



DESIGNEE NEWSLETTER

THE PUBLICATION OF THE EAA DESIGNEE PROGRAM



WITTMAN AIRFIELD, OSHKOSH, WI 54903-2591
(414) 426-4800

Paul H. Poberezny — Publisher
Chuck Larsen — Editor

The *DESIGNEE NEWSLETTER* is a forum for the exchange of information and ideas of interest to aircraft and ultralight builders, restorers, and flyers. The sources of the materials published are EAA Designees, readers, Chapter newsletters, and other publications. Readers are encouraged to submit manuscripts, drawings, and black/white photos for consideration. Every effort is made to select accurate materials of interest to a majority of readers. Opinions expressed and responsibility for accuracy rests entirely with the contributor. All materials submitted become the property of EAA - no remuneration will be made. Materials should be sent to Chuck Larsen, EAA Designee Director.

CONTENTS

Volume 15, Number 8 August, 1984

	Page
INTRODUCTION	1
OSHKOSH '84	
Advisory Circular 20-27C	
EAA Publications	
LETTERS 'N SHOP TALK	2
Parachutes	
Airworthiness Directive on Parachutes	
Fiberglass "Bumps"	
Cooling by Color	
TECHNICAL TOPICS	3
Rules for Installing Aircraft Nuts and Bolts	
DESIGNEE VISITS	4

EAA AVIATION FOUNDATION MANUALS & PUBLICATIONS

"How to Books"

	Each*
Basic Hand Tools, Vol. 1	\$3.65
Custom Aircraft Building Tips, Vol. 4	3.50
Powerplant Handbook - CAM 107	4.50
Aircraft Maintenance Manual - CAM 108	4.50
Modern Aircraft Covering Techniques	3.65
Metal Aircraft Building Techniques	3.65
The Sport Plane Builder	17.95
Wood Aircraft Building Techniques	7.95
Pilot Reports & Flight Testing	3.65
Sport Aircraft You Can Build or Buy	6.50
The Custom Built Sport Aircraft Handbook	3.25
EAA Aircraft Show Judging Standards	1.00

Aircraft Design Aids

Aircraft Detail Design Manual	15.95
Aircraft Hardware Standards Manual & Engineering Reference	12.95
Helicopter Design & Data Manual	9.95
Handbook of Airfoil Sections for Light Aircraft	8.95
Hangar Plans	5.00
Theory of Wing Sections	7.00

Logs & Maintenance Manuals

Amateur-Built Service & Maintenance Manual	3.50
EAA Aircraft Log Book	2.65
EAA Pilot Log	2.65
EAA Propeller (or rotor) Log Book	2.65
EAA Engine and Reduction Drive Log Book	2.65
EAA Ultralight Pilots Log	1.95
EAA Ultralight Engine & Aircraft Log	1.95

EAA Sales Item

EAA Aircraft Placard & Passenger Warning Set (Stainless Steel)	3.50
--	------

Magazine Back Issues

SPORT AVIATION and SPORT AEROBATICS Back Issues	2.00
VINTAGE AIRPLANE, ULTRALIGHT AIRPLANE and WARBIRD Back Issues	1.25

*NOTE: Shipping and handling charges are \$1.00 for the first item and 50 cents for each additional item.

Send Check or money order to EAA, Wittman Airfield, Oshkosh, WI 54903-2591, (414) 426-4800.

Please include payment in full with order. Wisconsin residents add 5% sales tax. Allow 4 to 6 weeks for delivery.

Designees and Subscribers,

OSHKOSH '84 is unfolding before nearly one million EAAers and other enthusiasts as this month's *DESIGNEE NEWSLETTER* reaches your home. Those in attendance will experience the event firsthand but those of you unable to attend will be able to discover and enjoy the Convention in future EAA publications.

Most of the aircraft on display at our annual Conventions are the result of years of dedication and hard work by their builders. Builders recognize family, friends, fellow Chapter Members and Designees as being instrumental in their successful pursuit of putting wings on their dreams of personal flight. We all look forward to the day when our own and those we help can take our creations to glitter like jewels on the emerald green carpet of Wittman Field.

FAA Advisory Circular 20-27C (Provided in the June, 1983 issue of the *DESIGNEE NEWSLETTER*) brought Designees to a new level of importance in assisting builders to present a "zero defect" aircraft to the FAA for the plane's Airworthiness Inspection. EAA has published or revised several technical publications and log books to support builders in documenting the progress and operation of their plane. A list of these publications is included in this issue. It is of particular importance that EAA Designees understand that, in their position as a Designee, they are not authorized to make any log book entries or provide any documentation when visiting projects. These activities are the function and responsibility of FAA Inspectors. AC 20-27C should not be interpreted to require or suggest Designees enter a pre-cover visit in the builders log book. Designee visits to builders and restorers projects should be recorded on the latest version of the Designee Visit Form available from my office at Headquarters. When this form is completed, one copy should be sent to EAA and the other retained by the Designee.

Chuck Larsen, Designee Director

WITTMAN AIRFIELD
JULY 28-AUG. 4



LETTERS 'N SHOP TALK



PARACHUTES: The FAA has issued an Airworthiness Directive on parachutes whose harnesses contain rings manufactured by the 3 Ring Co. This may be of interest to pilots of ultralights, sailplanes, and aerobatic aircraft. The AD requires pull testing of all 3 Ring, Inc. Part Numbers RW-1-82 or RW-1-83 Large Rings installed on these harnesses and removal of these which are elongated beyond acceptable limits. Some rings shipped by the ring manufacturer without receiving proper heat treatment may be elongated by unusually large parachute opening loads and prevent proper operation of the main canopy emergency disconnect. The required action will assure immediate release of the main parachute under emergency conditions. Compliance to this AD is required before the next jump.

AIRWORTHINESS DIRECTIVE ON PARACHUTES: Aerobatic and ultralight pilots as well as all others who wear parachutes may be interested in a recent FAA Airworthiness Directive covering HERBIE Hog parachutes. This AD requires the replacement of the plastic rip cord handles on all Herbie Hog parachutes with metal handles by May 10, 1984.

FIBERGLASS "BUMPS"

By Fran Benton, EAA 221569, from *GROUND EFFECTS*, the Victoria, B.C. Canada Chapter Newsletter

One useful thing I've learned to do while building my Quickie is make weird-shaped bumps, blobs and blisters out of fiberglass. Let's say you have a big ugly piece of something protruding from your airplane. To contain it smoothly and nicely, you can do the following.

1. Round up a block of styrofoam (not polyurethane!) bigger than the size of the thing you want to contain. Figs. 1 and 2.
2. Carve it to the shape you want with a bread knife and medium sand paper. Fig. 3.
3. Buy a piece of fiberglass which is woven 2 dimensionally (called Bidirectional) and cut it so that it covers the foam in 3 layers and leaves a 3-inch margin around the edge.
4. Mix up some 2 part epoxy resin (not polyester resin) and cover the glass so that all the resin soaks in and the glass is firmly stuck to the foam.
5. Scrape off all the extra resin. Extra resin adds weight and not strength.
6. If you are attaching the "cover" to a curved surface, shape the foam to that surface and before you add the epoxy to the glass, cover the surface with saran wrap. Then lay up the glass over foam right on the curve. Fig. 4.
7. When the glass is dry, peel the "cover" off the saran wrap and round up some car gasoline.
8. Pour the gas onto the foam. The form will disappear, leaving you with a lovely smooth cover. Trim the margins, drill holes as needed and presto-one cover. Fig. 5.
9. When finishing over your cover, mix some white microspheres into the epoxy mix and make a paste. Smear this over the cover, let dry and sand smooth. Fig. 6.
10. When painting, don't forget to give the cover a coat of uv primer to prevent decay of the epoxy from sunlight.

COOLING BY COLOR

By Rollin Caler, EAA Designee #1277, as published in *HOWDY PODNER*, the Las Vegas, Nevada, Chapter 163 Newsletter

Dark colors absorb heat and light colors reflect heat, so what is new? Actually, colors are a two way street. I like to think of black as an open door and white as a closed door.

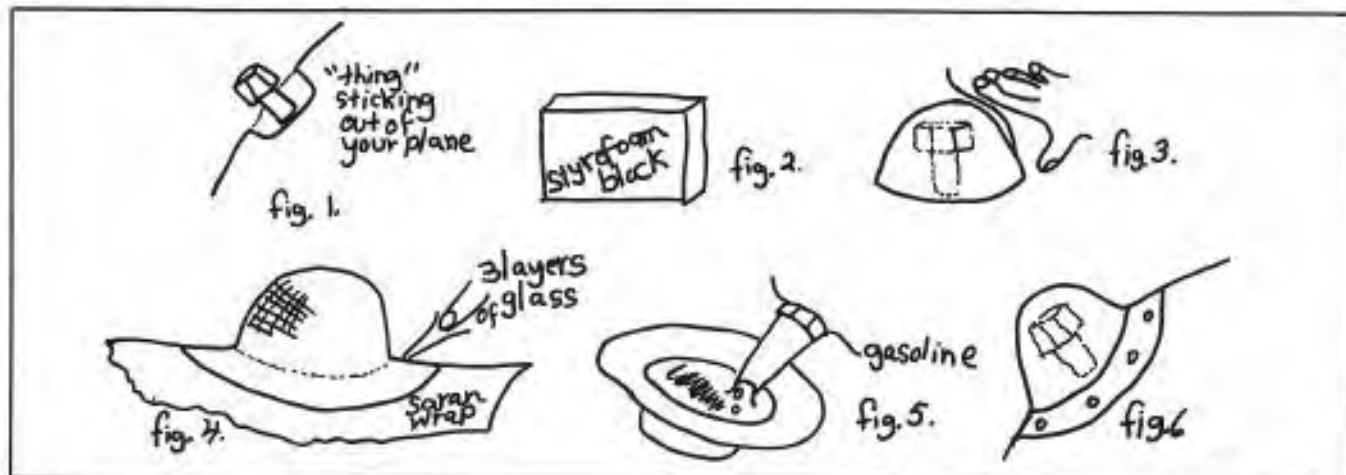
Black colored items will let heat in if it's hotter on the outside or will let heat out if it's hotter on the inside. That's the reason they paint auto radiators black. A thin coat of paint works better and flat black even better yet. Engine cooling can be greatly affected by color. Not only do the cylinders and oil coolers radiate heat but so does the entire engine. The crankcase and valve covers also act as an oil cooler by radiating heat. When these are painted black, they radiate heat even better. A black surface is more than ten times better in heat-radiating ability than a plain cast surface. The more efficiently the engine is cooled, the smaller the air intakes can be, therefore less drag and more speed. The best time to paint an engine is at manufacture or overhaul when the engine is disassembled and clean.

White is the closed door paint. It resists the passage of heat in either direction. Painting exhaust stacks white helps keep the heat inside the pipes until it can be dumped overboard. This helps to keep the engine compartment cooler.

Solar heat has the consideration of direction. White colored horizontal surfaces are more important than vertical surfaces in avoiding excess heat from the direct rays from the sun. We can add those colorful color schemes to the sides of the fuselage or vertical fin and rudder. On a sunny day with 75 degrees F. ambient temperature, the temperature of a horizontal black surface will rise to 190 degrees F. while that of a white surface will reach only about 123 degrees F. As we have 110 degrees F. days in this area and many of our aircraft are tied down outside, the following information from *Soaring* magazine, September 1975 may be of interest:

Ambient Air Temp.	80 degrees F.	110 degrees F.
Black	198 degrees F.	237 degrees F.
Brown	191 "	231 "
Red & Green	178 "	219 "
Orange & Tan	162 "	198 "
Light Green	155 "	193 "
Purple & Silver	148 "	183 "
Light Blue & Aluminum	143 "	177 "
Yellow & Pink	134 "	169 "
White	128 "	163 "

Many materials and accessories in aircraft really don't last well in high heat. Perhaps if we have the option of choice of colors, we can better prepare our aircraft for the desert environment.



TECHNICAL TOPICS

RULES FOR INSTALLING AIRCRAFT NUTS AND BOLTS

From the Green Bay, Wisconsin Chapter 651 Newsletter

The proper installation of aircraft nuts and bolts calls for a good deal of common sense with a foreknowledge of what FAR 43.13 refers to as "accepted industry practices." First of all, whenever you torque a bolt, tighten the nut down into the bolt, rather than placing your torque wrench on the head of the bolt. If you are screwing a bolt into a blind hole, or for some reason you cannot reach the nut and find that you must turn the bolt, good practice dictates (and the FAA mandates) that you torque the bolt to the higher torque limit. (When you rotate the bolt, the wrench is working not only against nut-bolt torque, but against the friction of rotation as well. This causes the desired torque to be reached prematurely. To correct for this, it is necessary either to measure the bolt drag torque and add it to the desired torque, or taken the bolt to the higher torque limit.)

In the case of locknuts, the FAA requires that once the final torque has been reached, the end of the bolt shows through the nut. More specifically, flat-ended bolts must extend a minimum of $\frac{1}{32}$ in. through the locknut, while rounded or chamfered bolts must extend the full round or chamfer through the nut.

Regardless of the type of nut or bolt being used, it is always good practice to position the bolt in such a way that its head is on top of the structure, or facing forward, rather than down or back (unless, the manufacturer's recommended service procedures advise otherwise). This tends to prevent the bolt from slipping out of place if the nut is accidentally lost.

The FAA requires the use of one washer beneath the head of every bolt and beneath every nut, except when the manufacturer specifies the omission of washers. Whenever a steel bolt is used to secure aluminum or magnesium alloy members, aluminum alloy washers should be used under the head and nut of the bolt. This way, any dissimilar-metals corrosion that occurs will attack the washers rather than the underlying structure. Steel washers should be used when steel members are being joined with steel bolts.

Occasionally, because of unusually tight working conditions, you may find it necessary to use a "crow's foot," or other extension-type adapter on the end of your torque wrench. In that case the final torque you reach will be different from the apparent torque indicated by the torque wrench. Accordingly, you'll have to adjust your indicated (or apparent) torque upward or downward somewhat, to obtain the correct final torque at the nut or bolt. This can be done with the aid of the following simple formula:

$$\frac{T \times L}{L + E} = T'$$

Where T' = The proper indicated torque
 T = The actual final torque at the nut
 L = The handgrip-to-drive distance (minus adapter)
 E = The adapter length

SAFETYING TECHNIQUES

According to the FAA, all non-self-locking fasteners used in aircraft primary structures must be externally secured, to ensure that said fasteners will not depart the aircraft. When such fasteners are externally secured, usually with safety wire fasteners are externally secured, usually with safety wire (MS 20995) or cotter pins (MS24665), they are said to be "safetied." Although oil filters, piano hinges, wing nuts, studs, and drain bolts (among others) can all be safetied, the most familiar type of safetied fasteners is the AN310 or AN320 castle nut, which can be safetied with either cotter pins or wire. Safetied one of these nuts is easy, providing you can get the nut's castellations (or slots) to line up exactly with the hole in the bolt tip after tightening the nut to its proper torque. As it turns out, strict adherence to recommend torque values frequently prevents slots from lining up at all, since castle nuts are not "keyed" (i.e., the hex does not clock to the threads). There are ways, naturally, of dealing with this situation. The first thing you can do is try torquing the nut to its minimum torque limit, then tighten the nut slowly in an attempt to get things to line up before reaching the maximum torque limit.

The second thing you can do is try a different washer under the nut. Quite often, the substitution of a shiny new washer for an old, flattened one will do the trick; if not, you can simply substitute a new washer of different thicknesses, to deal with just this situation. The thinner washers can be identified by the presence of a suffix L on their dash number: An AN960-5L is a

thin-series $\frac{1}{16}$ in. flat washer. Of course, one thing you definitely will not want to do is use two washers where there was only one to begin with.

If all else fails, you have one final option — and that's to try an entirely new castle nut, an entirely new bolt, or both. Remember, a castle nut's threads are not keyed. The AN310 nut that didn't work on this particular bolt will work on another one somewhere else.

After you've achieved alignment between the bolt hole and the nut's slots, you can begin to secure the assembly with safety wire or a cotter pin (whichever was there originally). If you're using wire, select the largest diameter wire that will fit through the bolt hole. Be sure to use none other than aircraft-quality stainless steel safety wire with MS20995 printed somewhere on the package.

Aircraft safety wire comes in brass, copper, soft iron, galvanized, and other special forms, in addition to stainless steel. If the assembly you're working on requires one of these special types of lock wire, use it. Consult a mechanic if you're not sure what to use. The actual safety-wiring of a nut or bolt to another nut or bolt (or to an anchor lug, housing, etc.) is very simple, once you get the hang of it. Basically, it involved little more than looping a long piece of wire through the anchor point, twisting the wire together tightly (6 to 12 twists per inch) until the nut-bolt assembly is reached, passing one strand of wire through the bolt and the other around it, and making a $\frac{1}{4}$ to $\frac{1}{2}$ in. pigtail past the last item to be wired.

It should go without saying, always use new safety wire for each job. And route the wire in such a way that the only possible direction in which the wire can pull on the nut is in a tightening direction. Also make certain that the wire is positioned so that the loop around the edge of the nut stays down and does not come up over the bolt.

Remember that your twists should be tight and even, but not excessively tight. Do not overtwist the wire, creating a very taut run between anchor points; this is both unnecessary and imprudent. You don't want to work-harden the wire to the extent that normal airframe vibrations may cause it to fail, and yet that's exactly what can happen if the wire is overtwisted. Take it easy, don't overtwist. Be sure to bend your pigtails back or under when you're finished so that there is no danger of them snagging other parts — or bare skin. Sharp-pointed pigtails can cut like razor blades.

The installation of cotter pins offers less opportunity for error than safety-wiring; even so, however, you'll want to watch what you're doing. Cotter pins come in a variety of lengths, diameters and alloy types. They also come in aircraft and nonaircraft grades. You want only brand new, never-been-used-before MS24665 (formerly AN380) aircraft-type cotter pins.

Here are some rules of thumb to bear in mind when working with cotter pins:

1. Check to be sure the pin fits neatly into the bolt hole with little or no side play.
2. Start the prong apart (once the pin is in place) with a screwdriver; then tap them lightly with a mallet to get them to bend. Avoid making any sharp bends.
3. See that the top prong (i.e., the prong bent back over the end of the bolt) does not extend beyond the bolt diameter. If necessary, cut the prong back.
4. Make sure the lowermost prong does not rest against the surface of the washer, or the underlying structure. (Again, trim the prong back if need be.)
5. If you wish, you may bend the prongs around the sides of the nut, rather than bend one prong up and one down. In this case, be certain the ends of the prongs do not extend outward from the nut hex.

Appendix A of FAR Part 43 specifically lists the replacement of defective safety wire and cotter pins as one of the preventive maintenance procedures pilots may engage in. This means that any time you encounter any broken safety wire or rusted or missing cotter pins on your aircraft, even if it's in an area you normally wouldn't work on, you may legally replace the safety wire or cotter pins in question. The one exception to this is turnbuckles, the safety-wing of which is somewhat complicated (and extremely critical to safety). If you happen across any poorly wired turnbuckles in your plane's control system, call in a mechanic immediately; this is one area you'd be best off not touching, regardless of what the FARs say.

DESIGNEE VISITS

One of the important services provided by our DESIGNEEs is visiting aircraft building/restoration projects to discuss and offer suggestions about them. The DESIGNEEs in the following listing are to be commended for their efforts in helping to make sport aviation a safer activity by providing this service. Comments for publication are selected for the purpose of providing guidance or assistance to builders and the DESIGNEEs visiting them. DESIGNEEs are requested to note problems or procedures observed in their project visits in the comments section of the Designee Visit Report.

Richard Paul Baker #1107
Bay City, Michigan
(517) 892-2442
*Falco F8L
*Stolp Aeroduster II

Glen Gauger #1150
Oaktown, Indiana
(812) 745-4522
*KR-2

John Goodpaster #1158
Hobart, Indiana
(219) 842-2401
*Bede 4

Brian C. Hoare #1191
Auckland, New Zealand
(AKL) 283-9377
*Thorp T-18C

James Madewell #1229
Sidney, Ohio
(513) 492-0665
*Chuby Cubby

Marton R. Clark #1264
Grants Pass, Oregon
(503) 479-1675
*Fisher FP-101

Gred N. Wimberly #1237
Arlington, Virginia
(703) 979-2483
*LongEZ

Tom Ryan #1238
Alexandria, Virginia
(703) 370-6864
*Moai

Shirley Dickey #1288
Salt Lake City, Utah
(801) 268-3360
*Avid Flyer

Theodore Travis #1291
Flushing, Michigan
(313) 659-8586
*Pitts S2AE
*Osprey II

R. V. Bud Upton #1308
Collinsville, Oklahoma
(918) 371-3528
*RV-4

Bert Sisler #1310
Bloomington, Minnesota
(612) 884-8920
*Coot A

John Hulm #1311
Crystal, Minnesota
(612) 636-6153
*Osprey I

Edward J. Stelba #1356
McHenry, Illinois
(815) 455-2675
*Monnet Sonerai II

John B. Shively #1369
Port Charlotte, Florida
(813) 481-4050
*LongEZ
*Coot A

James McGinness #1364
Cape Coral, Florida
(813) 574-1931
*Sonerai

John C. Powell #1373
Middletown, Rhode Island
(401) 846-6757
*LongEZ

James E. Mails #1379
Seymour, Indiana
(812) 523-8804
*Q-Z

George L. Shanks #1360
Oregon, Ohio
(419) 693-1737
*KR-2

Lannie Prince #1381
Waterville, Ohio
(419) 878-7258
*Mitchel, H-2
*Cayuna
*Grodette

Ray Morin #1445
Enfield, Connecticut
(203) 745-8167
*Fisher FP-202

L.E. Millholland #1452
Brookshire, Texas
(713) 484-8450
*Vuri-Ezo
*Corsair
*Quikkie

M. T. Perry #1459
Brookshire, Texas
(713) 934-8486
*LongEZ
*Sorell SNS-2 Guppy

Alan Bouixen #1472
Valparaiso, Indiana
(219) 759-4844
*Sonerai III

Joseph M. Smokovitz #1473
Taylor, Michigan
(313) 287-3167
*Evans VP-II
*Osprey

Robert N. Nelson #1484
Lakeland, Florida
(813) 687-1745
*Sea Hawk

Frank A. Karshick #1493
Bohemia, New York
(516) 589-3056
*Pitts S2A

Albert A. Burgener #1498
Salt Lake City, Utah
(801) 277-1591
*Starduster II
*Sonerai III
PAC-12 Cricket

The EAA presents the material and ideas herein only as a clearing house of information and as a forum for the exchange of ideas and opinions. No responsibility or liability is assumed, either expressed or implied, as to the suitability, accuracy, safety, or approval thereof. Any party using the suggestions, ideas, or examples expressed herein does so

at his own risk and discretion and without recourse against anyone. Any materials published in the DESIGNEE NEWSLETTER may be reprinted without prior permission. Please credit the original source of the material and the DESIGNEE NEWSLETTER.



DESIGNEE NEWSLETTER

WITMAN AIRFIELD
OSHKOSH, WI 54903-2591
(414) 426-4800

BULK RATE
U.S. POSTAGE
PAID
PERMIT NO. 1
RANDOM LAKE, WIS.
63075

S



THE PUBLICATION OF THE EAA DESIGNEE PROGRAM