DESIGNEE NEWSLETTER

THE PUBLICATION OF THE EAA DESIGNEE PROGRAM

P.O. BOX 229, HALES CORNERS, WI 53130
(414) 425-4860
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.

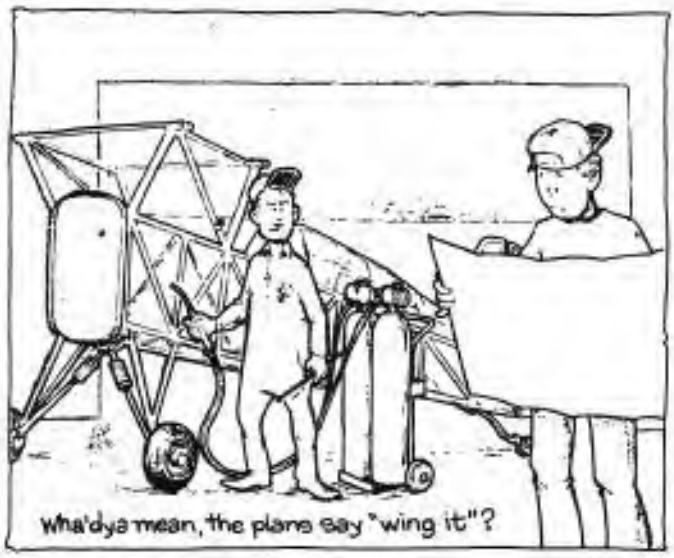
Designees and Subscribers,

OSHKOSH '83 is EAA's annual showcase of sport aviation activity. The opening of the new EAA Aviation Center will illustrate the Convention theme of "Wings On Dreams" as will the demonstrations, workshops, forums and fly-bys that take place each day. Rows and rows of homebuilts, antiques, classics, warbirds and ultralights will reflect in the eyes of hundreds of thousands of enthusiasts who gather at Wittman Field.

Experienced builders and Designees are in a unique position to help in at Conventions. Your knowledge and experience can be used to demonstrate the skills necessary to build aircraft and other tasks utilizing your aircraft expertise. If you plan to attend OSHKOSH '83 we ask you to support the Convention by volunteering for a number of hours, days or the whole week to work in:

WORKSHOPS
AIRSHOW AIRCRAFT REVIEW
DESIGNEE INFORMATION or
DESIGNEE FORUMS

Please contact Designee Director, Chuck Larsen at EAA Headquarters for more information and to arrange for your participation.



CONTENTS

OIL PUMP: LOSS OF ENGINE PRIME

By Ted Travis, Designee 1291 of Flint, Michigan as published in the Flint EAA Chapter 77 Newsletter

Your engine may lose prime during winter storage. The Continental A65-8 engine may be reprimed by lifting the tail of the ship, allowing the oil in the oil strainer cavity to flow toward the front of the cavity and into the oil pump gears. An alternative solution is to remove the oil temperature sending unit and squirt some oil into the center of the screen cavity, until it comes out, then replace the temperature bulb. Rotate the propeller and the gears will be oiled, thus, drawing oil from the pump and pressurizing the system. THIS WILL ONLY WORK IN THE -8 ENGINE!!!!! The -12 engine is quite different. The screen cavity does not flow to the gears as the oil passage is higher at the rear inside of the cavity. Consequently, when the tail is lifted or the bulb is removed and oil squirted into the cavity, oil will not run into the gear cavity. This passage is located in the cavity near the outside edge and high, toward the tachometer output, which is the top gear of the oil pump. Turn the propeller slowly as you do this and you will feel the gears with the end of the oil squirt can. Do this carefully as you do not want to cut off the end of the oil nozzle. The gears will now be lubricated. If in doubt, pull the oil pressure line from the right side of the case, remove the spark plugs, replace the oil screen and housing. Prop the engine until oil comes out of the pressure line pick-up connection. At this point, everything is primed and the engine will have oil pressure.

SKULL CAP SPINNERS ON VW MOTORS

Dear Chuck,

Here is a small item for the DESIGNEE NEWSLETTER.

If one uses the Skull Cap Spinner on a VW motor, it would be wise to replace the sheet metal screw and the timmerman nut with a plate nut and a stud. The opposite rotation of the VW has the tendency to unwind the screw and throw the spinner off. And it will!

Henry C. Olsen, Designee 1037
818 S. 19th Street
Escanaba, MI 49829

LETTERS 'N SHOP TALK

WOOD GRAIN INSPECTION STANDARDS

From THE LEADING EDGE, the Mont Vernon, New Hampshire EAA Chapter 336 Newsletter

For you woodworkers, Wayne Whitaker, EAA 37885, reports a refinement of the wood-grain inspection standards:

"Recently, I received a shipment of materials from Wicks Aircraft that included fabricated wood center section spars for my Osprey 2 project. Upon checking the materials used in the spars I became concerned about the angle of the grain in the "edge-grain" planks. A review of CAM-18 gave me everything about wood as a material except what I wanted to know; namely how edge grain is defined. Visions of returning the materials to Wicks (which they concurred with if I was not fully satisfied) or the risk of improper material were not the way to start the project. Wicks offered to send me a copy of the Mil Spec AN-5-6b they use in material application. It is basically the same as CAM-18 except that edge grain is defined as follows:

"A piece shall be considered edge grained if on ⅔ or more of the width of both wide faces the annual growth layers make an angle of 45 degrees or more with the face."

Illustrated by Jim Newman, EAA 109981

TECHNICAL TOPICS

"PROCESSING" 4130 PARTS

By Henry Karstons, EAA 13932, of Grand Rapids, Michigan. As published in the February, 1983 issue of the Deer Park, Texas, EAA Chapter 712 Newsletter.

In studying various aircraft construction plans and periodicals, I have noticed a lack of information on how to fully process 4130 parts. Due to the toughness of the material, plus the high cost, I hope to point out the proper, as well as the easier way to do it. For the most part, this will cover fittings that are used on the wood type of aircraft construction.

What is 4130 steel? The Society of Automotive Engineers uses a numerical index system to identify the composition of an alloy steel. In CAM-18, section 18.30-8(a), it explains how the system is used. The chromium in the alloy gives it strength, hardness and resistance to corrosion. The molybdenum adds strength plus toughness, while the content of carbon controls the hardness and ultimate strength. 4130 can be used in the annealed state, but the normalized condition is the most commonly used by homebuilders. Annealed parts must be normalized, i.e., heat treated, and therefore adds another problem for the builder.

In the normalized state, this steel is tough . . . a desirable feature for aircraft parts. So tough is it that one can get easily discouraged with the progress made when hacksawing a small number of parts. My procedure for making steel fittings has been layout, sawing, edge dressing, drilling and bending.

To prepare for the layout, first draw full-size fittings on stiff manila paper, the kind used as separators in file drawers. Cut these out with scissors, then double-check to make sure that the measurements are right. Now one has templates for drawing the outlines on a sheet of 4130, making it handy when there is a number of parts of one shape to make.

Inspect the surfaces of the sheets for deep scratches or other defects. Avoid these areas in laying out the parts. Check the grain of the steel, noticing rolling-mill marks or by the printing. Lay out the pieces parallel to the grain and mark the outlines with a silver lead pencil. By carefully positioning the templates, one can utilize the most of a given size sheet. On the average, space the parts about 3/32 in. apart so that after sawing some stock remains above the lines for edge dressing. Do not spot for the holes at this time, but wait until the parts are shaped to the lines. Handle the sheet with care, as the pencil marks rub off easily.

Sawing 4130 is best done on a steel-cutting type of band saw, I like a raker-tooth blade best, with the wavy-tooth kind as second best. A word of caution in using a raker-tooth blade - wear a protective eye shield! Cutting 4130 with this type of blade can cause tooth breakage. The teeth fly off with considerable force and often into the face. Set the band saw at a cutting speed of 50 fpm. A faster speed will dull the blade quickly. Saw between the lines and as straight as possible. Avoid cutting into the marked lines.

If no band saw is available, the next best tool is the hacksaw. I find that a sabre saw is useless in trying to cut 4130 steel. The cutting strokes are too fast, resulting in quickly dulling the blades. In using a hacksaw, use a rather flat angle of sawing after a cut has been started. A high speed hacksaw blade should be used, one with 24 teeth per inch, and this will give good results. Cut with slow strokes, to avoid premature dulling of the blade, and use a paint brush to remove the dust as it covers the marked lines.

After the parts are sawed, next finish the edges to their correct shape. Place in a smooth-jawed vise, or one similarly protected. Draw the file to the lines to remove any saw marks or other defects. File the edges square to the face of the material. A little practice may be needed here, but inspect all edges for this condition.

After filing, polish the edges by using emery cloth. Starting with about a 240 grade, follow with a 320 grade, bringing the edges to a high polish. Hold a small strip of emery cloth around a file of a similar size piece of steel and use in the same manner as draw filing. Using a sanding block with the 240 grade emery, polish both faces of the steel, and finish with the 320 grade for a higher luster.

Using the templates again, spot the parts for drilling of the holes. Place the fittings on a block of steel when using a center punch to insure decent punch marks. Center drill these prior to drilling. Only a sharp drill should be

DESIGNEE OF THE MONTH

Dear Chuck,

"Big Al", "a giant of a man", 6'4", 230 lbs. That's Al Gonserkevis of Sewell, New Jersey, the Designee of EAA Chapter 216 of Southern New Jersey.

Al is in his early 60's going on early 20's.

He is innovative, creative and serious in his love of aviation.

At our monthly meetings, he suggests methods of solving problems many members have had in building or restoring aircraft. He will move up to the blackboard at our Chapter's meeting room and sketch out various things that are always interesting to all.

He is knowledgable in all phases of airplane construction and design criteria: wood, fabric, metal and composite types of building. He is proficient at improving his own jigs, tools, layouts, cutting, welding and has even built his own bending tools and air compressor. Painting is another of his accomplishments.

Al is a humble person, giving freely of information, encouragement and a helping hand whenever he is needed. He has been the Chapter's Designee for years as well as having been a past President of our Chapter.

Among Al's accomplishments is the building of a Bowers "Fly Baby" in 1968, "Flaglor Scooter" in 1970 and a RV-3. A powered motor glider of all metal construction is nearing completion in his basement and he has started a "Boredom Fighter Biplane" of wood and fabric construction.

When Al isn't busy you can find him at the Pitman Airport lending a hand or servicing or flying one of two airplanes he has built and still keeps tied down there.

We, the members of EAA Chapter 216 salute "Big Al" and we are proud to have him aboard.

Elmer H. Conover, EAA 152884
Secretary, EAA Chapter 216

---

used on 4130, as a dull drill produces a troublesome burr and nearly always an oversize hole.

So many times we have mated fittings with four or more holes that have to match. This is my way of insuring proper alignment of the drilled holes; insert the proper size bolt and tighten with a nut, reclamp the piece at the opposite end, and drill and remaining holes. This works good on strut-spar fittings that are bolted on a wing spar.

For pulley or bell crank fittings, drill the base holes firt. Bend the parts, align the bases and clamp together. Drill the bolt or clevis hole on end, insuring the hole location height on both parts.

On fittings such as hinges that have holes facing at opposite ends, drill the base holes and at one end. Bend the part, fit a piece of wood in between the ends, slightly wider than the height of the base dimension. This is so that the base will bear on one vise jaw, and the wood on the other jaw. Place in the drill vise, square up a side of the part with the drill bed and, using the existing hole as a guide, drill through to the opposite end. Clear away the wood chips often, as a clogged drill will lead off and cause the holes to be out of alignment.

When drilling into steel, especially 4130, a lot of heat is generated. Most of it will concentrate on the thinning stock ahead of the drill. The burrs formed at the hole edges absorb this heat and harden, making removal of the burrs a tough task. Using a deburring knife on these hard edges cause edge gouging and extra work to clean them up. The best tool is a countersink, using a slow drill speed, and just touch up the edges. Without a countersink, a small half-round smooth file works fairly well.

Before bending the fittings, they should be given a thorough inspection for defects. In CAM-18, section 18.30-4(F) entitled "Fittings", it states how to inspect finished parts for any imperfections: "A careful examination of the parts with a medium power (at least 10X) magnifying glass will be considered an acceptable inspection." You'll be surprised how those shiny edges still will have nicks and scratches on them.

On any fitting, we are depending on the full strength of the part. Faults on the edges can cause fractures from vibrations and loads imposed on them, with the possibility of a part failure. Most of the steel fittings used in an aircraft are hidden from view or are not readily available for a good visual safety check. With fittings properly processed and given 100% final inspection, what peace of mind it will give a homebuilder!

The bending of 4130 fittings can be a time-consuming job. I was fortunate to see plans of sheet metal brake, so I made a few, the extra ones being given to builder friends who welcomed them wholeheartedly. This, too, makes bending of fittings a pleasure. The other most commonly used method involves two pieces of angle iron held in a vise, the familiar hammer, and a piece of brass for forming the parts over the angle iron.

Now, there is a minimum bend radius that is allowed in forming 4130 steel fittings. That is, the inside radius is equivalent to the thickness of the steel. Thus, for .063, the radius is 1/16 in.; .093, the radius is 3/32 in., and for .125, the radius is 1/8 in. In a formed piece of steel, the metal is compressed on the inner radius and stretched on the outer radius. There is more safety in using a slightly larger radii, causing less strain in the bend area. The toughness of 4130 is demonstrated here, as it safely bends 90° or more without developing cracks.

All 4130 steel fittings should be protected against corrosion. The best, by far, is cadmium plating and covering with zinc chromate paint. The next best is a couple of coats of zinc chromate alone. This is commonly done to all aircraft metal parts and has proven to be satisfactory.

In summarizing, I hope that I have shown the easier way to make fittings. I want to emphasize the danger that lurks in poorly made parts. The loads and strains imposed on aircraft fittings are hard to describe, but they are always present whenever an airplane is in flight. If we can reduce the danger of part failures, we have made a step forward in safety. I'm older than the "average" homebuilder and so give thought to the safety end of flight. Many times we read of air accidents, and some of these are caused by the failure of a small part. What a price to pay just for overlooking one small item in safety! By pointing out the right and proper way of making fittings, I hope that I have shown a better and faster way to make 4130 steel fittings.

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 comment's section of the Designee Visit Report.

Tom Ryan, #1238
Alexandria, Virginia
(703) 370-6854
*Monnett
*Thorp T-18
*Hiperbipe

Jack Joerns, #1263
Houston, Texas
(713) 333-5704
*Steen Skybolt
*Great Lakes

V. L. Curley Owen, #1279
Severne Park, Maryland
(301) 544-0122
*Dragonfly
*Dragonfly

Shirl Dickey, #1288
Murray, Utah
(801) 268-3360
*Glasair

Theodore C. Travis, #1291
Flushing, Michigan
(313) 659-8986
*RV-3

Norman Petersen, #1292
Franklin, Wisconsin
(414) 529-2728
*Osprey II

R. V. Upton, #1308
Collinsville, Oklahoma
(918) 371-3528
*Hatz CB-1

F. Dale Matuska, #1332
Carr, Colorado
(303) 897-2402
*Quickie

O. A. Campbell, #1342
Whippany, New Jersey
(201) 588-4970
*Hawker Hurricane

J. L. Murphy, #1349
Cape Canaveral, Florida
(305) 783-1515
*Mustang II

James McGinness, #1364
Ft. Myers, Florida
(813) 481-4050
*Coot-A

W. J. Boehm, #1368
Roselle, Illinois
(312) 529-7277
*Osprey II

Thomas A. Roche, #1372
Tempe, Arizona
(602) 838-3136
*CriCri
*Glasair
*Dragonfly

George F. Brunkalla, #1375
Roselle, Illinois
(312) 529-5944
*Mustang II
*Osprey II

Robert W. Harris, #1399
Terre Haute, Indiana
(812) 299-5736
*Quickie

Raymond Olimski, #1416
Westminster, California
(714) 892-9451
*Rotorway Exec.
*Bryan Aircraft HP-18
*Dragonfly
*Smith Miniplane
*KR-2
*Burak Aircraft Design 1
*Thorp T-18
*LongEZ

Ray Johnson, #1433
San Francisco, California
(415) 566-5632
*Quickie II

Robert M. Chafer, #1447
Atlanta, Georgia
(404) 457-6081
*Steen Skybolt

John J. Alder, #1450
Hurricane, Utah
(801) 635-2963
*Glasair

L. E. Milholland, #1452
Brookshire, Texas
(713) 434-8450
*F4U Corsair

M. T. Peery, #1459
Brookshire, Texas
(713) 934-8486
*Teenie Two
*Dragonfly

David R. Esterak, #1464
El Paso, Texas
(915) 755-8305
*Quickie II

Louis Luth, #1471
Vancouver, Washington
(206) 254-6645
*Quickie

Joseph Smokovitz, #1473
Taylor, Michigan
(313) 287-3167
*LongEZ

Frank R. Kaess, #1486
Timmonsville, South Carolina
(803) 346-2191
*Glasair

Mike Cole, #1500
Everett, Washington
(206) 334-4334
*Cuby

Ray Mull, #1506
Benton Harbor, Michigan
(616) 926-6275
*Zenith

Phil Sisson, #1512
Litchfield, Illinois
(217) 324-6468
*Pitts Special
*Acro Sport
*Acro Sport
*Vari Viggen

Theodore W. Strub, #1514
Wisconsin Rapids, Wisconsin
(715) 423-7242
*Sonerai II

Raymond D. Alexander, #1539
Morristown, Tennessee
(615) 586-0159
*CGS Hawk

William Hehmann, #1541
Miami, Florida
(305) 238-1082
*VariEze

EXPERIMENTAL AIRCRAFT ASSOCIATION

DESIGNEE NEWSLETTER

P.O. BOX 229
HALES CORNERS, WI 53130

BULK RATE
U.S. POSTAGE
PAID
PERMIT NO. 1
RANDOM LAKE, WIS.
53075

THE PUBLICATION OF THE EAA DESIGNEE PROGRAM