy of this CD