Section 15
Chain
Oil Bath

Procedures covered in this section:
Remove chain and lift main rotor shaft; install rubber stripping on lower oil bath pan; mount lower oil bath pan to airframe; install front and rear oil seals; re-install and tension chain; fabricate and install master link insertion plate; cut out and install inspection window; install front and rear oil bath covers; fabricate and install rain guard.

Cards used in this section:
HARDWARE CARD E33 CARD 1F

Prints used in this section:
E33-2000

Templates used in this section:
E33-1 E33-2

Tools required for this section:

Air or electric drill	Hacksaw	Pliers	Screwdrivers
Drift punch	Hammer	Pop rivet gun	Straight edge
Files	Metal cutting snips	Sandpaper	

Drill bits of the following sizes: 1/8", 3/16", 1/4", #19, #40
Ratchet with sockets of the following sizes: 3/8", 1/2"
Wrenches of the following sizes: 3/8", 1/2"

Notes:
1. OIL BATH: It will be necessary to remove the chain and lift the main shaft and sprocket to install the oil bath.

2. OIL SEALS: If the oil bath leaks, it is probably due to one of the following:
   A. Not enough sealant around the front and rear covers.
   B. The seals were installed before the oil bath was bolted solid to the airframe; or the oil bath or secondary assembly were moved after the seals were installed.
   C. Moving parts are rubbing against the fiberglass pan and have worn through.

3. MASTER LINK COTTER PINS: See Section 11, Photo #40 for cotter pin installation.

Photo #1

Use print E33-2000 and templates E33-1 and E33-2 when constructing the oil bath assembly. Parts as received from RotorWay International.

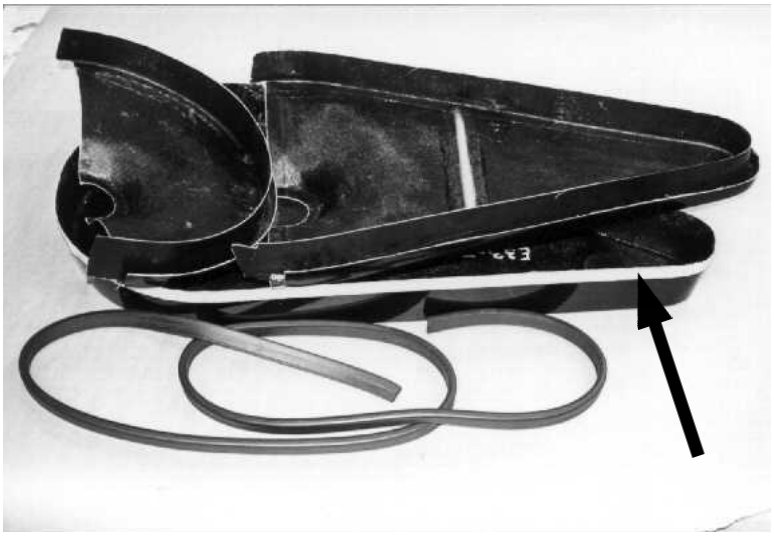


Photo #2

The parts seen here are the lower oil bath pan, the front and rear oil bath covers and the rubber stripping. Using medium grit sandpaper, sand the area (indicated by arrow) the same width as the rubber stripping all around the oil bath, both inside and out. Wipe the area clean with acetone or an equivalent solvent before gluing the rubber in place to achieve proper bonding.

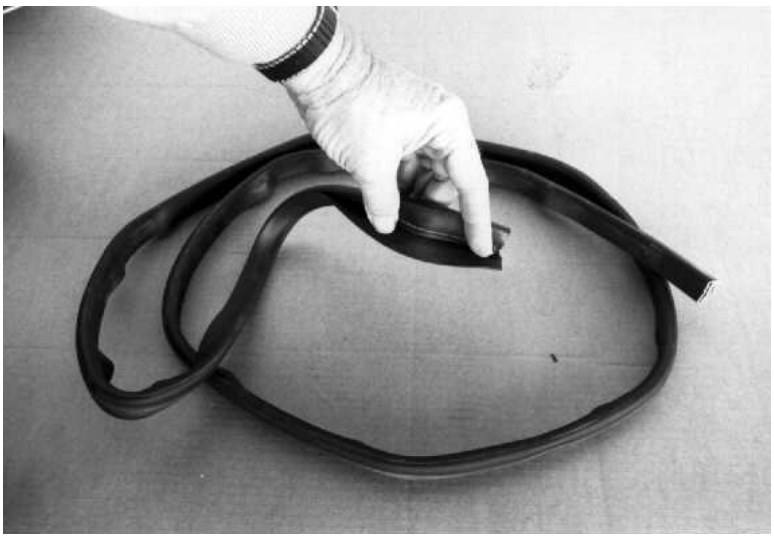


Photo #3

Open up the rubber stripping and wipe it clean with acetone or an equivalent solvent. All of the white powder must be removed completely. Use sandpaper to scuff up the rubber to help it bond to the lower oil bath pan. The thin flat part of the rubber must be positioned inside.

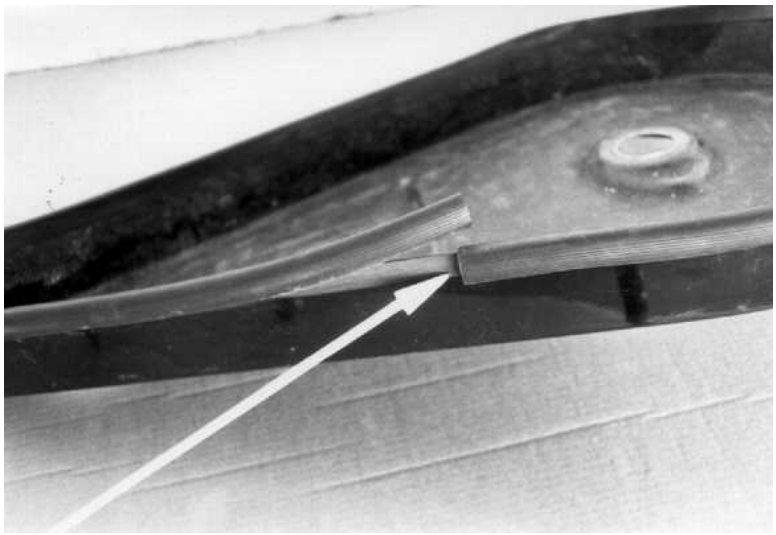


Photo #4

Use sandpaper or a file to make the top edge of the lower oil bath pan flat and level if necessary. Fit the rubber stripping and cut it to length.
Note: Cut a few notches on the inside of the rubber at the small end of the oil bath to help it fit tightly around the curve. Apply a layer of 3M two-part epoxy adhesive to both pieces. Hold the rubber in place with tape or clamps as necessary to keep the seal tight while the epoxy is drying. A good idea is to place the oil bath upside down on a flat surface so that the epoxy remains inside the rubber stripping.

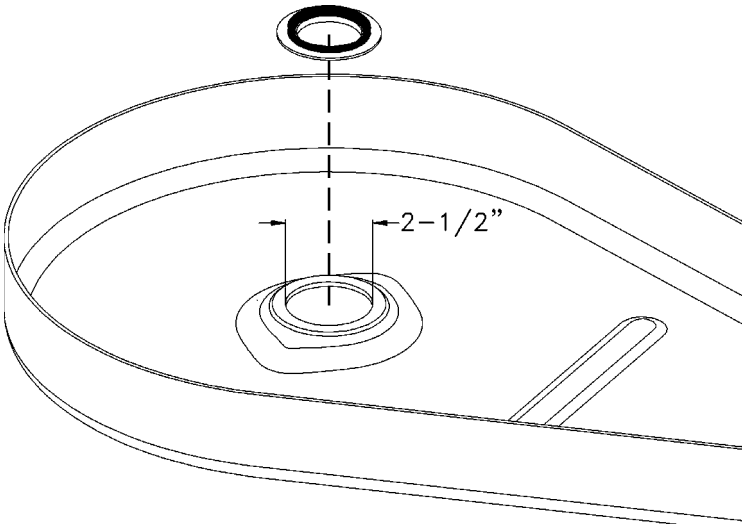


Photo #5

Locate the hole in the oil bath for the main rotor shaft and front seal assembly. Drill and enlarge the hole to 2-1/2 inches in diameter. The seal will be installed on the inside of the oil bath with the rubber part of the seal facing up, and the aluminum part glued to the fiberglass. Use a sanding block to flatten the mating fiberglass surface.

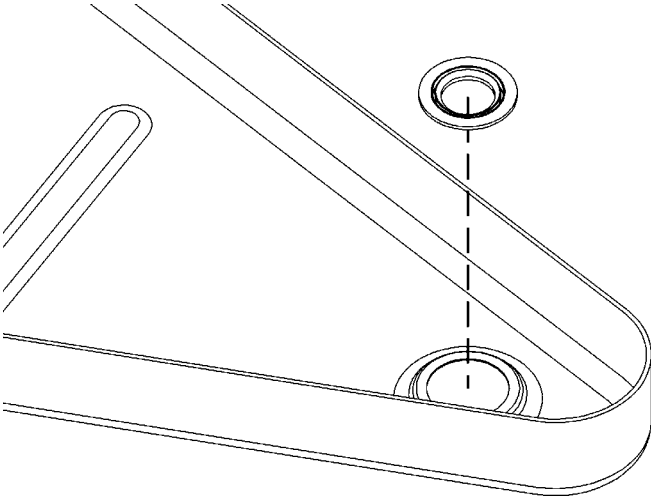
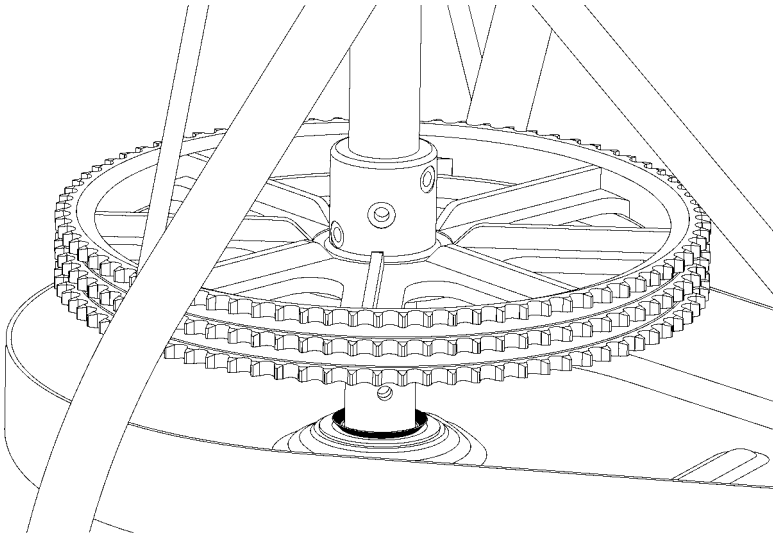


Photo #6

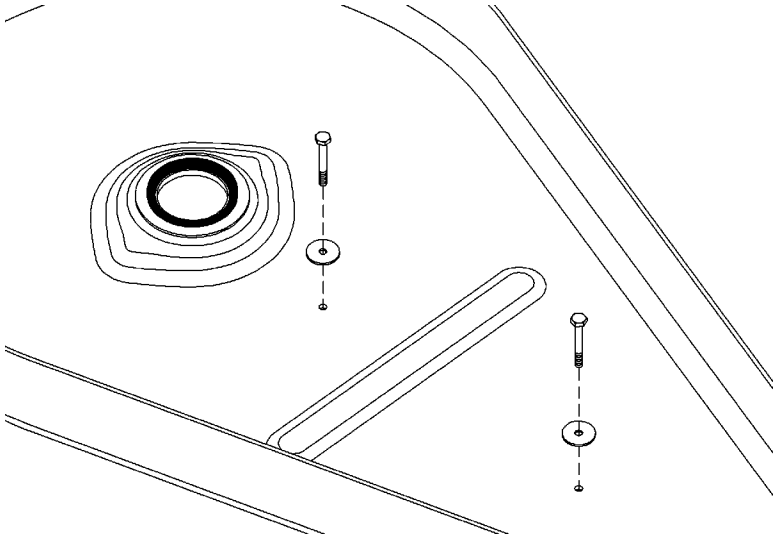
Locate, drill and enlarge the hole in the oil bath for the rear oil seal. This seal assembly will be glued to the inside of the oil bath, with the numbers on the seal facing down. Enlarge the hole so that only the aluminum mounting ring touches the fiberglass. Then use a sanding block to flatten the mating fiberglass surface.

Photo #7



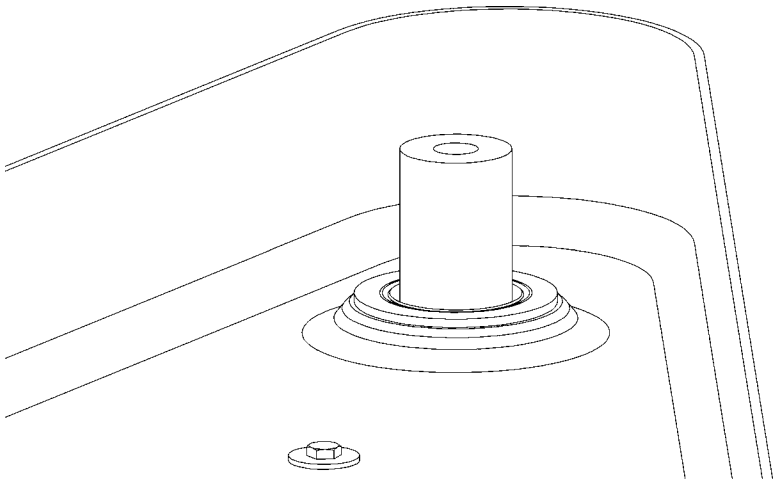
With the rotor system (including large sprocket) raised, position the lower oil bath pan onto the airframe so it is centered over the lower main shaft bearing and the secondary shaft.
Place the front seal into the previously made hole. Keeping the sprocket raised, lower only the main shaft through the seal. Ensure that the seal assembly is centered around the shaft. This can be accomplished by wrapping the main shaft with tape. Lower the sprocket and sprocket hub to ensure that the 3/8" bolts that attach the hub to the shaft can be installed, and that the seal will contact the lower surface of the sprocket hub. If the hub will not drop down enough to install the 3/8" bolts, additional sanding of the fiberglass below the seal assembly will be necessary.

Photo #8



Drill 3/16" holes at the two points shown to secure the lower oil bath pan to the fore/aft square drive mount tube on the airframe. Refer to print E33-2000 for approximate hole locations.
Note: Locate the forward bolt to avoid interference with the upper engine mount clevis.
Use a large fender washer between each of the 3/16" bolts and the fiberglass surface. On final assembly, apply a generous amount of silicone sealant to prevent oil leakage through these holes.

Photo #9



Make sure that the rear oil seal fits properly and is not forced off center of the shaft. It may be necessary to enlarge or elongate the hole in the fiberglass to ensure proper fit.
Note: The position of the oil bath and/or the secondary shaft must not change after the oil seals are glued in place, or there may be leakage at the rear oil seal. Make sure that all of the following have been completed before permanently installing the seals:

1. The airframe has been painted.
2. The secondary assembly is installed on the airframe, chain tension has been set, and mounting bolts are tightened.
3. The lower oil bath pan is installed for the final time.

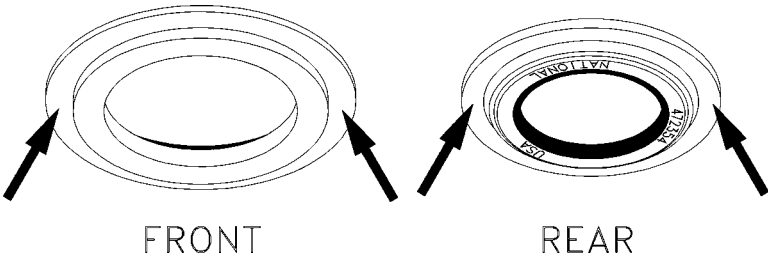


Photo #10

Using sandpaper, roughen the bonding surfaces of the front and rear seal assemblies. This will help ensure a good bond. Only the aluminum rings will be glued to the fiberglass. The front seal will be installed with the rubber part facing up. The rear seal will be installed with the numbers facing down. Clean the mating surfaces of the oil bath (which have been sanded flat) with acetone. Apply a light coat of oil to the rubber seals, being careful not to contaminate the bonding surfaces.

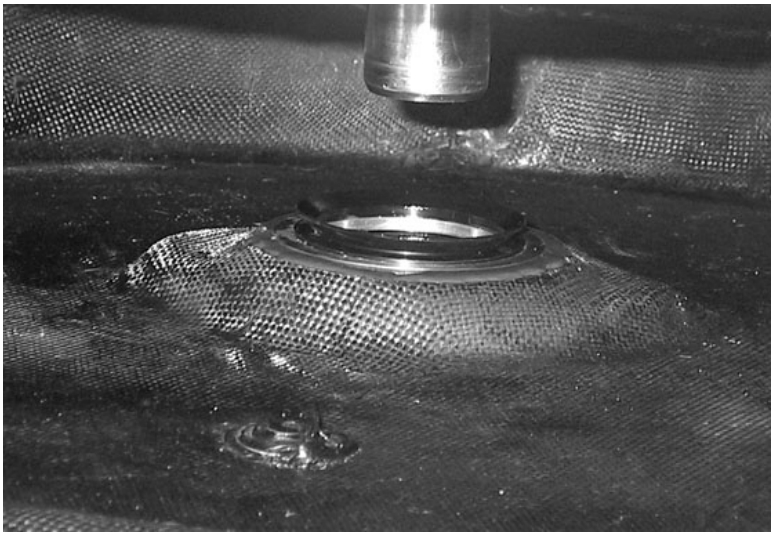


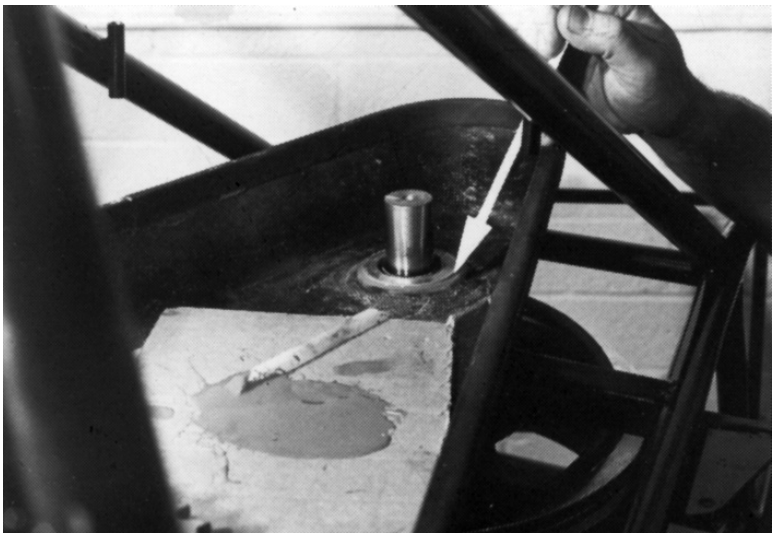
Photo #11

When gluing the front seal, apply a layer of 3M two-part epoxy adhesive (blade glue) to the aluminum surface of the seal assembly and to the mating surface of the oil bath. Lower the shaft through the seal to maintain position, then lower the sprocket and sprocket hub, allowing the full weight of them to rest on the seal while the glue cures.

Photo #12

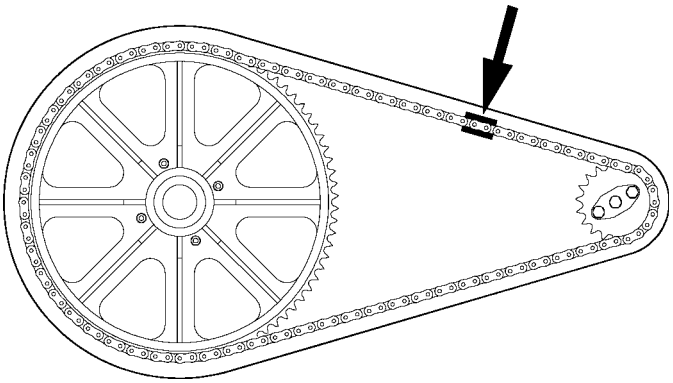
For the rear seal, make sure that there are no sharp edges on the secondary shaft so that the seal is not damaged when placing it on the shaft. (If necessary, sand a light radius on any sharp edges of the shaft using 400 grit sandpaper. Then clean the shaft with acetone.) Apply a layer of 3M two-part epoxy adhesive to the surfaces to be bonded. Carefully install the seal over the shaft and press it in position, allowing it to center itself. Do not apply any downward pressure to the secondary seal after initial installation.

Photo #13



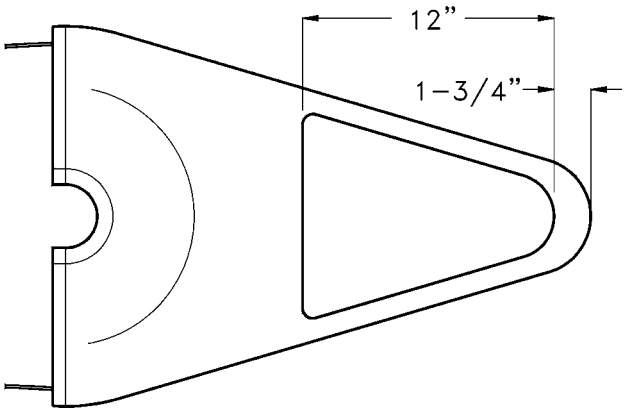
Wipe off the excess epoxy, leaving a little around the edges to ensure a complete seal. Once the seals have been bonded, do not allow either shaft to rotate until the epoxy has cured (12 hours).
After the epoxy has cured, raise the sprocket hub off of the front seal and remove the tape used to center the shaft. Ensure that the surface of the sprocket hub is smooth where the seal makes contact. Apply a coating of engine oil to the seal and the mating surface of the sprocket hub. Also apply an additional amount of oil to the rear seal before rotating the secondary shaft. If these procedures are followed carefully, the seals should not leak.

Photo #14



Re-install the main drive chain and the two sprockets. Cut out the opening for the master link insertion plate in the lower oil bath pan, shown here by the arrow. The fore/aft position must be within the window area shown in the next photo. Use template E33-1 to cut out the insertion plate, and install per print. Seal the plate with silicone.

Photo #15



Cut out the inspection window to fit on the rear oil bath cover as shown. The window should not extend forward past the wooden brace on the underside of the cover. The sides of the window should be far enough away from the edge to prevent the nut plates from contacting the rubber stripping around the edge of the pan.

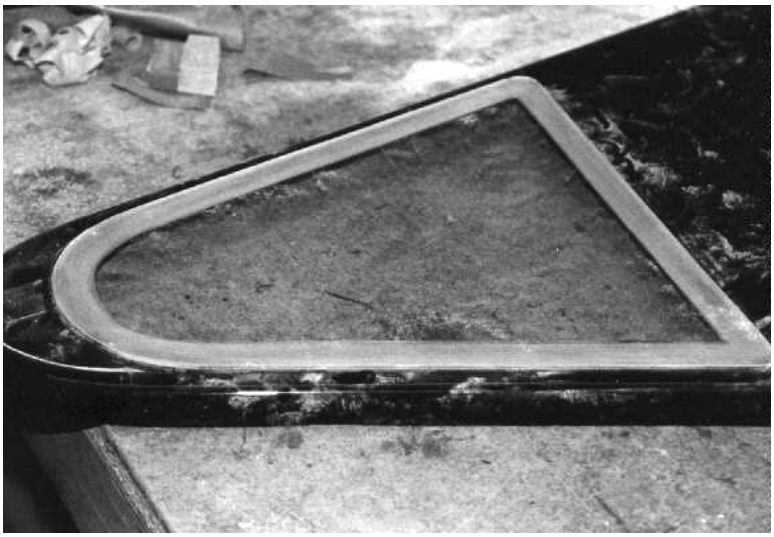


Photo #16

Cut out an opening in the rear cover 3/4" smaller on all sides than the inspection window. Do not cut through the wooden brace on the underside of the cover. Using sandpaper, sand an area 3/4" wide all around the opening, and also sand the matching area of the window. This will roughen the surface for a better seal.

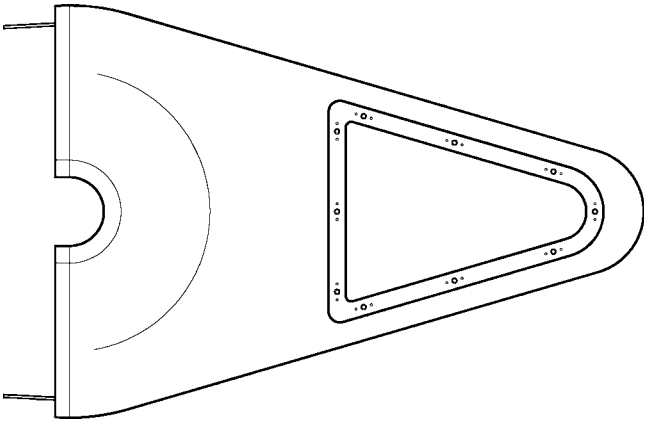


Photo #17

Lay out and drill the screw holes in the window. Place the window on the rear cover and drill the holes through the cover. Install the nut plates on the rear cover, then install the window, using silicone on the sanded area.

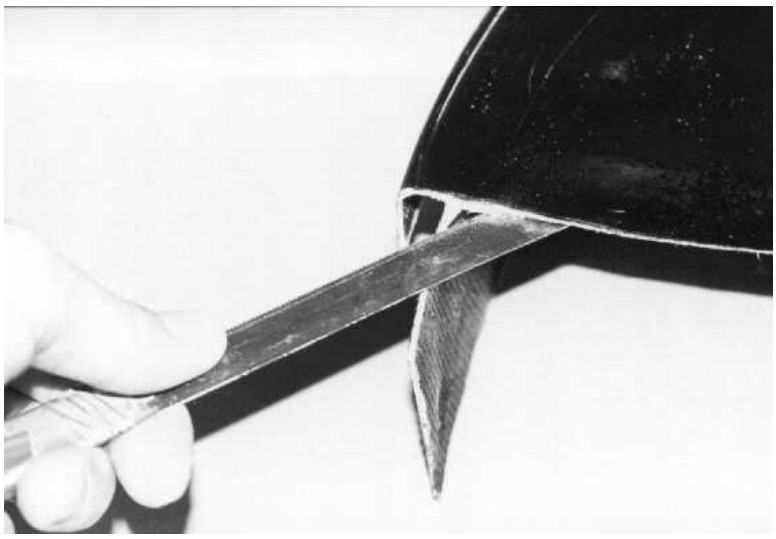


Photo #18

Use a hacksaw blade to undercut the front cover so that the corresponding part of the back cover will fit under. Cut no more than necessary.

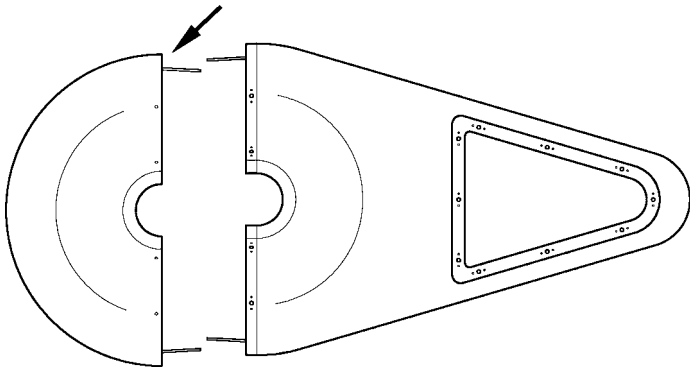
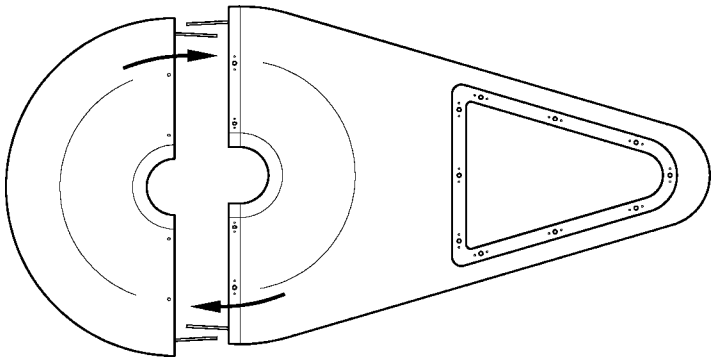


Photo #19

Trim the overlapping part of the front cover as necessary to achieve a good fit.

Photo #20

When installing the top covers, position the flaps so that they overlap in the direction of rotation of the main sprocket (clockwise when viewed from top). Push the front cover towards the rear for best contact with the seal. Locate the nut plates according to the dimensions on the print, making sure that they do not contact the chain. Install the 5/32" rivets (used as spring grommets) according to the print. Push out the stem of each rivet so that the ends of the springs will fit through, and flatten the rivets so that they do no extend into the rubber strip.



Before installing the top covers, check the following:

1. Chain tension.
2. Correctly installed master link, master link cotter pins (see Section 11, Photo #40) and master link insertion plate.
3. Safety wire on secondary retainer plate bolts and main sprocket hub to main rotor shaft bolts.
4. Safety wire on main sprocket to sprocket hub bolts.

Before starting the engine, make sure oil has been added to the oil bath. The correct amount is one quart of engine oil and one can of STP oil treatment. Mix the two oils together before pouring them into the chain oil bath.

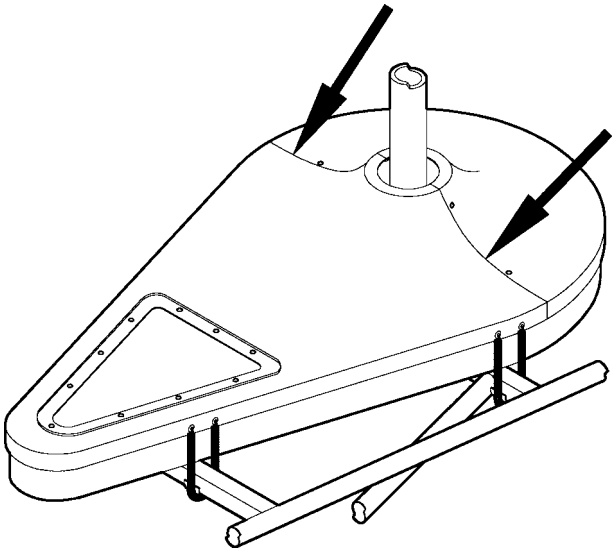


Photo #21

Apply a bead of silicone to the rubber stripping where it will contact the front cover only. Install the covers, screws and springs. (Hold the front cover in place with tape or clamps until the silicone is set.) Apply a small amount of silicone over the seam where the two halves of the cover join (arrows) to prevent splash leakage.
Note: Do not use silicone to seal the rear cover. This will allow the rear cover to be easily removed for maintenance, while the front cover stays in place.

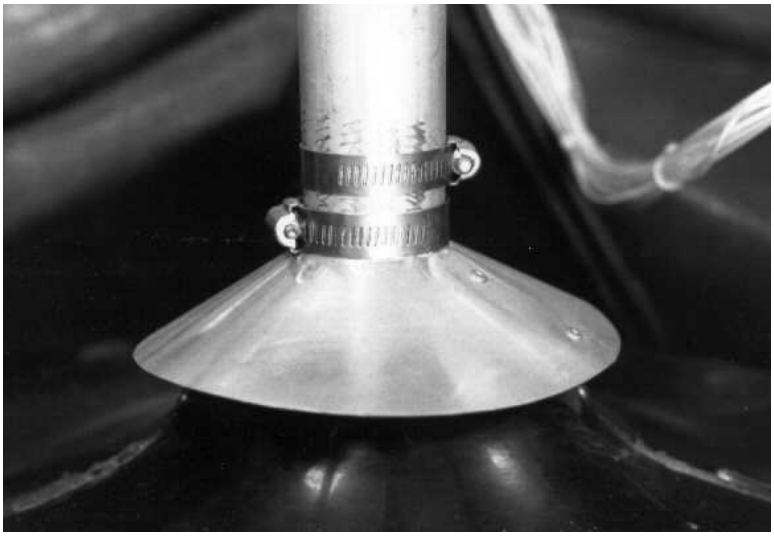


Photo #22

Using template E33-2, fabricate the rain guard and install it with the hose clamp provided.
Note: Be sure that the rain guard does not rub on the top of the oil bath when the shaft is turning.

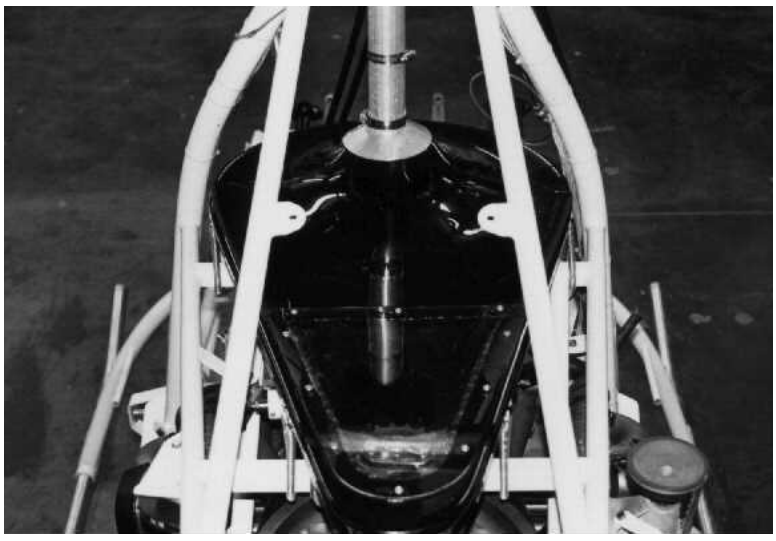


Photo #23

Finished oil bath in place on the airframe.