

## TECHNICAL UPDATE

# 6

Distributed as a free service to all Lazair owners

Number September '82

**PLEASE NOTE:** These Technical Updates are provided to all Lazair owners as a free service in the interest of safety. If you know of a Lazair™ owner who is not on our mailing list and is not receiving these updates, please let us know. If you change your address or sell your Lazair™, please use the forms supplied in Update 4 (December '81) to keep us informed.

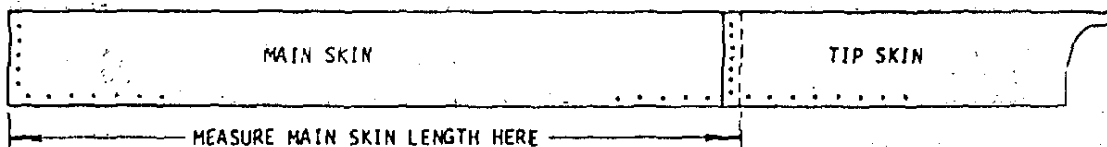
However, distributing this information is not sufficient. The recommendations in these updates must be acted upon before they can be of any benefit. For your own safety as well as the safety of those around you, please take the time to make the recommended changes to your aircraft. In the past six weeks we have had three engines sent to us for service. Not one of them had the propeller bolts installed as recommended in update 5, item 5.4. Please read these updates carefully and make the recommended inspections and/or changes which apply to your Lazair™.

### 6.1 D-CELL SPLICE

As you are probably aware, the D-Cell skin is comprised of two sections - a main skin and a tip skin. During final inspection of a batch of D-Cells recently, we discovered one which did not have sufficient overlap at the junction of the main skin and the tip skin to allow the proper edge distance for the rivets. Although it is unlikely that any D-Cells were shipped with this defect, please check yours as described below. Since the outboard end of the main skin is covered by the tip skin, if the problem does exist, it will not be obvious and must be checked carefully.

To check the edge distance for the rivets, it is necessary to know the position of the outboard edge of the main skin. To locate this edge, look at the trailing edge of the bottom of the D-Cell. By looking inside, you should be able to see the outboard edge of the main skin. Put a mark on the outside of the tip skin at this point and measure the distance from this mark to the inboard edge of the main skin (so you know the exact length of the main skin). Then transfer this measurement to the leading edge of the D-Cell. You can now draw a line on the tip skin showing the exact location of the edge of the main skin. To achieve the correct edge distance, the rivets should be located so that the centre of the rivet hole is at least 1/4 of an inch from the edge of the skin. If necessary, install additional rivets (with the required edge distance) between the existing rivets.

If the overlap on your D-Cell is insufficient to permit the required edge distance, please contact your dealer or the factory and we will make up a special splicing kit for your D-Cell(s) and ship it to you at no charge.



### 6.2 KEEP YOUR ASI COOL

Although the Hall Brothers airspeed indicators are surviving quite well on the aircraft, we have had two reports of ASI's becoming so hot that they actually bent slightly and were no longer useable after being left in the rear window of a car.

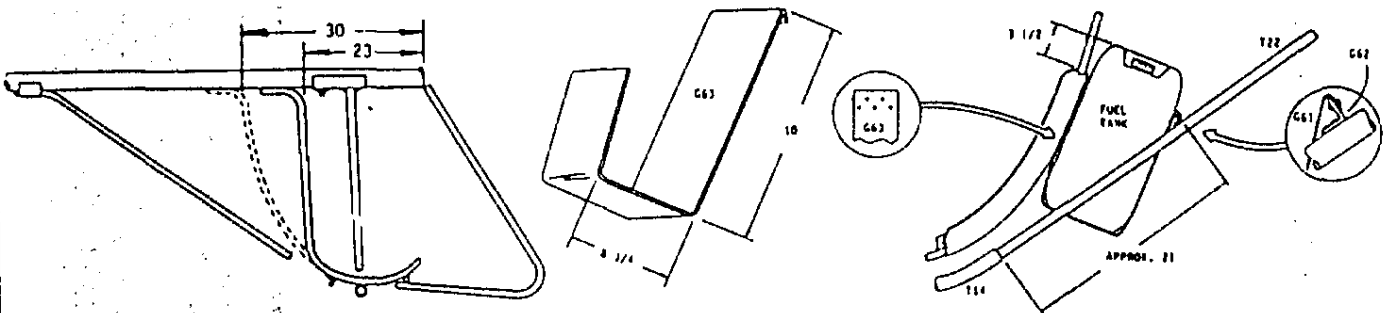
### 6.3 CARBURETOR NUTS

In Update 5.8 we reported on a potential problem of carburetors working loose, and suggested that the nuts be checked and retightened periodically. Since then, we have determined that the self-locking nuts work properly, but the studs work loose in the crankcase. To prevent this from happening, we are now lockwiring the nuts and studs after installation of the carburetors at the factory, and it is recommended that this be done on all Rotax engines. To install the lockwire, make sure the nuts are tight, then drill a small hole through each nut (and the end of the stud). Feed a single piece of lockwire through both nuts and twist the ends together.

### 6.4 LARGER FUEL TANK INSTALLATION

Although as stated earlier, we do not supply a conversion kit for the new 20 Litre (5 U.S. Gal.) fuel tank, many owners have installed the larger tank and now that the new FAA rule specifically allows a 5 gallon tank, many more owners may wish to make the conversion. As stated previously, these changes are not recommended unless you have had experience and have access to the equipment required for bending thin wall aluminum alloy tubing. However, for anyone who is qualified to do the job, the following guidelines are provided:

1. To achieve the proper centre-of-gravity, it is necessary to move both the fuel tank and the pilot forward. This involves rebending and repositioning the seat tube (T44) as shown (or replacing the T44 with the new T60 seat tube).
2. Make a saddle for the new tank so that the weight is carried by the T22's at the rear and by the seat tube at the front. Do not attempt to support the weight of 5 gallons of gasoline (about 140 pounds at 4 g's) entirely by the T22's.



### 6.5 RIVETS IN PJ PLUGS

Although calculations and testing have shown that one rivet would be sufficient to hold the PJ plugs into the control pushrods, we use two rivets in each to provide a safety factor in the order of ten-to-one for normal control surface loading. However, it may be possible in the event of a mishap (such as an aircraft being blown over by severe winds while tied down) to apply stresses beyond the strength of the rivets and shear them off. If your aircraft is ever involved in any type of incident which could put abnormal loading on the control pushrods, they should be inspected very carefully before the next flight. Pushrods should also be inspected very carefully if you buy a used aircraft, especially if it has been damaged. If there is any indication that a pushrod could have been overstressed, install an extra rivet in the PJ's for security.

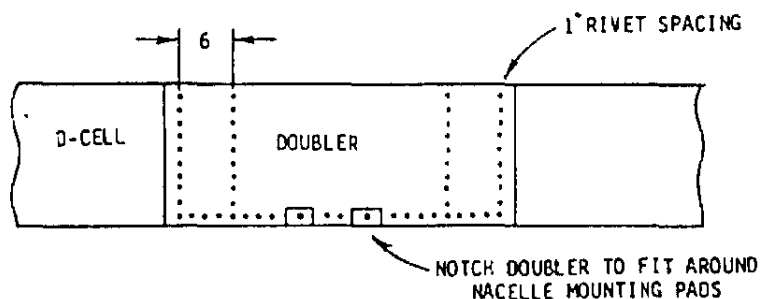
## 6.6 PROTECT YOUR TAPE

All new Lazairs and many older ones are now being covered in Tedlar. While the operating life of the Tedlar is expected to be many times that of Mylar, the life of the adhesives used on the tapes has not been precisely determined. To obtain the maximum life from the tapes, it is recommended that all tape be protected from ultraviolet exposure. This can be done in several ways. If you intend to paint your Tedlar, then the paint will afford some ultraviolet protection but the degree of that protection will depend on the particular type of pigment used in the paint. Aluminum paint works best and it is therefore recommended that the tapes be painted over with aluminum paint (regardless of whether or not the balance of the Tedlar is painted). As an alternative, the tapes holding the Tedlar in place may be covered by a metalized tape (such as type 850-PAU, available from your local 3M distributor). In addition to providing ultraviolet protection, this tape creates a very neat, clean appearance, especially when used over the foam tape on the ribs.

## 6.7 ROTAX ENGINES ON .016 INCH D-CELLS

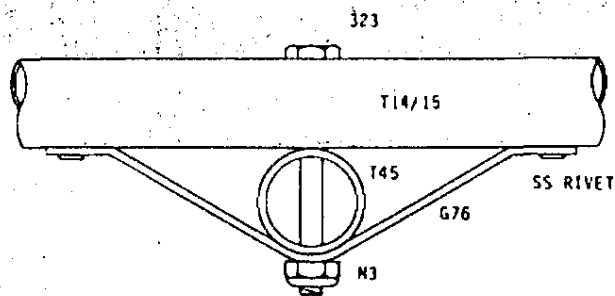
In Update 5, item 5.7 we stated that the use of Rotax engines on Lazair's with .016 inch leading edge skins was not recommended. This statement was not based on any particular experience, but rather on a lack of experience. At that time, we had one demonstrator flying with this combination, but we did not have sufficient time on it to evaluate the results. Since then, our demonstrator has continued to perform well, however, one dealer who installed Rotax engines on .016 inch D-Cells reported that one of his D-Cells acquired a slight buckle just inboard of the Nacelle when he shut down the engines and one of them backfired. Based on this, we are obviously not recommending the installation of the larger engines on the lighter D-Cells.

However, for those who have already made the conversion and those who probably will (in spite of our recommendations), we suggest that, as a minimum, you rivet on a two foot wide doubler of .020 2024-T3 aluminum alloy over the leading edge of the D-Cells under the Nacelles.



## 6.8 AXLE GUSSETS FOR RUDDER PEDALS

In the assembly manual for the rudder pedal kit, there is a reminder that when one rudder pedal is pushed down, the other one must come up, and therefore you should not attempt to push on both pedals simultaneously. However, for whatever reason, people do occasionally push down on both pedals. While reasonable pedal pressure does not cause a problem, excessive force will bend the two 323 bolts which hold the nosewheel axle to the side tubes. To alleviate this problem, we are now including with the rudder pedal kits two small gussets (G76) to help support the axle. If you have an earlier rudder pedal kit and wish to add these gussets, you can make them yourself from two strips of aluminum alloy .040 to .080 inches thick, 1/2 inch wide and 6 inches long. Bend and install the gussets as shown.

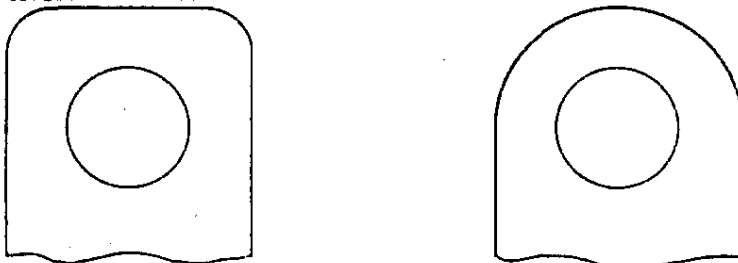


#### 6.9 MUFFLER OUTLET ANGLE

Although the velocity stacks reduce the amount of oil buildup on the wings considerably, you may still get a bit of residue on the wings from the exhaust if you have the new Nacelle mounted mufflers. This can be greatly reduced by bending the exhaust exit tube in the muffler upward about 15 degrees. To do this, simply fit a 3/4 inch diameter rod or pipe into the exhaust exit tube and pull it upward to the desired angle.

#### 6.10 FRONT FITTING RADIUS

A few kits were shipped recently with front fittings shaped as shown at left below. If you assemble the control system with the fitting as shown, you will probably find that it interferes with the pushrod when you move the control stick to deflect the ailerons.



To work properly the fitting should be cut, filed or sanded as shown at right above.

#### 6.11 PAINT YOUR MYLAR?

If you recently covered your Lazair™ in Mylar and you don't relish the thought of tearing it all off to recover in Tedlar, you may be interested in the following: in spite of the fact that paint will not adhere well to Mylar, a couple of owners have had relatively good success with it. The testing which we did a year ago indicated that initial adhesion was extremely poor after a 48 hour cure. The same test samples were re-tested about a week ago and while the adhesion was not as good as we might like, it was acceptable.

If you wish to experiment with paint on Mylar, we suggest that you let the Mylar weather for a couple of weeks, then degrease it with Lacquer thinner and paint it with a pigmented urethane (this appears to be the best of any of the paints we tested). Although the paint should offer some protection against ultraviolet radiation, for maximum Mylar life it is recommended that you still follow the guidelines in update 3 item 3.11.

#### 6.12 RECOIL STARTERS

It's now almost a year since we started flying with Rotax 185 cc engines. In general, the reliability of this engine has been very good, but the operating life of the recoil starters has been less than we would like. The most common problem we have seen is premature wearing of the starting pulley (this is the cast

aluminum device which mates with the pawls - not the sheave on which the rope is wound). The shape and location of the wear pattern indicates that the pawls are vibrating in synch with the engine, but vibration testing with an amplitude of 10g's over a frequency range of 10 to 100 Hz. failed to detect any resonances. Changing the rate of the pawl springs and adding rubber damping seems to reduce the problem a bit, but not to an acceptable level. Evaluating a potential solution to this type of a problem is very time consuming, because although we have had a few starters show signs of wear in the first 20 hours, most will last 80 to 100 hours before exhibiting any indication of a problem, and it can take this much running time to determine if any improvement has been made.

After several weeks of changing, testing, and evaluating we have reached the conclusion that the only way to get rid of the problems in the Rotax starter is to get rid of the Rotax starter. A survey of manufacturers and small engine mechanics indicated that the most reliable recoil starter in common use is a relatively cheap and simple unit made by Tecumseh. We have several of these starters undergoing testing at present, and so far the results have been excellent. If this starter proves to have the reliability we expect, it will soon become standard on all of our Rotax engines. In addition to improved reliability, this starter also provides a couple of other advantages: it has a larger sheave which makes it much easier to pull when starting the engine, and the overall size is smaller than the Rotax. This allows us to use a simpler smaller engine mount which will accept a close fitting molded engine cowl to reduce drag and improve the appearance. The proposed mounting system will use the same rubber mounts and mounting pattern as we have used since late January 1982 (four mounts on top and two on the bottom) so retrofitting the new starters should be relatively easy.

For those who wish to repair the Rotax starters when necessary, we will be stocking parts. For those who would like to convert to the new starter, we will make a retrofit kit available as soon as the test program is complete and the necessary parts are made. All dealers and distributors will be notified as soon as these retrofit kits are available. As a service to customers, these kits will be sold at our cost, and the usual manufacturer and dealer mark-up will not be applied (when the kits are purchased to replace Rotax starters).

#### 6.13 ENGINE MOUNT ANGLES

We have received two reports of broken G42 engine mount angles (these are the large brackets which are bolted directly to the crankcase). Although this represents less than 0.2% of the mounting brackets in use and therefore does not indicate a trend, a careful inspection of these brackets should be included in your normal pre-flight walkround. Since we will probably be changing to a different type of mount to accommodate the new recoil starter, we expect to have a few surplus mount angles which we could supply at no charge to anyone who returns a broken one.

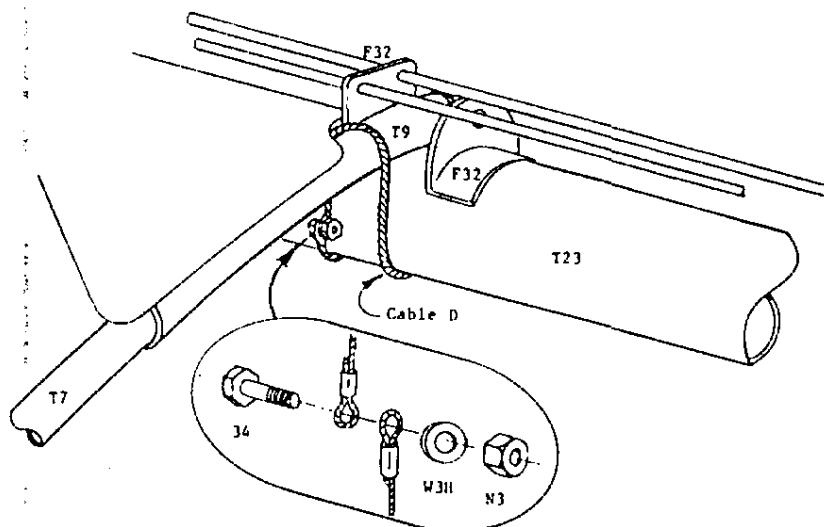
#### 6.14 WARRANTY CLAIM FORMS

Enclosed with this technical update is a copy of the standard Ultraflight warranty claim form. Even though the warranty period on your kit may have expired, we would appreciate it if you would report any component failures on this form. This will assist us in assessing any potential problem areas so that we may continue to keep all owners informed.

#### 6.15 STABILIZER ATTACHMENT

Approximately a year ago we investigated a potential problem of broken F32 pushrod guides causing the leading edge of the stabilizer to become detached from the boom. At that time, it was determined that it would be necessary to break two F32 fittings to cause a problem, and even if this did happen, the stabilizer would be held in position by the 126 pushrods to permit a safe emergency landing. This conclusion was substantiated by structural testing on the ground, flight testing, and field reports.

However, we have since received one report of F32 breakage, believed to be caused by severe lateral loading on the tail caused by side-slipping (this was not possible before the rudder pedals were incorporated). Fortunately, this did not cause a serious problem and the aircraft made a normal landing, but it does renew our concern. This situation is not relevant to the newer kits which incorporate the folding tail because the stabilizer is secured to the boom by the hinge brackets. However, if you have one of the earlier Lazair™s and you intend to execute some of the higher stress maneuvers possible with the rudder pedal conversion, we suggest the use of a small safety cable wrapped around the boom and T9 as an added precaution. If you cannot obtain the cable locally, we can supply one at a nominal cost of \$5.00 (including hardware). Please order "Cable D Kit".



#### 6.16 PUSHROD ROTATION

If you have rudder pedals on your Lazair™, you may have noticed that if you push the stick as far as it will go in one direction, and push the rudder pedals as far as possible in the opposite direction, then reverse both to get full cross control the other way, the BE rod end on one end of the T18 pushrod will rotate on its threads about twenty degrees. Since this will happen only infrequently in service, the amount of thread-wear in the PJ will not be appreciable. However, you should be aware of this situation and ensure that the BE which rotates is threaded into the PJ at least half an inch. Check the quality of the threads occasionally and replace the PJ if there is any indication that the threads are worn.