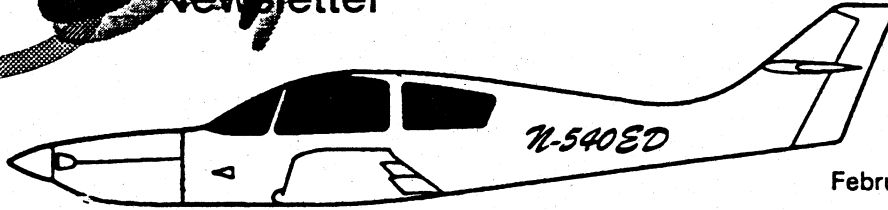


Express LINK

Newsletter

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.. und comes now Hartmut Huber !!

Once again the *EXPRESS* design proved to be very tame right off the bench. After overcoming a myriad of last minute details and minor problems, Hardy Huber personally test flew his *EXPRESS*, N-HE93 without incident. Hardy reported that no significant trim changes were required and that all systems remained within normal operating parameters with the exception of an indication of one cold cylinder during all flight operations. The CHT on the "cold" cylinder read normal during periods of idling, but went "cold" as soon as the throttle was advanced. After removing the offending head (and finding nothing out of order) and conversations with several A&I mechanics and CONTINENTAL FACTORY representatives (none of which could provide a clue to the problem) it was left to the skill of one of our own Nor Cal Builders to furnish the solution. Bob Hockett from Pine Mountain Lake traveled to Knoss Field in Novato where Hardy had built his *EXPRESS* and promptly suggested the solution to the "cold" cylinder. After tweaking the mixture settings the "cold" jug miraculously came to life and there has been no further problem with the way the engine has performed. Hardy, in his typical methodical manner then set out to fly off the 25 local hours prescribed by the FAA as quickly as possible.

Flying a large oval pattern over the southern part of Marin County, Hardy said that he "felt like an inspector on the Golden Gate Bridge", and was "happy to see that it was still in place each time around". The 25 hour task was completed in short order with little to do but check out some of the flight envelope. Nothing unusual was discovered and actual performance numbers will be published in a future issue as Hardy is currently on a trip to Europe (not in the *EXPRESS*).

Hardy visited the CBROS hangar shortly after his *EXPRESS* was signed off. We were happy that he chose Livermore as one of his first X-country visits. We were also pleased to be able to help him solve a problem which he discovered as he taxied out to take off. It seems that, having

extended his flaps to the full down limit when he landed, they decided to stay in the full down position despite Hardy's repeated commands to move to the



up position. After careful inspection Hardy determined that the flap actuator had locked in the full down position and it was only after it had been removed and "convinced" otherwise did it decide to resume normal operation. Hardy decided then and there that his next trip would be to Redmond to get a replacement actuator. True to his word he left for

Redmond the next day and the faulty actuator was replaced forthwith. One more "disaster" was to befall him before he left Redmond. Following a photo flight in the company of factory personnel flying 540ED and lunch at Sun River, when Hardy tried to restart for the flight back to Redmond, the starter gave up. The problem required that Hardy's *EXPRESS* remain at Sun River overnight. After





some very nifty "footwork" by Mike McDaniel to secure the necessary parts, and a return to Sun River to replace the faulty starter parts Hardy flew direct Knoss Field, Novato to the security of his home hangar. The return trip was uneventful.

Always master of the understatement, Hardy said that the "performance of the *EXPRESS*, once completed, is by far the least of the exaggerated claims made by sales representatives when he originally purchased the kit". That can be translated to read - Hardy is well pleased with the performance of his *EXPRESS* in its early phases of exploring the performance envelope and believes that the airplane will be everything he had hoped it to be. Congratulations to Hardy!



MORE LANDING GEAR SOLUTIONS!

When we last left the landing gear, we had told the readers that the Rib J landing gear bracket had failed on Ufe Gerstman's *EXPRESS* and the factory was working on a replacement. It can now be reported that the fix has been designed, fabricated, and distributed. Since the replacement of the Rib J bracket was the last main gear component left from the original design, it seems safe to assume that there will not be any further problems to face associated with the main gear. In the process of finding someone to fabricate the new bracket, the factory may have found a source to provide all the metal parts. That will be really good news.



THINK YOU ARE AN ELECTRONIC EXPERT ?

Try this on. See if you can solve the mystery of the "SHORT RANGE RADIO".

You have just completed your *EXPRESS*, including a beautiful white paint job. You have installed your VHF antenna on the forward vertical web in the vertical stab - just as the documentation suggests. You are using the runway on an uncontrolled field to taxi and test fly. Everything goes well with your radio during taxi testing but now that you are flying, you find that your radio transmissions are weak in the pattern area and unreadable when you are any farther out but your "standby" hand held works acceptably. The radio is brand new and the co-ax lead from the antenna to

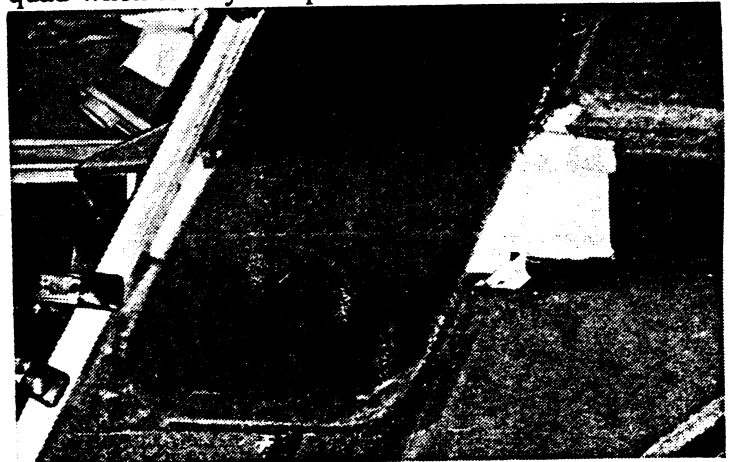
the transceiver tests perfect. The question is - why won't the radio broadcast or receive the way it should? (find the answer on page 5)



MOLDING VERTICAL WEB DOUBLERS AND TAIL CONTROL INSPECTION COVER DOUBLERS.

In the last Express Link we promised to describe the method used by CBROS to mold the vertical web doublers and the doublers needed to secure the installation of the inspection covers for the tail control hardware. Here's how it goes:

The following procedures presume that the builder has removed all primer from the joggles and removed all excess glass to the edge of part (EOP) lines on both lower quads. Begin by setting one lower quad on the "tower" fixtures in a position which will allow the normally vertical portion of the quad to lie horizontally, with the further provision for space and support to fit the appropriate upper quad in a position which it will assume relative to the lower quad when finally completed as shown here.



Cut a 6 inch piece of 2x4 and place it in a position which will emulate the thickness of the horizontal stabilizer spar. Clamp a 1"x 1" angle iron at the aft edge of both quads so that they are in line in both directions. Clamp the leading edges of both horizontal stabilizer skins together just past the fillet which transitions the vertical stab into the horizontal stab and also near the tip, making certain that the leading edges of both quads are flush together. Securely support and clamp both quads in this position.

Using a felt tipped pen locate and draw the complete outlines of the forward vertical web, the aft vertical web and ribs A, B, and C on the inside of the quads (which should be facing up at this time). Using the dimensions noted in the factory

**Doublers Cont....**

documentation in Fig. 6.030-2, also outline the top, bottom, forward and aft limits of the vertical web doublers with a felt tipped pen.

Locate a piece of 1/2" 4.5lb foam approximately 4" longer than the width of the vertical web doubler from front to back and approximately 4" wide. Shape and taper the foam to fit flush with the inside of the quad skins for the full length of the foam piece you are using and glue in place with hot melt glue.

To prepare the area on the upper quad for laying up the vertical web doublers, use aluminum foil tape, vacuum bag material or other "non stick" release material to carefully cover the area where the layup will be placed, from the edge of the lower quad up, and 2" outside the area of the layup on the forward side, the aft side, and the top of the layup.

To prepare the area for laying up the Inspection Cover doublers, cover the area of the "box" formed by the intersections of the forward vertical web, the aft vertical web and ribs "B" and "C" and extending two inches outside the "box" on all sides with release material. For reference the outlines for Rib "C" can be extended outside the area of the layup.

Cut the appropriate uni and bid cloth to the dimensions noted in the factory documentation in Fig. 6.030-1 for the vertical web doublers. For the most accurate results, draw the outline of the doubler on the vacuum bag material and position material as follows. With the outline on the bagging material down, place a layer of peel ply over the entire area extending 1.5 inches outside the area of the layup; lay the uni and bid layers in position **IN REVERSE ORDER**; after wetting out the layup, a layer of peel ply will be applied to the area of the layup **ABOVE THE TOP EDGE OF THE LOWER QUAD**; finally place a layer of bagging film over the whole area. As this layup will be **REVERSED** for application, make certain that it is correctly oriented for the side that has been prepared before it is wet out. The layup can now be completed assuming the area on the lower quad where the layup will be permanently attached has been appropriately prepared using normal methods. Use care in positioning the layup to insure that the full thickness of the layup extends equally in front of the forward vertical web and aft

of the aft vertical web and is centered vertically as nearly as possible to the center line of the horizontal stabilizer airfoil.

The layup for the inspection cover doublers is simply four layers bid at 45 degrees cut large enough to extend at least 1 inch beyond the outside the edges of the "box". To facilitate trimming these layups to rough size, after they have cured, it is helpful to mark the inside dimensions of the "box" on the layup before it is removed.

The advantage of completing the inspection cover doublers using this method becomes immediately apparent when the release material is removed, the inspection cover dimensions (approx. 3.5"x 5.5") are drawn on the quad 1/2" **INSIDE** the inside dimensions of the box, the door is cut out and the doubler is cut out 1/2" **SMALLER** (approx. 2.5"x4.5") than the size of the door, the door and doubler are positioned for best fit and jointly drilled for the appropriate number of screws. Floating nut plates are attached to the inside of the doubler, the covers are screwed to the doubler and, using a thin milled fiber mixture, attached to the quad. Being able to complete these procedures "on the bench" saves a lot of awkward work when the quads are positioned for procedures which follow in their construction.

**FLAP, AILERON AND TRIM TAB HINGE INSTALLATION.**

Sooner or later all kit builders will confront the dilemma of how flat hinges can be accurately installed. The technique that CBROS has settled on is based on the method Hardy Huber used to mount his flaps and ailerons.

You will find that you have several choices available when the hinge procedure comes up. One can 1) Flush rivet hinge halves to the fixed surface as well as the hinged surface; 2) Flush rivet one hinge half and use flush screws on the other half; 3) Use flush screws on both halves.

For the most flexible location options and best alignment adjustment possibilities, the use of flush screws on both halves is recommended. The use of flush screws on both hinge halves also allows easy

Pockets Cont....

installation or removal of any control surface and simple replacement of any excessively worn hinge component.

Several methods involving the use of flush screws have been discussed in the various sources of documentation produced for the *EXPRESS*, but all of them commonly end up with a "pocket" of one sort or another into which the hinge material is installed and secured with screws. The following procedure will facilitate the accurate construction of the necessary hinge "pockets". The method will work for installation of hinges for the ailerons, flaps, and trim tabs:

Begin by laying out and marking the location(s) and limits for the hinges to be installed on the inside of the skins to be hinged. Next place the outside of the skin to be hinged flat on flat surface. In the case of the wing skins this will not be practical, so simply hot glue a straight, flat piece of material to the outside of the skin. The idea here is to make certain that the edge of the hinge "loop" will be flush with the outside surface. When a piece of hinge material is placed on the inside of the skin in the proper location you will find that the skin will either be too thick or too thin to allow the hinge to lay flat on the skin and at the same time allow the "loop" to be flush with the outside surface. In every case the skin, where a hinge is to be mounted, must be 0.15" thick. Determine the amount of material to be removed or added at the location of each hinge half and complete the required work. Continue the required thickness at least 1 inch beyond each end of the hinge. When hinging elevator or trim tab skins, a considerable number of layers of fiberglass or a significant shim will be required.

Next, as noted in the latest factory documentation, cut a notch in the edge of the skin for the full length of the hinge, deep enough to align the center line of the hinge pin with the edge of the skin on each side, past the limit of the hinge being installed (approx. 0.03"). If the hinge is set in this position, it will result in a zero gap between the surfaces. Actually, zero gap will not work, but if the gap is zero or nearly zero to begin with, the

amount of gap ultimately provided can be precisely controlled. Once the hinge half is fitted to its final position, temporarily attach the hinge half to the skin using double stick tape, cyanoacrylate, or hot melt glue. Try to keep the adhesive material entirely under the hinge half. Alignment is not critical at this point, but work as carefully as you can.

Continue by covering the hinge half and the area 1.5" beyond the edges of the hinge with aluminum tape, vacuum bag material or other protective covering. If you are using aluminum tape, burnish it in place and apply a light coat of mold release or other wax.

Cut enough fiberglass cloth to laminate four layers over the entire protected area and laminate in place.

After the laminate has cured, remove it and the protective covering. Trim the laminated "pocket" to allow at least a 1" flat surface on all three sides which will eventually be attached to the skin around the hinge.

When all of the "pockets" for a given surface have been completed, **AS CAREFULLY AS YOU CAN**, line the hinges on a common plane, clamp the hinge pockets in place over the hinge half and mark and drill the appropriate number of holes to allow the installation of screws as required (in most cases on 1" centers) behind each hinge loop.

Remove the "pockets" and mount appropriate sized floating nut plates to the outside of the laminate. Finish the screw holes on the outside of the skin using a 100 degree countersink.

Attach the pockets, with the hinge half in place, using a thin milled fibre mixture and apply pressure using screws and clamps to insure good adhesion.

After the milled fibre has cured, pull the hinge half and carefully label each one. Then apply a single layer, 1" wide layup around to edges of the pocket, centered on the edges. Apply peel ply, let cure, remove the peel ply and you're done.



Strings Too Short To Save.....

... CBROS has gotten an early look at the new PULSED LANDING LIGHT KIT which will probably be available for builders from EDI by the time you read this. Included in the package are most of the materials needed to install the high power quartz-halogen lights in both wings including the lights, the lexan "lenses", the pulse unit, rocker switch, a generous amount of wire and the appropriate miscellaneous hardware. The documentation is clear and the installation appears to be straight forward. CBROS has fired up the lights and find that they should be more than adequate in terms of candle power. Having worked on the landing light installation in N-540EX I found that these small but powerful units give off so little heat that ventilation is of no concern. The light units are designed to be installed in the leading edge of the wing between rib G and the wingtip. You will find that there is plenty of room to fit and install the units.

... The last time we got a chance to get a close look at the factory demonstrator we noticed a hairline paint crack developing on the squished side of the rudder in the area of the rudder horn support rib. To mitigate the possibility of having to deal with this same problem on future rudders CBROS suggests that some form of flange be built on one or both sides of this narrow rib before the rudder is squished. This should distribute the load enough to avoid paint cracking at this location.

... When preparing one of the elevator skins to be squished it was found, when, the primer was removed from a "wavy" area, that the fiberglass had not adhered to the foam when the skin was originally "bagged" at the factory. If you have not already decided to remove all or at least most of the gray primer from the molded glass parts, at least remove it over areas to be squished and any areas which look like "waves" or flat bubbles. Remember, air trapped anywhere in the composite

components will expand at altitude and possibly cause a lot of grief where and when you least need it.

... THE ANSWER FROM PAGE 2

The answer to the case of the short range radio is: NOT THE ANTENNA, and not where it was placed or how it was installed, but *the paint. Yes, the paint.* Hardy discovered, by using his handheld in various locations inside and outside the fuselage that *the signal was completely lost when the handheld was located behind the bulkhead at station 162.* It seems that Hardy had purchased the white paint he had used in Germany and that, unknown to him, the lead content was so great that it effectively screens any radio signals going out or coming in. Hardy's solution was to mount a large aluminum ground plane with an antenna on the bottom of the fuselage between the front of the wing and the firewall. So, it pays to check labels in everything you use.

... CBROS is considering the possibilities of setting up a "Builder Support Center" operation on or near the Livermore Airport. The idea would be to acquire up to as much as 10,000 square feet of floor space - possibly in a large hangar - where as many as eight or ten separate kit plane builders could rent space where they could construct whatever type of aircraft they wished to work on. Preferably the space would be filled with EXPRESS projects, but any kitplane or renovation project could be accommodated. Each "tenant" would have a marked off space on the floor, and would share in the cost of utilities. Common use of tools and equipment such as compressed air, band saw, drill press, 220 power, *EXPRESS* wing and tail fixtures and templates etc., would be available, and CBROS could stock a small supply of common AN hardware and specialized supplies like they do now, and perhaps add some items commonly ordered from EDI such as 2 foam 2, 40 lb. foam and 4/5 lb. foam. We have gotten a positive response from several builders, but would need much more encouragement before we could get serious. If the idea appeals to you, let us know and we will keep the idea warming up to see if it might be ready to fly.



Subscription Information: It was the intent of *Express LINK* to furnish 6 issues for the original subscription cost. Reviewing publishing expenses to date, it is apparent that the original payment will be good for 8 issues. Please do not send any additional money until requested to do so.

Documentation: CBROS, Inc has retained an extensive file of patterns and templates for all procedures through flap and aileron construction. We will be happy to share them with any builder for the cost of copying them. If you have a particular need, give us a call at (510) 455-1036.

Materials/supplies available: CBROS, Inc. can furnish vacuum bag material, 7781 fiberglass cloth, precast flanges, and precast cable tunnel for use on your *EXPRESS*. If you are interested in any of the above, call John or Bill at CBROS, Inc. for prices.

Component construction: Now that your Editor has retired and Bro will retire in March, CBROS, Inc can offer to assist other builders with their projects. It is not our intention to build complete airplanes, but to assist with component construction of parts such as wings, lower fuselage/firewall, empennage, and control surfaces. Our plan is to parallel the Factory "quick build" program, but on a more customer controlled basis. As each project is unique, if you are interested in speeding up your *EXPRESS* project, call CBROS, Inc. to discuss costs and scheduling.

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