The Cleco

Experimental Aircraft Association • Chapter 393 • Concord, CA

Mail to: EAA Chapter 393 P.O. Box 272725 Concord, CA 94527-2725

DECEMBER 1994

YOUR 1994 OFFICERS

PRESIDENT	Fred Egli 935-7551
VICE PRESIDENT	Lisle Knight 658-6629
SEC/TREASURER	Louis Goodell 682-4198
EDITORS	Ken & Linda McKenzie 283-3119

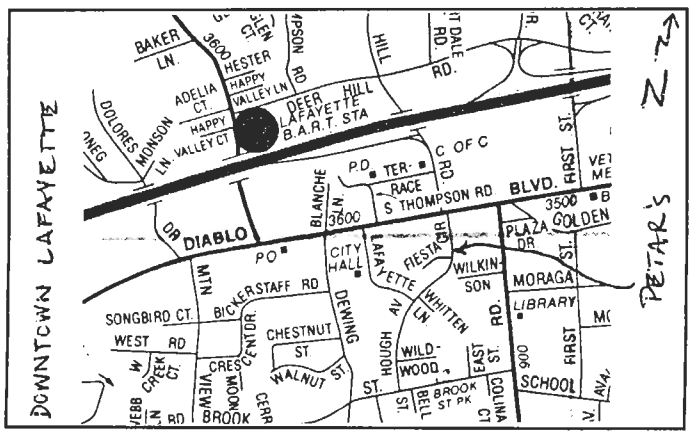
CHRISTMAS DINNER

Sunday, December 18, 1994 at 5:00p at Petar's in Lafayette. Petar's is located at 32 Lafayette Circle. See map below.

No host cocktails will be served from 5:00 to 5:45. We would like present our annual awards beginning at 5:45. Dinner will be served around 6:30.

A fish entree has been added to the menu. If you would like to change your previous entree selection, please contact Tony Tiritilli before Tuesday, December 13. Phone 674-1001 or fax 671-0556.

The deadline for reservations has been extended to Saturday, December 10.



MINUTES OF THE CHAPTER MEETING
held November 30, 1994

The meeting was called to order at 1930 hours, Fred Egli presiding. The minutes of the October meeting were approved as submitted in the November 1994 Cleco.

The third super-duper raffle was held. NED's Auto Body Supply donated a $50.00 gift certificate, which is being raffled at the Christmas Dinner. The winners were Lisle Knight, Fred Egli, Charlie Adkins, Dick Rihn, Chris Kenyon, Rich Powell, Bob Belshe, Jeff Culver, Rick Young, and Pete Wiebens.

SUMMARY OF NOVEMBER'S PROGRAM

This month we had the pleasure of having Brian Shul, "The Sled Driver", speak to us. He recounted several highlights of his tenure with the SR-71, including the interview process that he had to go through in order to be chosen.

In addition to his delightful anecdotes, Brian showed us many of the slides that he took both of and from the SR-71.

After the SR-71 was grounded, Brian took his collection of photographs and wrote two books about his experiences flying the plane. Brian has since added a book about the Thunderbirds and will soon be publishing a book about the Blue Angels.

THE NEW RAFFLE
by Larry K. Laughlin

Special Thanks to **NED'S Auto Body Supply, Inc.** in Concord for their generous donation of a $50.00 Gift Certificate, for November's club raffle prize.

We builder's have been buying painting supplies from NED's for years, but did you know that Ned Stilinovich, the owner, used to be a custom painter himself? He got

into selling the products way back in 1968 and has had his Concord store since 1978. Did you know that NED's used to supply most of the paint for World Airways in Oakland and in fact, sold John Daly (the CEO) the Multi-tone Shamrock Green paint for his own DC3? It was PPG brand, which Ned still recommends today for any aircraft.

NED's is widely known to be one of the most complete Auto (and Aircraft) body and paint supply stores in the East Bay Area, with a knowledgeable staff ready to help you as soon as you walk in (15 people on staff there at the Concord Store). Ned keeps everything up-to-date and knows most of the laws, materials, tools, and the like for doing the best job, too! NED's now has the new "PROPHET" machine, which is a computerized color matching tool - you can't get it any closer! Lastly, NED's sells everything else you'll need to keep your finish and plexiglass looking sharp. NED's has almost everything for our custom aircraft painting needs right there in one store. Be sure to thank Ned for his donation to our raffle next time you see him.

NED's Auto Body Supply is located at 1939 Market Street in Concord. Call (510) 682-8500 or stop in anytime Monday - Friday 8-5:30 or Saturdays 9 - 4.

NED's also has a smaller store in Antioch (1610 B West 10th Street). Call (510) 778-3838 or stop in anytime Monday - Friday 8 - 5 or Saturdays 9 - 3.

PERSONAL PROFILE–BOB BELCHE
by Will Price

Your trusty newsletter coeditor (Linda) decided that the Cleco needed a change of pace from an O.D. of the Internet. So, she leaned on yours truly for another profile. Well, here we are. This time, I decided on new guy--what's more, this one doesn't even have an airplane yet. But he has the interest and desire.

The feature: Bob Belche, who only recently joined 393. A big welcome to you, Bob. Little did you dream that you would be famous within a year.

Bob is another of those relatively rare breeds (nowadays) who is a native Californian. Even though he was born and raised in Southern California, there is a good side. He grew up in Long Beach (during World War II) not far from Lockheed (or was it Douglas). Anyway, he watched B17's fly over his house constantly. Seems that all the manufacturers were making them. Nothing like an awe-struck kid watching Flying Fortresses skimming rooftops. A local airshow had several on display. He found one with a hatch open and crawled in for his own individual tour. There were some harsh words when a guard found him (I think that's called catching hell). But he insists it was worth it.

About high school time, the family moved to Hanford (a small farming community south of Visalia). I don't remember if he actually used the word "boring" but his overall tone and enthusiasm told the story. Hey, working in the cotton fields and hacking weeds around grapevines didn't pump him up too much.

Finished with high school in 1951 and what to do--get away from the farm!! What's the furthest thing from farming: ah yes, the Navy. So, he joined the Navy with the guarantee of electronics school. (He was good in math and science in high school. Plus, his deceased father had been an electrical engineer.)

Here's where we come to a real coincidence. For the September, 1992 issue of the Cleco, I interviewed Lou Ellis. Lou told me about being assigned to the carrier Bon Homme Richard at Bremerton when she was reactivated for the Korean War. In 1953, Bob served aboard that same carrier for a very brief period. Then he was assigned to the John Hancock (at Bremerton) for its reactivation. He remembers with nostalgia watching launch tests with new steam catapults and later (like Lou) launching and retrieving aircraft. Small world.

Three and a half years in the Navy--that's enough--time for bigger and better things. After discharge, he and his new wife departed for Berkeley where he got a job as an electronics technician at LBL and started his academic career (in what else, but EE). Took him five years of 3/4 time school and swing shift at LBL to get his EE degree--that's real persistence. His career as an engineer didn't last too long--computers beckoned. Before he knew

it, he was programming control systems for data acquisition and analysis from machines with names like Bevatron, etc.. His favorite project is a software system to measure gamma radiation from nuclear bombardment experiments. This particular project has been ongoing in one form or another since about 1980 (upgrading to new computers and all that stuff). Right now, the system uses six computers because one can't keep up with data coming in.

I personally concluded that he was okay when he quit talking about his profession and said he loved skiing. Now there's someone with the right idea for recreation. He is trying golf as well. Finding it fun but he can't imagine himself being a golf nut. He also told me about restoring a 1967 Corvair. Rebuilt the engine, new paint, new upholstery, sandblasted and paint underside--the whole works. Sounds like a show car. He really likes the car--drove it for 100,000 miles.

On the flying side, he took flying lessons while at UC as a member of their 184 Flying Club. Learned in an Aeronca Champ and a Cessna 140 at Buchanan Field (before the tower). For a while, he flew 20-30 hours per year, but then dropped out of the scene for 14 years. In 1982 he joined the Buchanan Flying Club and got some time in but strayed again. He now flies with the NRI Flying Club. His plans for his own airplane are up in the air right now. He wants something, but not sure just what. Even though he retires soon (maybe by the time you read this), he doesn't know if he wants to put in the time necessary to build from scratch (or kit). Maybe one partially finished, maybe one completed, who knows. (Hey Jim Lewis, sell him a Mustang.)

On the personal side, he has two children by a previous marriage. A son is a successful service station owner in El Cerrito, and a daughter is a bookkeeper/accountant for paving company in Marysville. By his present marriage, he has twins: a boy and a girl. He is a software engineer with Hewlett-Packard and she is in the graduate school of pharmacy at UCSF. Bob tells me that he taught them all to ski as kids (of course, they out-ski him now). Each year he rents a cabin in the Sierra and they have a family ski vacation.

Bob's wife Sally sounds like a fascinating person. She was a school teacher but left teaching to raise the family. In 1981 she was diagnosed with a serious heart blockage and ended up with a triple bypass. Her stay in the hospital sparked an interest so, upon recovering, she went to nursing school. After working as a nurse for a time, she wanted more so went to UCSF for a masters degree. She is now in nursing education at Alta Bates. That's what I call inspiration and determination--great.

As I review what I have written, I think "another one of many multi-talented and fascinating people in our Chapter." You fit right in, Bob. Here's a belated welcome to you.

MINUTES OF THE BOARD MEETINGS

The November 2, 1994, board meeting was called to order at Fred Egli's house at approximately 1930 hours. In attendance were Fred Egli, Lisle Knight, Louis Goodell, and Ken and Linda McKenzie.

Lisle Knight was following up on putting together a committee for the Christmas Party.

UNCLASSIFIEDS

Pete Wiebens has hangar space for rent. Call 933-7517.

FOR SALE: IO-360-A1B (fuel injected, 200hp) for sale "at more than a fair price." Call John M. Agee, M.D. at (916) 484-7038.

FOR SALE: Lightweight starter for Lycoming engine. Manufactured and STC'ed by Lycoming. New; $450. Call Mike Parker, (510) 685-4809 (leave message).

FROM THE INTERNET

From: greg@silver.ucs.indiana.edu (Gregory R. TRAVIS)
Subject: Re: Octane of Jet Fuel
Date: Sat, 19 Nov 1994 19:13:37 GMT

Ed,

I'm afraid your understanding of Octane ratings pretty much misses the mark. Not because of your incomplete knowledge of chemistry, but because of what's being measured when we refer to a motor fuel's "octane."

The octane number assigned to a motor fuel has very little to do with the actual "octanes" in the fuel and everything to do with how well the fuel resists detonation (which is directly related to the amount of

energy (heat) required to get the fuel burning in the first place).

It is possible to assign octane VALUES to fuel which contain no octanes whatsoever (such as LPG, I think).

There are three things to consider when comparing hydrocarbon fuels:

1. Volatility. In short, what's the fuel's propensity to vaporize. This effects the ability to easily mix the fuel with air and the fuel's tendency to "vapor-lock"

2. Pre-ignition & knock resistance. Referred to as "Octane value." How much energy does it take to get the fuel burning - how much does it resist auto-ignition from compressive heat?

3. Energy content. How much ENERGY can be extracted from the fuel as a percentage of its volume.

The three factors are often confused and interrelated when, in fact, they measure three completely separate things. There is no natural correlation between them.

General rules:

Heavy fuels (diesel, jet): Low volatility, low knock resistance, high energy

Light fuels (gasoline): High volatility, high knock resistance, low energy.

Note that gasoline, partially, makes up for its (relatively) low energy-per gallon by the fact that a gallon of gasoline weighs less (by 25%) than a gallon of jet fuel.

Octane rating is in no way correlated with engine power or efficiency. There is more potential "energy" in a gallon of diesel fuel than a gallon of gasoline, yet the diesel fuel has a much lower octane value (more on that below).

OK, then, how IS octane rating determined? First, you go out and get a suitable supply of the fuel which you wish to test. Then, you get yourself some heptane (made from pine sap) and some iso-octane (a petroleum derivative). Finally, you and your buddies in the SAE all, arbitrarily, agree that iso-octane has an "octane" rating of 100 while heptane has an octane rating of 0.

Next, you call up Waukesha Motors and order yourself an ASTM-CFR test engine. This single-cylinder wonder has a three bowl carburetor and a movable cylinder head that can vary the compression ratio while the engine is running.

You fill the ASTM-CFR full of your "mystery" fuel and, for automotive fuels, you run two test protocols using the ASTM. One protocol is called the "motor" protocol and the other the "research" protocol. You vary the compression ratio until the onset of knock and write down all kinds of various scientific parameters.

Next, you run your "reference" fuel, made up of various proportions of heptane and iso-octane through the ASTM-CFR. You keep varying the proportion of heptane to iso-octane until you get a fuel that behaves JUST LIKE (knock-wise) your "mystery fuel." Once you get that, you say to yourself "How much heptane did I have to add to the iso-octane to get the mixture to knock in the ASTM-CFR just like my mystery fuel?" If the answer is, say, 10% heptane to 90% iso-octane, your mystery fuel has an octane number of 90.

Note that the motor protocol and the research protocol will yield different "octane" numbers. At the pumps, the numbers are averaged together to get the value you see.

Tetraethyl lead raises the "octane rating" of a fuel not because it adds more "octanes" to the fuel but because it makes the fuel knock at a higher compression ratio in the ASTM-CFR. It works by slowing the flame front. Slowing the flame front has the effect of slowing the pressure rise in the cylinder. Since the pressures do not rise as fast, there is less chance of spontaneous combustion AHEAD of the flame front, which is what causes knocking. This, in turn, allows a higher "real" compression ratio to be used.

Diesel and Jet fuel (along with kerosene) have, indeed, TERRIBLE "octane" numbers. They tend to ignite easily from high compression. Their use in a gasoline engine will quickly destroy the engine.

Diesel fuel is rated by its "cetane" number which is determined, like octane, by running the fuel in a test engine. Instead of heptane and iso-octane they use naphthalene (cetane rating = 0) and n-cetane (cetane rating = 100). In total opposite to octane ratings, the higher the cetane rating the higher the fuel's propensity to knock!

Just as using a fuel with an octane number higher than necessary in a gas engine will gain you noting, using a fuel with a cetane number higher than necessary in a diesel engine gets you nothing. On the other hand, where using a fuel with too low an octane number in a gas engine will result in a damaged engine, using a fuel with too low a cetane number of a diesel engine will just result in a rough-running (or not running at all) engine with no damage.

Why can diesel engines tolerate a low octane fuel? In all gasoline engines, (including injected gasoline engines!) the fuel/air mixture is present in the cylinder the entire time the piston is travelling upward on its compression stroke.

This means it could be ignited at any time whereas we only want it to be ignited when the spark plug fires, some time just before the very top of the stroke. Furthermore, we want a nice, even, steady, pressure rise in the cylinder as a result of ignition. This means that we want the "flame-front" to travel linearly from the source of ignition (the sparkplug) to the other side. We do not want combustion to occur randomly within the mixture as that may cause a too-rapid pressure rise which will throw off all our calculations about where the piston should be and when.

In the absolute WORST case, if the fuel is too low octane, it MAY spontaneously ignite BEFORE the spark plug fires due to thermal rises from the heat of compression or from "hot spots" in the cylinder itself. This kind of ignition is called PRE-ignition (as opposed to knocking) and is a PATHOLOGICAL case which will just turn an engine to scrap. Diesel fuel is low enough octane that mixing it with gasoline can cause pre-ignition!

What usually happens, and what we usually call "knocking" or pinging is that the fuel/air mixture does not ignite before the spark plug fires but does ignite spontaneously after that. The sparkplug fires and this causes an immediate, rapid, rise in combustion chamber pressure. This causes fuel on the other side of the flame-front to ignite BEFORE the flame-front reaches it. In turn, this causes combustion chamber pressure to rise even more rapidly. The result is an "explosion" inside the combustion chamber as opposed to the desired "just very rapid burning."

A high octane rating ensures that it takes a REALLY hot ignition source to ignite the fuel (such as a spark plug or the flame-front itself) and not just the rise in pressure & temperature that's a result of normal combustion. Note that the thermal rises in the cylinder are in direct proportion to the compression ratio of the engine (more below). The higher the compression ratio, the higher the octane of the fuel that's needed.

IF the mixture, in a gasoline engine, ignites BEFORE the spark plug fires, we call that "pre-ignition." Pre-ignition will damage an engine before you finish reading this sentence. To reiterate, what we're really concerned with is called "knock" and that's the spontaneous ignition of the fuel-air mixture ahead of the flame-front as a result of the rise in cylinder pressure caused by the onset of ignition (caused by the firing of the spark plug).

In a diesel engine there is NO fuel in the combustion chamber as the piston starts up on its compression stroke. Instead, fuel is INJECTED at high pressure (up to 3000PSI!) into the combustion chamber at the EXACT moment when ignition is desired. In a diesel engine with a compression ratio of around 20:1 (compared to 7:1 for many "modern" gas engines), the heat of compression will have raised the combustion chamber temperature to around 1000-1500F. The injection time takes about .002-.004 seconds during which the fuel spontaneously ignites from the heat of compression at just the right time. Even so, a diesel fuel with too low a cetane rating may not ignite, or may ignite poorly - especially on cold days starting a cold engine.

The first critical difference, which allows a diesel engine to tolerate low-octane value fuels, is the fact that there is no fuel in the combustion chamber until the EXACT moment at which ignition is desired. In a gas engine, even engines with so-called fuel injection (which inject into the INTAKE port, not the cylinder (as in a diesel)), cylinder vacuum is what pulls the air/fuel mixture into the combustion chamber and the fuel/air mixture remains in the cylinder throughout the compression stroke. As such, it is very important to keep the fuel/air mixture from igniting BEFORE the spark plug fires. It's also important to keep the mixture burning evenly AWAY from the spark plug as it does burn. One way of doing this is to keep the octane rating high.

The second critical difference is that Diesels are set up to burn the fuel in a slightly different way.

In a gas engine, you typically set it up so that the mixture is ignited before the piston hits the top of the stroke. What you're aiming for is for the mixture to be fully burned around the top of the stroke - thus combustion pressures are maximized at the top of the stroke and gradually fall off as the piston moves downward on the power stroke (and increases the volume in the cylinder). Diesels, on the other hand, are set up to inject fuel very close to the top of the compression stroke. The fuel spontaneously ignites (auto-ignition) and, actually, "knocks" just like it does in does in a gasoline engine (hence the classic diesel "knocking"). The combustion pressures in the diesel increase evenly as the piston goes DOWN. The net result is that the diesel piston "feels" a constant pressure on it as the piston travels from top dead center to bottom dead center whereas a normally operating gasoline engine piston "feels" a constantly decreasing pressure as it travels to the bottom of the stroke. The net result is that the diesel feels a lot lower PEAK pressure while the pressure is MAINTAINED over a longer period. The gasoline engine feels a much higher peak pressure which starts to fall off immediately as the piston travels downward. The implication, for the latter, is that it periodically operates very close to the capabilities of the base metals. Anything,

such as knocking, which increases those peak pressures even more is apt to push beyond the capabilities of the base metals and result in engine damage.

Knock in a gasoline engine tends to occur at the END of combustion, when pressures inside the cylinder have reached, as a result of spark ignition, very high values - values high enough to auto-ignite the fuel. Knock in a diesel engine happens at the BEGINNING of combustion as a direct result of piston compression only. It is what allows FURTHER combustion as the piston moves downward. This continued combustion keeps the cylinder pressure constant as the piston moves towards BDC.

Now, back to aircraft. We want to make aircraft engines with the following characteristics:

1. Very high power/weight ratio

2. Low specific fuel consumption (so we don't need to carry around heavy fuel)

The easiest way to do this, without involving lots of complex machinery that might fail and add weight, is to raise the compression ratio of the engine. An engine's efficiency is in direct proportion to its compression ratio. Unfortunately, raising the compression ratio means we need to protect against knock/detonation. How do we do this? We use high (100 octane) fuel!

Whew, went on a little longer than I meant to!

greg

From: eew4aql@prism.gatech.edu (GT Amateur Radio Club)
Subject: How to make General Aviation feasible... you got the guts to do it??
Date: 16 Nov 1994 19:14:09 -0500
Sender: eew4aql@prism.gatech.edu

Bruce Weisberg <71643.542@CompuServe.COM> writes:

This all raises an interesting question: Will the FAA get nervous about the BD-10?

Because if they do, that could spell the end for Mr. Bede and his innovative airplanes. The only thing that would stop me from investing my money in any of this is the fear that the FAA can (and would) change the rules re homebuilt/experimental a/c, and make him get a type certificate for this ship. That would be ...

Well, I think it's clear that if the FAA continues the trend of the past decade, then there will be NOTHING but airliners and military aviation in the US. The FAA has tried very hard to make it hard on any group not paying lots of money to them (i.e., the Airline industry) and they have little reason to help us, since the public doesn't really know enough or care enough about private aircraft operations... other than the many hyped-up, misleading reports of every single little incident. There has NEVER been a crash of any of the jets now being restored due to lack of proficiency, to my knowledge... yet there is a moratorium (i.e., elimination) on the right to fly all those like-new and well cared-for jets now coming out of service from overseas. Of course, the fact that these owners wouldn't fly these planes, much less pay the BIG bucks to own/ fly them in the first place, if they were unqualified to do so if absolutely ludicrous!!! That's typical FAA thinking for you.

The same day that that air traveller's group denounced the safety record of commuter planes, the Atlanta news reported a commuter plane had landed with an engine out... video of the landing and all, reporting it as if it was something that put many people's lives at risk and as if it were conclusive proof that the traveller's group was right. Just think of all the misleading things that are said every time a Cessna or Piper goes down, or even lands safely with a malfunctioning engine. I am not yet a pilot, but I too am VERY alarmed that the dream I have always worked towards is on the brink of being ripped from me by the fact that our government has become the corrupt, sickening compost heap it is. Look at Hoover... he lost his case, and the only avenue left is an appeal to the Supreme Court (who may, of course, refuse to even hear the case.) I have been told that there's a Notice of Proposed Rulemaking in the FAA right now that will require pilots to report ALL types of counseling... even, for example, for women getting attacked and seeking counseling. They will have to report it to the FAA medical office (i.e., the guys who grounded Hoover) to surely be used against them as a tool to arbitrarily revoke their right to fly. I have yet to find anyone who had even heard of this... yet, it is in the process of being made into a law. PEOPLE, WAKE UP!!!!!!!!!! As long as folks keep quiet, afraid to say anything, this trend will continue, regardless of which party is in power or who is in charge of various divisions of the FAA. THE GOVERNMENT IS NOT YOUR FRIEND. If the silent majority remain so, well, it will be too late to reverse the damage once we can't fly, or nobody can pass the Private Pilot medical, or flying is taxed to the point it is not feasible for ANYONE but the airlines. It is happening all around us. Open your eyes.

And about the BD-10: Yes, it would be VERY sad to see this project killed by the Feds. Let's hope not!

tragic; General aviation is suffering enough as it is. If the idea of the "assembly assistance institute" pans out, it would be monumental. Think of it: People who never dreamed of assembling an airplane could do so at a very (relatively) low cost, learning a great deal in the process. There could be a resurgence of General Aviation, with other kit co.'s following suit. The potential is limitless, folks...as long as big brother doesn't ruin it.

-- Bruce

I hope so. It will take several things to truly make GA safe and healthy again:

A) A monumental public exposing of the FAA, possibly through (in part, anyway) a favorable Supreme Court decision in the Hoover case, and possibly (although perhaps more difficult and unlikely) a massive inquiry launched from a friendly and powerful legislator within congress. While there are some congressmen/women who are more understanding of the cause in both parties, it will take the right people in the right places to effect a change. We will just have to see.

B) FAA leadership with the balls to say, "Hell yeah, we were wrong, the FAA is a mess, we are going to right this for the betterment of the country, even if it means eating a lot of crow and lots of headaches." From what I have seen, Hinson most certainly is NOT the one for this... if he had effected an ethical treatment of Hoover's case and had the balls to both fire and prosecute those involved in it, it would have gone a long way towards helping out the FAA. Same with the Neil Hunter crash in Apopka and all sorts of similar crap they have pulled to protect their own ass. They can run, but they can't get away with it forever.

C) Outside groups (i.e., EAA, AOPA, ALPA, etc.) with the courage to stand up to the FAA and Government, and go public with it. Until the general (and voting) public knows what is going on, and is made to care, NOTHING will be assured.

D) This is perhaps more of a fatalistic and attention-grabbing tactic that can tie into all the above, but: We need some people who are willing to take on the FAA, even with the knowledge they will probably lose in the short run. Bob Hoover is none of these folks. Win or lose, he is no longer fighting for his own flying privileges nearly as much as he is representing what is happening to lesser-known pilots everywhere. To my knowledge, the only non-aviation related media to cover his story has been the Wall Street Journal article in early summer and the recent slightly sugar-coated story on "The Crusaders" about 3 weeks ago. That is it. Joe Blow on the street has NO idea that this is going on. Why not?? He may care. He may know folks who can help. He may have always wanted to fly. Who knows?

Well, sorry for the length. Think about it though.

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REPLIES TO: WHALEY@CAMELIA.MIRC.GATECH.EDU
PLEASE!! THANKS :-) :-) :-) :-)

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MIKE "GATOR" WHALEY KD4UGI
whaley@camelia.mirc.gatech.edu

"Ipecac- isn't that a Genesis album?" --- Joel, MST3K

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From: masak@aslvx1.sugar-land.anadrill.slb.com
Subject: Re: fiberglass fatigue
Date: 14 Nov 1994 20:45:05 GMT

In article <3a8cc5$19s@giga.bga.com>, gee_bee@bga.com (Jim G. Hard) writes: *The sailplane I fly has some gelcoat cracks radiating from the speedbrake slots. It also has "dimpling" at the wingroot. It's pretty old, and lives outdoors with no covers for protection of its fiberglass wings and fuselage.*

Tying down a fiberglass sailplane outdoors, and exposing it to ultraviolet light and moisture is about the worst thing that you could do to it.

One way to test the stiffness and indirectly the strength of the structure is to just take the wingtip and shake it up and down until you get it to vibrate at the lowest natural frequency. Count the number of oscillations over a minute and see how this compares to the original glider. The glider should have documents for it which have this listed. If you have lost more than a few cycles/min, then the structure will need repair.

Most people don't realize that a fiberglass sailplane has only two layers of glass fiber (usually) which carry all the torsion loads for the wing. Damage these and the structure is unsound.

The best thing would be to immediately remove this from the outdoors.

The Checo

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