

**NOR CAL EXPRESS
BUILDERS**

Express LINK Newsletter

Vol. 2 No. 1



March 1995

OAKHURST WORKSHOP IV SCHEDULED

For what will probably be the last time, before its completion, to inspect Jerry Sjostrand's *Express* in "the nude", Jerry has extended an offer to put together another of the series of weekend workshops which have become the hallmark of the *Express* builders group.

The all day Saturday and half day Sunday event is scheduled for the weekend of April 8th and 9th at Jerry's fully equipped shop in Oakhurst, CA.

Past events have included, not only going over Jerry's almost complete *Express*, but some practical lessons in advanced composite aircraft construction. For those of you who have not attended one of these events in the past, you need to know that Jerry's *Express* will no doubt be the finest, most innovative example built yet (maybe ever). The airplane is now in the "finish" stage so information on sanding, filling, priming and painting will, no doubt, be on the agenda.

There are several motels in the area where one may stay on Saturday night. While the schedule has not been confirmed by Jerry, you can usually plan to arrive as early as you like on Saturday morning, have lunch with the other participants at a local restaurant, and dinner as a group that evening at a place to be named later. Work starts again about 8:30 Sunday morning and you can plan to be on your way home by 12:00 or 1:00.

If you need more information, you can call Jerry for additional details at (209)683-5523.

FOR DIRECTIONS, SEE MAP ON PAGE 7

E.D.I. QUILTS FT PRODUCTION

Latest reports from informed company sources indicate that E.D.I. has retired the molds for the upper fuselage and quads, and the cruciform tail F.T. model *Express* will no longer be available from Express Design Inc. Rather than speculate on the reason or reasons for the decision, it is expected that the official factory statement is due to be mailed to all *Express* builders as this is being written.

While there are many current builders to whom this will be unwelcome news, of more immediate concern is the proposed disposition of N-540ED. The venerable factory demonstrator, originally constructed by a dedicated crew of volunteers at the Wheeler Factory just prior to the bankruptcy, 540ED is the only F.T. example currently licensed to conduct demonstration and training flights.

The sale of this airplane to a party planning to use it solely for transportation or, worse yet, to a party outside the U.S., could have serious implications to F.T. builders seeking to insure their finished aircraft. This could be as simple as flying some number of hours without any insurance, to having to pay an exorbitant premium because of uncertainty as to the insurability of an aircraft being dropped from factory support. There are several people, who desire to remain unidentified, who are working to see that 540, if indeed sold, will go to an owner who will continue its availability as a training source. It is not clear at this time exactly what will happen.

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Builder alert !!!

EDI Single Door, Upper Fuselage Door Opening Incorrectly Cut

The following alert applies only to builders who have purchased the F.T. MODEL, SINGLE door, upper fuselage kit from E.D.I.

It has been found, on at least two such kits, that the edge of the door cutout in the **outer fuselage skin** was not correctly trimmed before the inner skin was attached at the factory. If this area is not properly trimmed or the door is trimmed to fit the fuselage cut out as furnished, the builder may end up with a door which does not overlap a sill. This would tend to expose the door seal directly to the slipstream. On the two examples found so far, approximately 0.50 inches will need to be carefully removed around the entire perimeter of the door opening (see sketch). An accurate EOP line should be found on the outer fuselage skin to assist in determining the final edge of the door opening. The best method used so far has been to set up an offset "fence" and rout the required amount of material **FROM THE OUTSIDE FUSELAGE SKIN ONLY**.

If you need to discuss the process with builders who have completed this work, you can contact Jeff Arnold at (703)382-4965, or Dick Bowers at (602)945-0314.



OOPS!!! **..... OUR FIRST MISTAKE:**

IN THE LAST ISSUE WE (I) MISTAKENLY NOTED LARRY OLSEN'S TELEPHONE NUMBER AT EXPERIMENTAL AIRCRAFT TECHNOLOGY, INC.
THE CORRECT NUMBER IS:
(360)491-2599 FAX(360)491-1345
SORRY LARRY !

Glassair Type Door latch Installation

In the last issue readers were promised the details on the installation of a modified door latch for the F.T based on the excellent spring loaded, over center system produced by Stoddard Hamilton for use in Glassair construction.

Before CBROS began the installation of the door latch system we had access to the Stoddard Hamilton construction manual section on the subject and a video tape produced for "Auriga" builders by an East Coast builder relating to the SH latch system. Based on what we saw, and reports of in flight door openings, we decided to use a three pin system as does the *Express* Manual and hardware, except that the third pin would be in the center of the door and drive directly down . We also decided to use the smaller "bullet" provided with the original *Express* latch system for the center pin, retaining the 0.50 dia. "bullets" (which we found could be driven in excess of 1 inch into the door "receiver") provided with the SH system fore and aft. Both of the above choices proved to be good ones and are recommended for other builders.

Unrelated to the latch system directly, but to be considered in the construction of the complete door assembly, is the installation of the hinges and the reinforcement of the portions of the door forward and aft of the door window. After removing the foam from the door frame, from approximately 1.5 inches below the window cut out to near the top of the window cutout, we laminated approximately 14 layers of carbon fiber uni-glass, cut in 0.50 inch wide strips. We found this reinforcement made the door much more stable as we installed the latch system and subsequently the door window (is that an oxymoron?). The hinges were installed as described in the last issue and the door was trimmed to fit in its proper location in the upper fuselage cut out. (Ed note... *see article opposite.*)

Installation of the latching system went pretty much according to the SH instructions but the following deviations were required:

1. The hole to be cut for the latch gimbal is located 3.30 inches above the bottom of the

Please See LATCH on page 3

LATCH... *Cont'd from page 2*

door and 6.50 inches aft of the forward edge of the door, measured on a line parallel to the bottom of the door. Either of these dimensions can be varied. Our vertical location was determined by the at-rest latch handle position in the open position. We wanted ours to be just

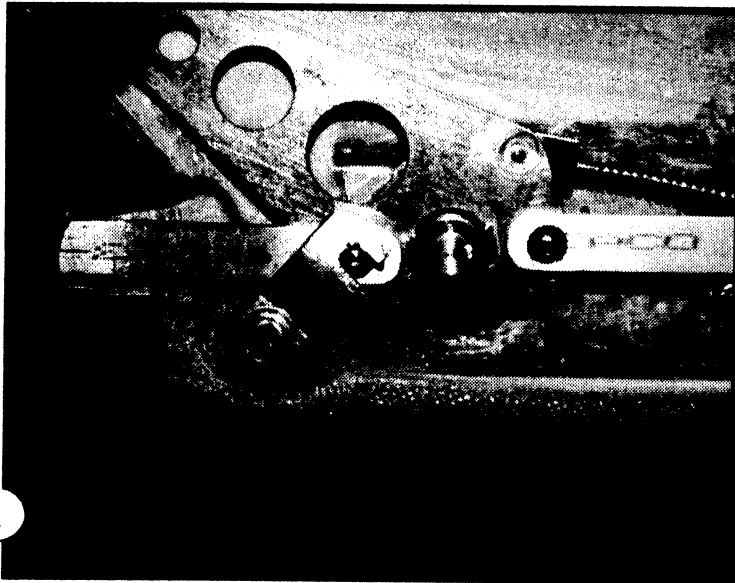


PHOTO NO 1 - HANDLE IN CLOSED AND LOCKED POSITION. -note black area where carbon fiber was used to reinforce "bullet" retainer.

below the window line. The fore/aft location was determined to be at the optimum location for passenger access and otherwise as far forward as possible.

2. There is a limit as to how far up the forward "bullet" can be located and still fall far enough below the windshield cutout to provide room for reinforcement of the "receiver" (see photo No.1).

3. The thickness of the door frame in the fuselage top is enough to allow fitting the "bullet" receivers between the inner and outer skins of the fuselage top.

4. You should find that the vertical location of the aft "bullet" will work best on a line parallel to the bottom of the door at the same elevation as the center of the latch handle assembly. (see photo No 2)

5. The location of the bellcrank which drives the center "bullet" should be as high as practical to allow the length of the articulating section of the center pin drive linkage to be as

long as possible. The longer the linkage, the easier it will be to fabricate and install (see photo 3).

6. The area around the gimbal and an area larger than the outside door handle will need to be filled with thin milled fiber to the thickness shown in the SH documentation (approximately 0.25 inches) with the gimbal/handle assembly in place flush with the outside door skin. A decision should be made at this time concerning the ultimate location of the lock mechanism. Some builders locate the lock mechanism in the recess behind the door handle. We opted to locate ours forward of and below the gimbal assembly to keep the overall thickness of the mechanism to a minimum (see photo No 1[locked]).

7. The center pin bellcrank is mounted on an AN4 bolt potted in milled fiber. All bearing holes in the bellcrank are brass bushed. As you proceed with the installation of the bellcrank, keep in mind the

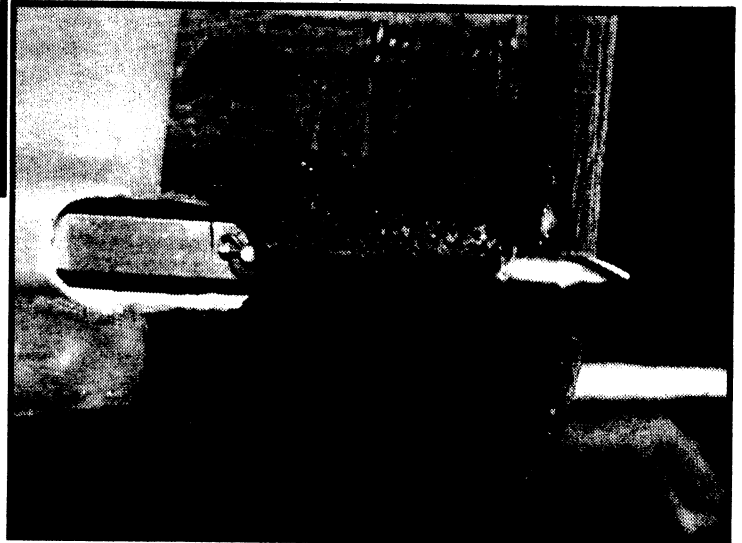


PHOTO NO 2 - AFT "BULLET" IN CLOSED POSITION. Located 3.00 inches above the inside edge of the door ledge.

direction of operation relative to the rest of the mechanism. This will allow for a minimum cutout of the foam in the door (unlike the interesting shaped cutout in our door foam).

8. Some of the SH aluminum stock can be used for push pull elements, but if you need to make as many as we did to come up with the final lengths and offsets, you will probably need to make a trip to your local hardware store. As with the mid door bellcrank, all bearing holes in the push pull elements are bushed. In photo No 3, the push pull element (left) between the gimbal and mid-door bellcrank runs in a groove cut in through the inside door skin and

Please See LATCH on page 4



LATCH... *Cont'd from page 3*

the door foam. It is kept from bending laterally by a glass covered foam insert in the latch mechanism cover (see photo No 4). The push/pull element between the mid-door bellcrank and the aft "bullet" is located in a "tunnel" where the foam was removed between the outside and inside

mechanism and handle operation, covering the shaped foam with aluminum tape, and laying up 4 layers of fiberglass. Trim after cure (see photo No 4) and pot threaded inserts in the door to match holes you have previously located and drilled in the perimeter of the cover.

10. For reference, the following element lengths were final for the CBROS installation (all dimensions from center of pin to center of pin): Forward "bullet" to handle - 3.05 inches; (including a lateral offset of about 0.25 inches); Handle to mid door bellcrank - 15.20 inches; mid door bellcrank to center "bullet" 0.55 inches; mid door bellcrank to aft "bullet" - 21.00 inches. A drawing of the bellcrank is available from CBROS.

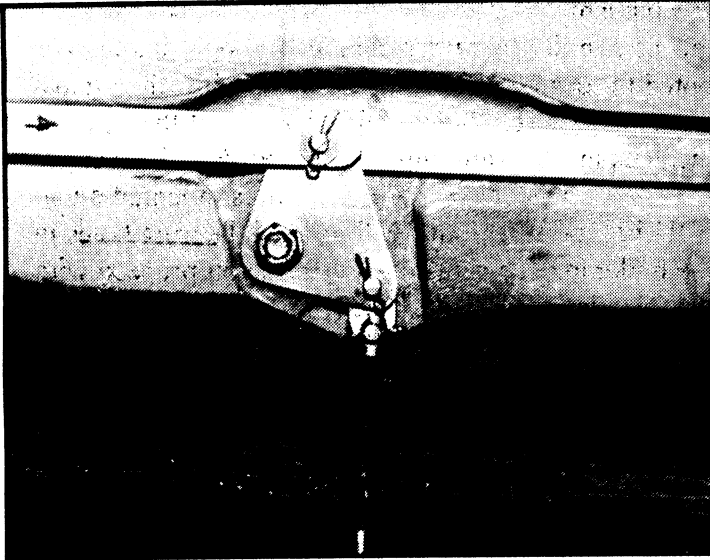


PHOTO NO 3 - MID-DOOR BELLCRANK AND LATCHING PIN - closed position. Note carbon fiber reinforcement here also:

door skins and does not require further lateral stabilizing.

9. The door latch cover was made by attaching 0.50 inch thick, 4-5 lb foam directly to the door in the area to be covered, shaping the foam to provide adequate clearance for the latch

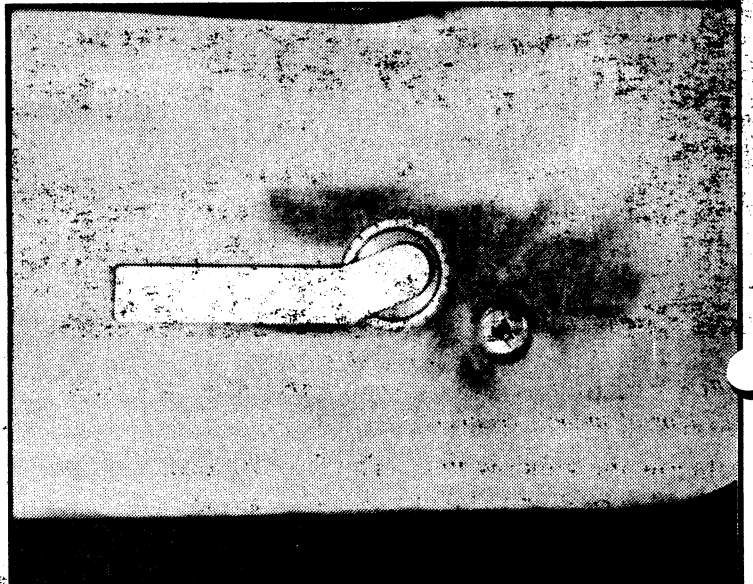


PHOTO NO 5 - OUTSIDE DOOR LATCH HANDLE - CLOSED

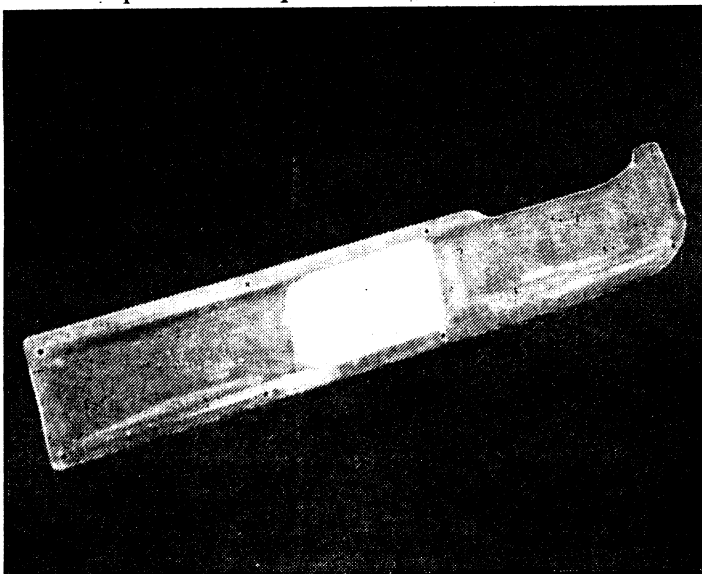


PHOTO NO 4 - DOOR LATCH COVER

CBROS INC.
EXPRESS BUILDER
SUPPORT CENTER
 HANGAR 153 SOUTH, ON THE
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Strings too short to save:

..... Dick Sutton of Bellevue, WA has experienced a failure of the nose gear on his FT *Express*. Landing at a strip on Blakeley Island (one of the San Juan Islands on Puget Sound) the junction where the spindle is welded into the strut failed, with the airplane finally coming to rest with somewhat less damage than might be expected. Fortunately, there was no injury to the occupant(s).

Close inspection failed to reveal the exact cause of the failure, but there was some evidence of rust on the inside of the strut near the failure.

Possible causes include:

- 1) A faulty weld.
- 2) Weldment not properly normalized.
- 3) Interior of strut not treated for rust prevention.
- 4) Inadequate engineering design.
- 5) Hard landing.

Subsequent independent engineering analysis indicates that the basic design apparently has only marginal strength for a 360 powered example and is probably under designed for a 540 example.

Recommended action(s):

- 1) Have nose gearstrut/spindle weldment magna fluxed.
- 2) Drill nose gear strut and treat interior with rust preventative.
- 3) Have nose gear strut weldments normalized to the proper level.
- 4) Make all landings gingerly.

Larry Olsen at Experimental Aircraft Technology is reportedly working on a retrofit fix which will allow the continued use of the factory supplied nose gear strut for both 360 and 540 models (see advertisement this page).

It is very interesting to note that, except for the expected damage to the prop and engine, there was

only cosmetic damage to the aircraft structure. In particular, there was **no apparent damage to the firewall or its attach system**. Try that on your Mooney, Cessna, Piper or Beechcraft.

..... On another, but related subject, we understand that Paul Fagerstrom, a builder from Mt. Laurel, New Jersey, has contracted with Larry Olsen to produce a firewall forward kit for the water cooled, LPE inverted V8 engine. If you have not chosen an engine for your *Express*, you might be interested in investigating the LPE option(s). Call Larry at (360)491-2599.

..... Just for fun... Hardy Huber and Larry Olsen have formed Di Blasi of North America to market a unique collapsible two wheeled motorcycle of Italian design. You will have to see it to believe it, Hardy will be showing and demonstrating this 65 pound, street legal little wonder, which will easily fit in the baggage area of your *Express*, at the various air shows this year.

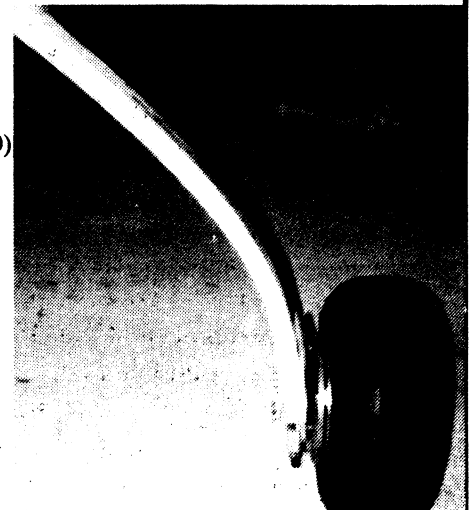
..... Ed Bernard is busy working on another *Express* project - this one will belong to his brother-in-law. Ed's second effort is an FT (cruciform) model which indicates that Ed is satisfied with the performance and flight characteristics of the FT. If it's good enough for Ed, it should be good enough for anyone.



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STRINGS ... cont'd from page 5

.... Tom and Judy Carrillo of Atwater, CA have finished a new garage (read hangar) at their home and are well along on their FT. Larry Olsen has been contracted to complete a "firewall forward" kit for them, which is due to be delivered soon.

.... Andre Goepfert has resurfaced in the world of *Express* builders. A recent fax from him indicates that his schedule has not permitted him to do much work on his *Express* lately, but that things are easing up, allowing him to return to work on his FT.

.... The Copeland Brothers operation is beginning to look like an *Express* production line. There are now four FT's being built in the big hangar. In addition to the CBROS project, Russ and Joyce Porterfield, Peter and Sally Becker and Jeff and Terri Miller are "go for throttle up". There also is a possibility that Shawn and Nadine Kelley, who have recently purchased the CBROS wing kit(s), may also take advantage of the efficiencies of building with more advanced builders - that is in terms of progress in the process, and choose to move in as well. If they do decide to move in, that would fill the last slot currently available. Five in one hangar - it's mind boggling.

.... Jeff Arnold of Christiansburg VA is making good progress on his FT. CBROS has been trying to help with delivery of parts from EDI, and were fortunate to have been able to alert him to the door trim problem (which he has now solved - see Builder alert on page 2).

.... Another "NOR CAL EXPRESS BUILDERS" meeting has come and gone. Approximately 20 builders showed up at the CBROS hangar on February 18th. It had been expected that David Ullrich and Jim Cooper would attend to discuss the current FT tail dilemma, but apparently bad weather in Redmond forced a cancellation of the flight. We understand that Jim Cooper, whom some of you builders with an *Express* history that

goes back to 1988 may remember, is considering employment with EDI as sales representative. If Jim does "arrive on the scene", you will find him to be honest and personable - a real asset to the EDI team.

.... Bruce Newlan of Napa, CA has received, and set up for construction, a pair of "fast build" wings from EDI, and is on his way to Redmond with a trailer, as this is written, to take delivery of the balance of the factory furnished parts. Bruce has decided to build a tail dragger with the Series 90 tail. He has received the documentation relating to the installation of the main gear through rib Q with the inboard attachment on rib I and the installation of the tail wheel assembly. Are there any other "tail dragger" builders out there?

**LOOK BEFORE YOU LEAP !!**

The following is a continuing series of hints, suggestions, cautions, clues, teasers, or otherwise pauses for coffee relating to potential actions or decisions which you may wish to consider to possibly save the builder some pain, embarrassment, expense or time in the construction of your *EXPRESS*. These items should not be considered "direction", but rather items to consider as you face the decisions those that have gone before you may have made. The items will not necessarily be made in order of construction, but are excerpted expressions of the accumulated wisdom and thinking that has occurred to the builders.

..... Consider adding washers between the rudder and elevator pulleys mounted aft of bulkhead 162. A small change of spacing between pulleys provides a rather nice increase in clearance between cables as they proceed aft from there. If the pulley blocks are already installed per the manual, this trick won't work unless you "uninstall" them.

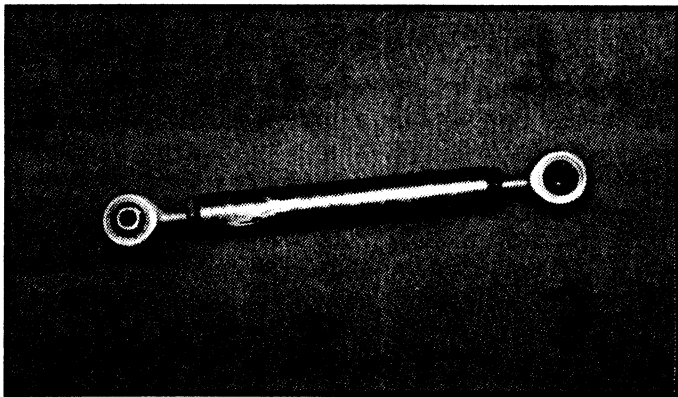
..... There is an opportunity to add a very utilitarian shelf aft of the 162 bulkhead. Consider the installation of a "level" shelf from sta 162 to sta 192. This process will require the installation of a partial bulkhead at sta 192 as shown in the picture on the opposite page. We were fortunate to have aluminum bonded (both sides) to a balsa core material to use as our shelf. It should make a great antenna ground plane. The front of the shelf rests on the lower side of the 162 bulkhead factory cut out. The aft end rests in a slot in the partial bulkhead. There are removable panels in Bulkhead

LOOK / LEAP *continued from page 6*

162 and 192 to facilitate installation and removal of the shelf.

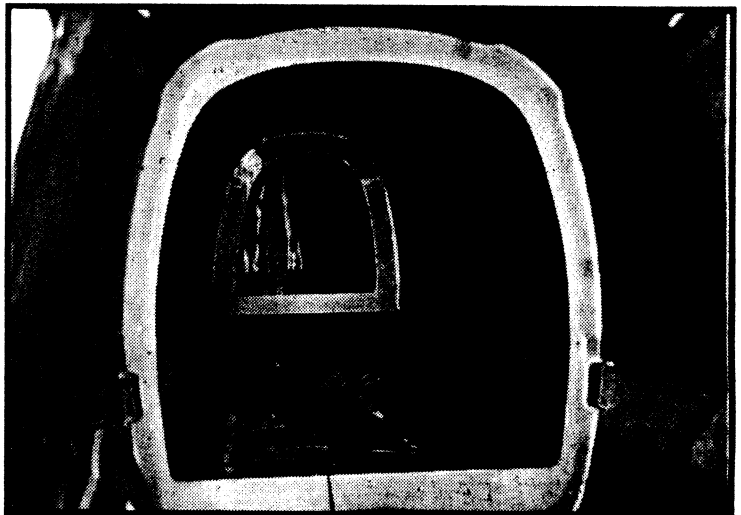
..... The pattern shown in the construction manual for the outboard flap torque tube bearing is nowhere near what it will end up looking like. In practice the outer end of the torque tube will come within about 0.25 inch of the aft shear web and the lower wing skin. Fear not, as the lower the tube, the greater the clearance the forks will have from the upper wing skin. You will find that a goodly portion of the aft shear web, toward the upper skin from the hole suggested by the manual, will need to be removed to clear the flap actuating link.

..... Speaking of links, both CBROS and Porterfield have manufactured a solid link that fits between the outboard flap torque tube fork and the flap actuating hardware to replace the aluminum tube/riveted affair furnished with the kit. It was really simple to drill and tap a 3.5 inch length of 0.50 inch drill rod into which the ball ends screw. Don't forget a 1/16th inch hole 0.30 inches from each end which is used to verify correct ball joint insertion. Here is a picture of the completed link.

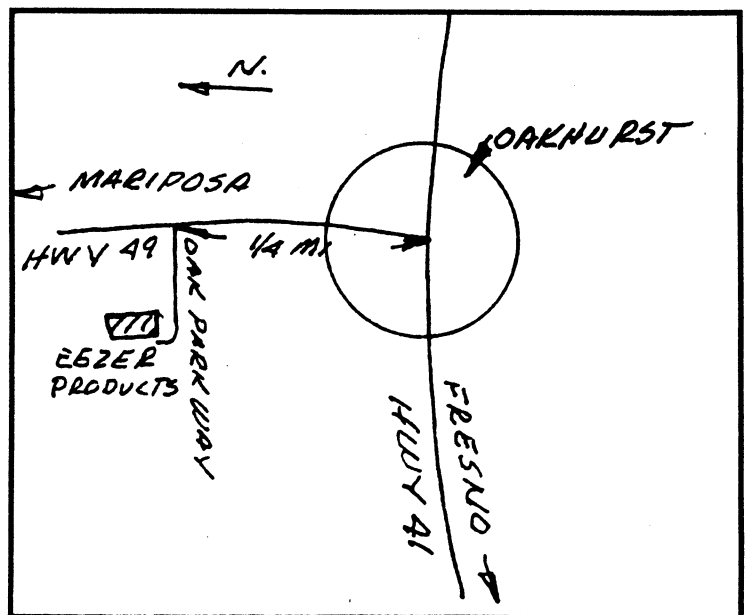


..... If you will need to install the main landing gear legs after the wings have been closed - take care. The factory documentation seems to indicate a dimension of 24.5 inches between the lower wing skin and the center of the hole for the bottom axle bolt. If you can achieve this dimension without cutting away the bottom of the hole in rib J to clear the inboard landing gear bracket - OK, but there is no need to make this

dimension absolutely. After considerable struggle we learned from the factory that the dimension can be anywhere from 24.5 to 26.5 inches. Remember when you are setting this dimension that the greater the number, the higher the airplane will sit off the ground. Also, though we did not do this, builders should try to set up a way of measuring the fore/aft location of the axle center line before setting the inboard bracket on rib J. There are no factory dimensions available that we know of - so you're on your own with this one.



PARTIAL BULKHEAD installed at sta 192. Note removable panel.





Subscription Information: Subscription to the *Express LINK* will be based on a 6 issue volume for the subscription price of \$36.00. Subscriptions entered during each volume will entitle the subscriber to all back issues of the current volume. Back issues from earlier volumes may be obtained upon request for \$3.00 each which includes shipping and handling. Make checks payable to: Bill Copeland

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, self stick window covering, 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: CBROS, Inc is prepared 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.

EXPRESS LINK
4863 PRIMROSE LANE
LIVERMORE, CA 94550

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