Or screwed in place.

Chapter 6- Wings, Ailerons, Struts

The wing spars are 2 1/4" front Diameter, and 1 3/4" Rear diameter, and the ribs are built with the Rib angles shown on the rib drawing. The ribs are attached to the spars with Rib Attach Cups, or 'Wigets', as many people know them as. This wing building method goes quickly, and learning to master the angle fluting comes easily. I have seen pre-teens pick up the skill quickly. The Hart Aero wing building system has you build the wing structure, or 'ladder', first, and as the compression and diagonal bracing is all done with ridged square tubing and channels, there is no 'tuning' involved as there would be with a conventional built up wing- Each tube is designed to take compression, as well as tension loads, so once it is assembled, it can be lifted off the jig table. See the sketch in the manual for the spar hold down fixtures. The tubular spars set down into these cradles, which are screwed to the Fixture table. This way the wing can be drawn out on the table in full scale, and these cradles hold the spars , so fitting of the various channels and plate fittings can proceed. The wing spars need to have their centerlines marked horizontally, and then hole drilling dimensions are obtained from the wing root. The holes are drilled, then the various fittings are bolted in place, and the square tubes are cut, filed, and drilled, at which time the assembly is bolted together.

The wing ribs are formed using the full sized template shown on the drawings, with the drawing glued to a plywood base. Cut short pieces of scrap spar material, and use epoxy to glue them in place on the drawing, to simulate the actual spar locations. Using more Jig blocks., position them around the edge of the drawn airfoil as a backup for the rib to be built. The trimming and fluting of the rib components now begins. Drill and cleco the vertical members and the Wigets to the upper and lower wing rib angles, and after everything is in place, remove the clecos, de-burr all holes, and re-cleco the rib together. At this time do not rivet the entire rib together, because the rib needs to be put onto the wing ladder, not slid onto the spars as other aircraft wings are built. Mark the locations of the ribs on the spars,And drill thru the Wiget flanges into the spars using a 12" long , 1/8" drill bit, using the location angles shown on the plans.Repeat these steps for all of the ribs. We make up large quantities of the rib angles and vertical members ahead of time, and have them marked in bins, so when we want to build up a rib, all the undrilled parts are cut , filed, and fluted in advance.

Enclosed in this manual is a sketch for simple, hand made fluting pliers. You can also purchase ready-made fluting pliers from Aircraft Tool supply houses.

The root ends of the upper and lower wings have hardwood dowels glued in place for crush reistance. The top wing dowels also are integral with aligning and joining the left and right panels together permanently. The strip aluminum reinforcements on the bottom wing roots serve two purposes- To keep fabric shrinkage from distorting the root rib, and to provide a hard point to screw on the wing root fairings.

Long, formed aluminum parts such as the aileron coves and spar can be farmed out to your local sheet metal shop With their equipment they can do an excellent job in short order. The false wing ribs are basically the nose of a full rib, rolled down on the back edge, to provide fabric roll-away. A standard Wiget, cut in half, attaches the false rib to the front spar. Note that the aileron control rods, bushing, and horns must all be fabricated and installed for trial fitting with

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