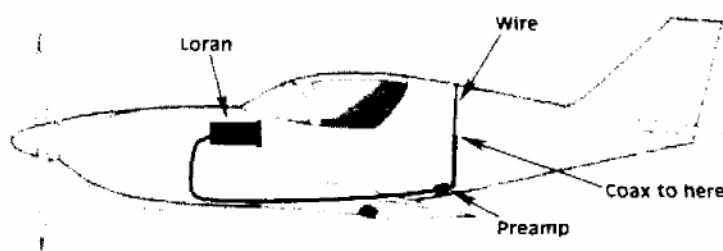
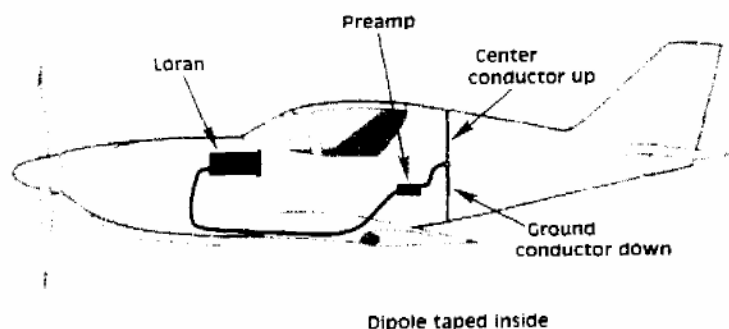


# GLASAIR News

Newsletter No. 15

Fourth Quarter, 1984



## LORAN-C ANTENNA INSTALLATION

One of the most frequently asked question about the Glasair concerns our recommendation for Loran-C antenna installation. Such installations in composite airplanes have been discussed elsewhere, for example in an article by Jim Weir of Radio Systems Technology in the March, 1984 issue of "Sport Aviation." A recently published book, *The Aviator's Guide to Loran-C* by John F. Good, also is an excellent source of information concerning all aspects of Loran-C. This article is a summary of the major point mentioned in chapters 7 and 8 of Mr. Good's book. *The Aviator's Guide to Loran-C* is available for \$12.00 from:

Aksunai press  
Box 326  
Wakefield, MA 01880

A booklet titled *Loran Antennas for Homebuilt Aircraft*, by Walter N. Dean, Vice President of Engineering for ARNAV System, Inc., is also a useful reference. Mr. Dean makes specific recommendations for simple Loran antennas in the Glasair and also de-emphasizes the need for an extensive ground plane. A major portion of this booklet was reprinted in the December, 1984, issue of "Homebuilt Aircraft" magazine and is also available on request from ARNAV Systems, Inc.

4740 Ridge Dr. N.E.

Salem, OR 97303

### THE ANTENNA

**For maximum efficiency, the length of a radio antenna should be a large fraction of the wavelength being received. Since Loran-C is transmitted at relatively low frequencies, the wavelength is very large, about 10,000**

feet. Any airplane mounted Loran-C antenna, therefore, is very inefficient because it is such a tiny fraction of the signal wavelength. This is overcome by the use of a preamplifier, often called an antenna coupler, which takes the very weak signal directly from the antenna, amplifies it before it can be contaminated by interference, and sends the amplified signal to the receiver. This preamp is usually supplied with the Loran receiver, and the manufacturer's recommendation for its installation should be followed closely. In particular, there is often a specified length for the lead between the antenna and the preamp that must not be altered. Since a Loran-C radio signal is vertically polarized (it concentrates most of its energy in the vertical plane), the effectiveness of an antenna is directly

proportional to its vertical height. You should choose a location for the antenna which allows the maximum vertical length of the antenna, such as in the vertical fin, on the inside of the fuselage sidewall, or on the baggage bulkhead. You should, however, heed the recommendations of the receiver manufacturer if a certain antenna length is specified.

Another consideration in choosing an antenna location is to avoid placing the Loran antenna in the "shadow" of another antenna or of some large metal structure. The "shadow" of an antenna can be visualized as a cone shape extending down from the top of the antenna at a 45° angle in all directions. This means simply that the Loran antenna should not be mounted near another vertical antenna such as the COM antenna.

Given the above considerations, the best location on the Glasair for the Loran antenna is in the vertical fin. If the Loran antenna is mounted in the fin, the COM antenna should be installed in the fuselage sidewall in the optional location illustrated in Appendix A of the Instruction Manuals. Alternately, if the COM antenna is mounted in the fin, the Loran antenna may be mounted on the baggage compartment bulkhead or on the inside of the fuselage sidewall. One of our builders has achieved good results with a baggage bulkhead mounted Loran antenna.

The form of the antenna is not important except that it should be a single wire (or length of metal foil) rather than any kind of loop. The size of the wire or the type of metal is unimportant, except that a wire that is too small could easily be broken or damaged.

### THE GROUND PLANE

Most experts agree that the other essential component of a successful Loran—C antenna installation is a ground plane that is electrically large compared to the actual antenna itself. Besides being as large as possible, the ground plane must be connected to the negative bus bar. The ground plane could consist of a network of wires or copper foil as described for the Quickie by Jim Weir in the "Sport Aviation" article or could be accomplished by bonding together the control tubes, rudder cables, and as many other metal pans as possible. Tony Bingelis' column in the August, 1984, "Sport Aviation" describes

procedures for electrically bonding together the metal parts of a wood or composite airplane. If you decide to construct an extensive ground plane, be sure that any bonding jumpers are installed so as not to limit control system travel. If a Loran antenna is being retrofitted to a finished Glasair, it will probably be easier to use the wire grid type ground plane in the tail cone.

By contrast, Mr. Walter Dean of ARNAV Systems, Inc. de-emphasizes the need for an extensive ground plane. One of his recommendations is to use a simple dipole antenna, such as described for the COM and the NAV antennas in Appendix A of the Glasair Instruction Manuals. The arm of the dipole that connects to the center conductor of the coaxial cable serves as the antenna and should be installed pointing up. The arm that connects to the shielding of the coaxial cable serves as the ground plane and should be installed pointing down.

Mr. Dean also recommends an even simpler antenna which consists of cutting a length of coaxial cable to fit the available mounting location and then stripping the shielding off the upper half of the coax. This antenna is equivalent to a dipole in which the bare center lead serves as the upper half of the dipole and the shielding of the cable serves as the lower half of the dipole. If the shielded lower half of this antenna is two feet long or less, use RG-58/U cable for the antenna. If the shielded half of the cable is longer than two feet, use RG-62/U cable. The two minimal antennas described here probably have not been tested with receivers other than the ARNAV Loran receivers.

### INTERFERENCE

Once the antenna is installed at an optimum location and a suitable ground plane has been provided, the only remaining obstacle to achieving the best Loran—C reception is to minimize interference from other electrical components in the airplane. Components such as alternators, voltage regulators, strobes, electric gyros, digital displays and computers all generate electrical noise that can interfere with the Loran signal.

Alternators contain a rectifier, which is a circuit that converts alternating current to direct current, and which produces noise. This noise is commonly controlled by the installa-

tion of a filter. If the alternator is excessively noisy so that a filter doesn't help, the alternator may be defective.

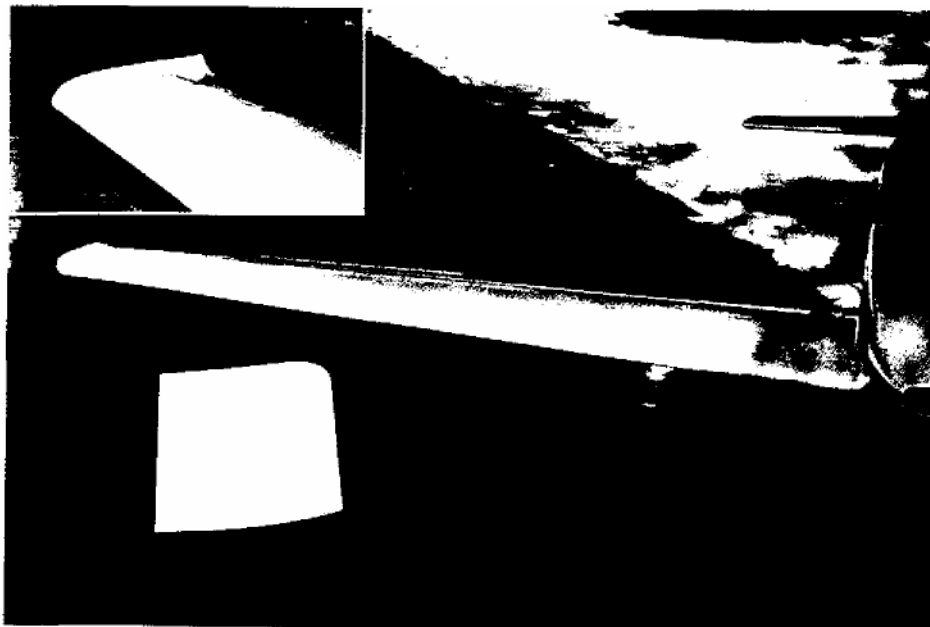
The voltage regulator controls the output of the alternator by switching the alternator field on and off. The best way to control the static produced by this switching is to use a linear voltage regulator which operates by varying the field current rather than switching it on and off.

To control interference from other equipment, such as strobes or instruments with digital displays, there are several courses of action. One solution is to run the power and ground wires to the noise generating equipment as closely together as possible, or even to twist the two wires together, otherwise the loop formed by the two wires can act as an antenna to transmit interference. You should also use shielded wire for the installation of any equipment that is a potential source of interference. The shielding on the wire should be connected to ground. If the above two steps don't reduce the interference to an acceptable level, a capacitor or filter will have to be installed in the circuit.

This article is meant to supply some guidelines for your antenna installation and is based on the experiences of others rather than on our own experience. We hope in the future to be able to make more specific recommendations for a Loran antenna installation.

## LIQUID FIREWALL

In Newsletter #10, we recommended a product called "Liquid Firewall", distributed by Quickie Aircraft Co., for fireproofing the RG nose wheel well and exhaust systems. In Newsletter #12, we published the results of tests of different fireproofing materials in which we found that the Liquid Firewall failed to reach a cured state. We are told now, by people who have been associated with Quickie Aircraft, that Liquid Firewall should not be used even if it cures properly. Liquid Firewall provides protection from flames but not from heat, so the heat from a fire would be conducted through the Liquid Firewall and ignite the composite material underneath.



## WING TIP EXTENSIONS

- Increased climb.
- Lower stall speed.
- Improved lateral stability.
- Greater speed.
- Longer range.

These wing tip extensions add four feet to the wing span which increases the wing's aspect ratio from 6.16 to 7.60. The climb performance is increased by 350 ft./min., stall speed is lowered by 6 mph, and the lateral stability is greatly improved.

Our tests consistently show that, at reduced power settings, the extended tips offer greater lift and more speed for the horsepower — approximately a 7 mph increase at 8,000 ft. in our RG. These tips may also be used as tip tanks, with about 7 gallons capacity per side.

Since the tip extensions reduce the roll rate considerably and are not approved for aerobatics, they are designed to be easily removable and replaced with the smaller standard wing tips if more aggressive roll performance is

desired. Wing tip change-over takes about 7 minutes per side if they are not used for carrying fuel. If the builder wishes to make the tip extensions and the standard tips interchangeable, the standard tips will have to be modified slightly to accommodate the larger flange necessary for mounting the tip extensions.

The wing tip extensions are designed with an attractive, upswept Hoerner-type tip, similar to the new Mooney's, which reduces drag compared to a standard rounded tip. The kit includes molded fiberglass upper and lower tip extension panels, foam and fiberglass, mounting hardware, and fabrication instructions.

The wing tip extensions should be available by early Spring. The projected price is \$490.00.

## FOR SALE

We have for sale a Lycoming IO-320-BIA engine that has just been overhauled. The engine was completely disassembled, cleaned, the steel parts magnafluxed, and the aluminum parts zyglowed with no defects found.

The engine was dimensionally inspected and found to be within tolerances and then reassembled with the following new parts: main, front main, and rod bearings; camshaft;

tappet bodies; rod bolts and nuts; front main seal; through bolt seals; pistons; rings; exhaust valves; valve springs, keepers, guides, and seats; seals and gaskets. The engine has been freshly painted and has chromed rocker covers and intake tubes and gold anodized push rod tubes. Included are the starter, mags, and mechanical fuel pump. The engine is set up for a constant speed propeller

## CARBON MONOXIDE IN THE GLASAIR

Since installing the smoke system in our new acrobatic RG, we have noticed that smoke and exhaust gases seem to be easily drawn back into the fuselage through the holes in the vertical fin which are cut out for the control linkages. In fact, when the smoke system is turned on, the smoke will come drifting forward from the tail cone into the cockpit. This caused us some concern, of course, so we used a carbon monoxide tester to sample the air in the cockpit. The testing indicated that the carbon monoxide level is well within the safe range.

We recommend, however, that if you have any suspicion that your airplane may be leaking exhaust gases into the cockpit, to test the air in the cockpit during flight, and, if the testing indicates unsafe levels of carbon monoxide, to take steps to seal the cockpit from exhaust gases. These steps would include sealing the belly panel hinges and around the wing roots with silicone sealant, and devising some positive means of sealing the tail cone from the outside air. You should make certain, also, that the cabin heat muff is not leaking and picking up combustion gases from inside the cowling. A good idea would be to install an electronic carbon monoxide indicator that constantly monitors the cabin atmosphere.

but does not include a governor or oil line. The only work necessary to complete the overhaul is an overhaul of the fuel injector. This engine requires the Type II dynafocal mount for an injected engine. We are asking \$6,500.00 for this engine. If you are interested in this engine, call us on our regular business line, (206) 435-8533.

## FLIGHT IN ICING CONDITIONS

This story of an actual experience should be of interest to those of you who may have wondered about the capabilities of the Glasair to carry ice. Jim Cline and his wife were fly-ing his Glasair TD in instrument conditions out of Nashville when they ran into unexpected icing conditions. The airframe picked up 1" to 1-1/2" of combined rime and clear ice on the wing leading edge and canopy in a very short period of time. Even though they were flying at a weight of about 1750 lbs., they were able to climb at 200 to 300 feet per minute until they broke out on top at about 5000 ft. At 6000 ft. with full throttle they were able to achieve only about 110 knots indicated. At this altitude, in the clear with the temperature well below freezing, the ice slowly sublimated off. Jim's airplane is fitted with a heated pitot tube and his fuel tanks are vented by NASA flush air inlets which are less susceptible to icing. This should not be taken as authorization to fly into known icing conditions — ice is definitely to be

seated with respect. It is, however, a pretty good indication that the Glasair wing is not particularly sensitive to imperfections in the airfoil or to contamination by rain or bugs.

Since we have so little data available on IFR flying in the Glasair, we gladly welcome any information concerning experiences you may have had while flying IFR in your Glasair. We will pass this information along in future newsletters, as it becomes available.

## NEWS BRIEFS

Glen Davis' Round-the-World **Glasair** is completed and flying now. He last reported to us that there are approximately 65 hours on the airframe and he is *very* pleased with the performance. We will report more fully on this airplane in our next issue.

Our options catalog is making good progress and we hope to be ready for the first mailing sometime near the beginning of February. Items included will be Airframe and Engine Accessories, Tools, Instruments and Avionics, Construction Materials,

Glasair Replacement Parts, T-shirts, etc.

The *tentative* date for the Second Annual Glasair Fly-In/Picnic is the weekend of August 24 and 25, 1985. If there are any changes in the planned date, we will notify you in the Newsletter. Registration information will also be published later. We should have a larger attendance of both builders and finished Glasairs this year so don't miss the fun.

## OFFICE HOURS

We would like to advise builders of our new office hours which are as follows: the main office (including the front desk, accounting, engineer-ing, and builder support) will be open from 8:00 a.m. to 4:30 p.m., Pacific Time, Monday through Friday. The shipping department will be open from 8:00 a.m. to 4:00 p.m. Pacific Time, Monday through Friday. On the first and third Saturday of every month (except Holidays), we have an Open House from 10:00 a.m. to 3:00 p.m., Pacific Time. We will be closed alternate Saturdays, all Sundays, and on major Holidays.

## SUN 50 AIRPLANE RACE

**The first Sun 50 Airplane Race will be held during the 1985 Sun & Fun Fly-In on Wednesday, March 20. The Sun 50 is a just-for-fun, all out speed race of approximately 50 miles, open only to Experimental Home-built, non-racing type aircraft. The race will be against the clock with the entrants started at 10 -15 second intervals. There will be several classes based on engine size, as well as classes specifically for the Rutan designs and classes for both the Glasair TD and the Glasair RC. For further information, rules, and entry forms, contact:**

**Charlie Gray 398  
Palm Drive Oviedo,  
FL 32765 (305)  
365-2735**

## BUILDER HINTS

Thanks again to everyone who has made suggestions for the Builder Hints department of the Newsletter. Builders often comment that some

### AVOIDING FUEL TANK LEAKS

Nobody likes to consider the possibility of having a leaky fuel tank upon completion of the wing. There are some steps and precautions that, if followed early in the construction process, will reduce to a minimum the chances of having leaks in the tank.

First of all, great care should be taken when fitting the wing and fuel tank ribs. If any of the ribs end up too high relative to the spar, they will tend to hold the upper wing panel above the spar during final bonding, preventing a good, solid bond for the whole bonding area of the spar cap to the upper wing skin. On the other hand, if the F ribs (fuel tank end ribs) are too small, there will tend to be gaps between the upper panel and the F ribs after final bonding. Fitting wing ribs is a somewhat difficult and tedious task and there is the temptation to quit early before a satisfactory fit has been achieved. Any extra time spent at this stage of construction, however, will be more than repaid by the reduction of problems later.

Leaks can also occur as a result of mistakes made when bonding on the upper wing panels. If the strips of mat cloth used to bond the upper panel to the spar cap are not butted tightly together, fuel can leak through the gap created. A better method than butting the strips together is to tear the ends and overlap them. By tearing the mat cloth rather than cutting it, a taper is formed for the last inch or so which allows an overlap without an increase in thickness. This is one bond where it is advisable to use an excess of resin. We always pour an extra bead of resin down the center of the spar cap just prior to placing the upper panel in position.

Insufficient weights used to bond the upper panels in place could also result in a faulty bond between the upper panel and the spar cap. Also, if resin begins to gel before the upper panel is properly positioned and weighted into place, the weights will not be able to squeeze out the resin, with the result that the upper panel will be held away from solid contact with the spar cap. The remedy for

particular hint has saved them immeasurable time and aggravation, so be assured that your suggestions are appreciated. We have not tried all of

### TESTING FUEL TANKS FOR LEAKS

Use a simple water manometer, made of a 6 foot length of plastic tubing, to pressure test the fuel tanks for leaks. Connect one end of the plastic tube to one of the vent lines and support the other end so it is about 18" above the top of the wing. Set the water level in the tube so it is about even with the bottom of the fuel tank, although this is not critical. The only requirement is that there be enough tubing above the top of the wing to allow a 12" rise in the water level as the tank is pressurized, but not so much tubing that an excessive head can be developed. 12" of water is equivalent to about 1/2 psi which the wing can sustain without damage and which is easily achieved by lung power.

After the filler caps are sealed (they will require an O-ring under the nut or taping with plastic tape to achieve a perfect seal) and the fittings in the pump are plugged, pressurize the tank, using lung power, through another tube connected to the other vent line. Pressurize the tank enough to raise the water level in the manometer by about 12" and then clamp off the pressurization tube. The water level in the manometer tube can be checked periodically to

### STABILIZER CUTOUT

When marking the outline of the stabilizer cutout on the fuselage also mark the reference lines at the forward and aft ends of the cutout. When installing the stabilizer, these

this last problem is to make sure that you have enough help to accomplish this step and that you and all of your helpers have rehearsed your jobs so that there are no delays after the resin is mixed. Also, try to accomplish this step on a cool day so that you have the maximum pot life of the resin available. (Remember that the larger batches of resin necessary for this step will have a shorter pot life because of their size.). We have found that we can accomplish this step with four workers (not necessarily experienced) in about 15 minutes.

these suggestions ourselves, so builders should use their own judgment in applying them.

determine if leaks are present.

Finding leaks is easy using a few drops of liquid detergent in a cup of water and brushing the solution over the suspicious area with a soft brush (on the end of a long stick, if necessary). Be sure to thoroughly clean up any soap residue to allow for future fiberglass work or before attempting to repair leaks.

The builder who suggested this method introduced a negative pressure (partial vacuum) in the tank while applying a fairly wet mill fiber mixture to the area of a leak. This encourages the sealant to enter the leak path and fill it. The next morning he was surprised to find that the manometer indicated a positive pressure evidently caused by gas given off by the resin curing. It also indicated, of course, that he had been successful in sealing the leak.

You should keep track of any change in the atmospheric pressure during the test; a change in the weather could mislead you into thinking you've got a leak when you don't. This would also apply if you were using a balloon or an altimeter to monitor the pressure in the tank. There may also be a slight drop in pressure as the warm air from your lungs cools down.

reference lines can be matched to the leading edge of the stabilizer and to the midpoint between the upper and lower stabilizer skins. This will insure that the stabilizer is installed parallel to waterline 100, especially if the cutout may have been enlarged to provide the proper gap around the stabilizer.

### FITTING WING TO FUSELAGE

To support the wing for mounting to the fuselage, remove the center bay of the wing jig and leave the wing in the remaining end sections of the jig. This is a very stable support for the wing, and holds it level laterally for attachment to the fuselage. All that remains is to support the fuselage so it also is level laterally and square to the wing.

## FITTING WING RIBS

Fitting the upper contour of the wing ribs can be a frustrating and tedious task. One of our builders had good success using Poly-eel One, which is a one component liquid polyurethane foam that comes in an aerosol can, to form the upper pan of the rib. To do this, first fit the 1/2" foam rib to the wing on its forward, aft, and lower edges. This is relatively simple because the wing is open and you can see how well the rib fits everywhere and also because any misfit can be adjusted with Q-cells when the rib is bonded into the wing. Leave a gap of about 1/8" between the upper edge of the rib and the inside of the upper panel for its full length of contact, and bond the rib into place using Q-cell. Mask the inside of the upper wing panel where the rib contacts using wide cellophane tape. Run a bead of the liquid foam along the top edge of the rib, then lower and weight the upper panel into place and let the foam cure. It would probably be best to concentrate the weights over the spar caps rather than over the ribs, otherwise the panels would be depressed over the ribs and the foam wouldn't form to the proper contours. When the foam has cured, trim any excess foam even with the sides of the rib and you have a perfectly contoured rib. Poly-eel One is available from Aircraft Spruce and Specialty Co.

## HYDRAULIC SYSTEM CLEANLINESS

It is very important, when working on the hydraulic system for the RG, to take pains to keep all the hydraulic lines and fittings clean. Blow out all the aluminum lines after fabrication and before installation. Keep the lines capped to prevent the entry of dust, especially when sanding or grinding fiberglass near the lines. You know how quickly your saw blades and drill bits wear when working on fiberglass; fiberglass dust is very abrasive and should absolutely be kept out of the hydraulic pump and cylinders. After the gear is installed and working and the preliminary testing is complete, the hydraulic fluid should be drained and replaced with clean fluid as a means of removing any foreign material that may have gained entry to the system. Part of the first annual inspection should be to remove the pump reservoir and clean out any foreign material.

## PRECURED LAMINATES

If you lay up your precured laminates on a glass sheet, you can cut them to shape with a razor knife in the green cure state while still in place on the glass sheet, instead of waiting until they are completely cured and cutting them with scissors or shears. LONG STRIP LAMINATES

For long strip laminates that are somewhat inaccessible, such as the strips that bond the control tunnel sidewalls to the inside of the fuselage belly, laminate all the layers at once on a long sheet of waxed paper on your work bench. The completed laminates and the waxed paper can then be rolled up and taken to their location on the airframe, unrolled and positioned. (Wet the area where they are to be applied first.) Leave the waxed paper in place on the outside of the laminates and press them into place, working the bubbles out by using your fingers or a squeegee on the outside of the waxed paper. Once the laminates are positioned properly and the bubbles worked out, the waxed paper can be peeled off and the laminates left to cure. Caution: One potential problem with this method is the possibility of the laminates picking up wax from the paper which could inhibit adequate adhesion of subsequent laminates. So use this method only where there are to be no later laminates applied, or use plastic wrap (such as "Saran Wrap") instead of waxed paper.

## LARGE FLAT LAYUPS

When laying up parts having a large area, such as the firewall bulkheads, seat backs, etc., handling

## FUEL CAP GASKETS

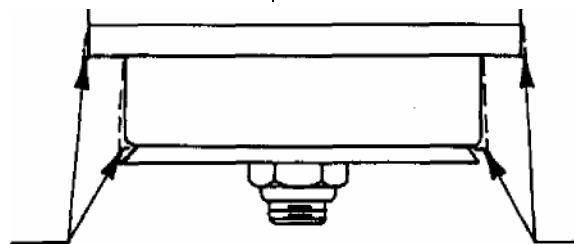
Builders are continuing to experience difficulty with the fuel cap gaskets swelling, making installation and removal very difficult. In a previous newsletter, we recommended trimming the gaskets with a razor blade to remedy this problem. We

the cloth becomes a problem. The cloth tends to stretch out of shape, and getting the cloth onto the wet surface without wrinkles is a real accomplishment. To solve this problem, cut the cloth pieces about an inch larger than the foam piece all around. using the foam as a template. Leave the cloth pieces flat on the work table. Wet one surface of the foam with resin and place it resin side down onto the cloth. The cloth will stick to the resin, and the foam (with the cloth adhering) can be lifted up and turned over to complete the saturation. The next layer of cloth is applied over the first in the same manner. Let the two layers on one side cure completely before starting the other side.

## CUTOUTS IN BAFFLES

In the Instruction Manuals the sequence for fabricating the E baffles in the main fuel tank is, first, to bond the foam cores into the wing using Q-cells, then to apply the two layer laminates on each side of the foam cores, and, finally, to cut out the bite-shaped cutouts and seal with mill fibers to prevent the entrance of fuel into the foam. An easier method would be to shape the foam cores to fit the tank and then to laminate the two layers of bidirectional cloth onto each side of the cores before installing them. The bite shaped cutouts could then be formed and sealed with either mill fibers or strips of bidirectional cloth before in-stalling the baffles. Finally, install the finished baffles in a similar manner as the D ribs and G and H baffles are installed, using 2" wide strips of bidirectional cloth.

have found since then that it is easier and neater to use a belt sander or grinding wheel to reduce the swollen diameter of the seals and also to grind a radius on the sharp lower corners.



## CANOPY INSTALLATION

Instead of using an eight layer masking tape dam on the plexiglass to provide an edge against which to butt the laminates, use silicone sealant to form a dam. First apply a 1/4" wide masking tape strip to the inside of the plexiglass along the edge where the glass cloth will be laminated. Then wax the inside of the plexiglass just inside the masking tape all around. It is OK to wax the tape also. Next apply a bead of silicone sealant (bathtub caulk) onto the inside edge of the tape and onto the inside of the plexiglass. Before the caulk starts to set up, pull the tape off perpendicular to the plexiglass surface, leaving a 90" wall of undisturbed silicone. Let the silicone cure and then apply SprayLat (see Newsletter #14) to the rest of the inside of the plexiglass (except where the fiberglass laminates will be applied). Waxing the inside of the plexiglass is an important step because the caulk sticks very well to plexiglass if it isn't waxed well. Sand the exposed 1/4" wide edge of the plexiglass in preparation for bonding, and continue the installation as described in , the Manuals.

## RUDDER SPRING MOUNTING

Use eyebolts (AN42 or AN43) instead of aluminum angles to mount the forward ends of the rudder springs. This will allow a small range of adjustment of the spring tension. You should use a large flat washer, or fabricate an aluminum disc with a nutplate in the center, for the forward side of the firewall.

## WEIGHTS

Use bags of lead shot (if you can afford them) for such jobs as weighting the stabilizer or wing panels in place for bonding. These bags provide a concentrated weight that conforms to the surface and is relatively "soft." It might be possible to rent bags of shot from a skeet shooting club or to buy them and sell them back to a shotgun shell reloader after you are finished.

## ACID BRUSHES

Use small, stiff-bristled, metal-handled brushes from the hardware store (the builder who recommended these called them "acid brushes") for laminating in tight areas. These brushes can be easily attached to a 1/4" dowel for those long reaches such as the laminates on rib D after the wing is closed.

## GROUNDING THE STARTER

We have found, through the experience of *one* of our builders, that it is not a good idea to ground the engine to the firewall. The firewall metal is so thin and there is so much current being drawn through the engine by the starter, that the firewall metal tends to deteriorate in the vicinity of the ground attachment, resulting in a faulty connection and an inoperative starter. The engine should be grounded, instead, directly to the battery. The firewall should still be grounded, of course, but no high current circuits should be run through it.

Our source of information on this problem said that, after the ground attachment of the engine to the firewall had failed, the engine was grounded only through the mixture cable which soon burned through because of the excessive current.

## CONTROLLING CLOTH

One builder uses a stick with a series of small nails stuck through to keep the cloth from stretching out of shape while laminating. He pokes the nails through the cloth and into the foam core to keep the cloth from stretching and to hold it in place until it is adhered well to the foam. After a good start has been made on laminating, he removes the stick and finishes the laminating.

## FIRST FLIGHTS

It was incorrectly published in the last newsletter that Ross Mathiesen had completed and flown the first Glasair in Australia. Our congratulations should have been given to Mr. Bernie Prentice whose RG was the first Glasair to fly in Australia. The second Glasair to fly in Australia is a TD belonging to Mike Chircop of Queensland. Congratulations Bernie & Mike!

We also inadvertently omitted mentioning in the last newsletter that Josef Toth of Sweden had flown his Glasair TD — the first Glasair to fly in Europe. Josef, who is not the least bit superstitious, made his first flight on Friday, the 13th of July, 1984.

Congratulations are also offered to Gene Spaulding of Studio City,

## ROTARY CUTTER

Use a rotary "pizza" cutter to cut the fiberglass cloth. This special knife has a revolving disc-shaped blade made of high quality tungsten steel. The knife is used with a wooden backing board and is rolled along the marked cut line on the fabric. Very clean cuts are possible, with no raveling of the edges and without stretching the cloth out of shape. We are looking for a source for these knives so we can include them in our options catalog.

## FITTING BELLY PANEL

A number of builders have noted difficulty installing the belly panel after the wing is installed for the final time. One builder discovered that if the belly panel is left in place while the control tunnel is fabricated this problem is reduced. Also, hoisting up the engine slightly while the belly panel is being installed will take the weight off the engine mount and will help straighten the fuselage so that the belly panel will fit into place. The belly panel hinge pins are always tight, so we use plenty of lubrication and use an electric drill motor to turn the pins while pushing them into place. Leave at least 1/2" of the pins sticking out to allow removal.

California, Dick Fisher of Pembroke, Massachusetts, Earl Brown of Aguila, Arizona, Cliff Johnson of Chico, California, Michael Parker of Bonners Ferry, Idaho, and Ed Yost of Wonder Lake, Illinois who have flown their Glasair TDs since the last report; and to Clarence Calcote of Charleston, South Carolina, Sherrod Campbell of Lakeland, Florida, Glen Davis of Carmel, New York, and Myron Jenkins of Parker, Arizona, who have flown their RGs. These airplanes bring to 65 the number of Glasairs that we know have flown. We suspect that there may be more Glasairs flying whose builders haven't taken the time to notify us. If you are one of these builders, we would like to hear about your flight.