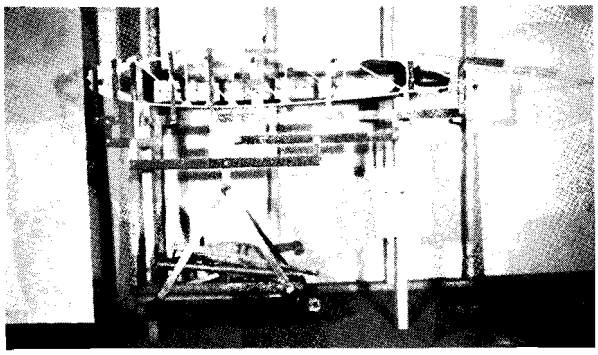


Rib under 315 lb. load in High Angle of Attack Condition.

for cumbersome gap-covers, the root bolts being installed through hand holes at the front and rear spars and these holes being provided with small, easily assembled sliding covers.

The fuselage is of conventional chrome-molybdenum steel tubing construction with a triangular cross section aft of the rear center section strut fittings. The vertical fin is a permanent part of the fuselage and the rudder is not detached when dis-assembling for trailering. The horizontal tail is mounted high off the ground at the top of the fin, thus reducing the possibility of ground damage and also keeping the elevators in relatively undisturbed air. There is more than adequate rudder area below the flippers to assist in recovery from spins. The elevator control system is provided with an adjustable spring bungee device to enable the pilot to trim for longitudinal balance under varying conditions of loading.

The wings are of entirely conventional construction, using solid spruce spars and double wire drag bracing. Drag struts are of spruce and were all constructed easily and quickly in a single jig. Ribs are of the truss type with 5/16" x ¼" spruce cap strips and 3/16" x ¼" web members joined with triangular spruce plywood gussets. All of the 50 ribs in the ship were built in one jig and the jig is still being used every day by our students in practice rib building. Extensive static load testing was carried out on the ribs, and they will withstand a load of 315 pounds in the high angle of attack condition before buckling.

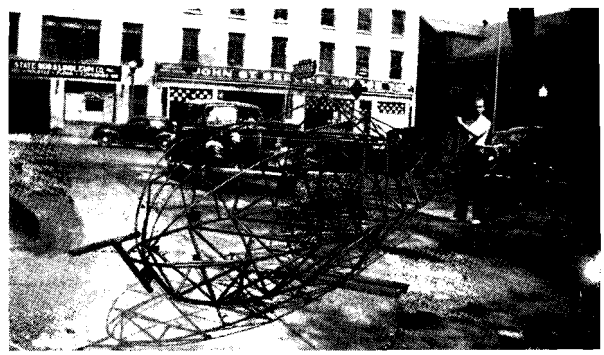
Wing tips are constructed of welded steel tubing and

The author and Engel landing at Crystal Downs after 35 minutes.

are attached to the spars with fittings so designed that they will fail under a lesser load than the spar ends, thus reducing the possibility of extensive damage to the spars at the tips. Wing tip skids are full floating on compression springs and are easily removable. Ailerons are mounted on four hinges and controlled by twin push-pull tubes from bell cranks arranged to provide a two-to-one differential movement. They are Friese balanced to correct partially adverse yawing moments and to build in torsional rigidity more easily. Wing lift struts are of streamline chrome-molybdenum steel tubing, provided with universal joints on each end to reduce the possibility of damage in handling and assembling.

The landing gear consists of the conventional single air-wheel with auxiliary front skid and a two-leaf spring steel tail skid. A two-wheel gear is projected for use in airport training work to facilitate groundwork and handling, following approval for the full Type Certificate by the Civil Aeronautics Authority.

Perhaps the greatest problem in the design of a side-



Welded Steel Fuselage Structure.

by-side glider is that of longitudinal stability. The crew must necessarily sit considerably ahead of the center of gravity, and, if the ship is balanced when fully loaded, it will certainly be tail heavy when flown solo. This fact influenced me to use the NACA 0012 airfoil, which is perfectly symmetrical and has no center of pressure travel and consequent zero moment coefficient. When the ship first appeared at Elmira there were many remarks about my having the wings mounted upside down, due to the appearance of the symmetrical section, but I am convinced that it has proven successful in this design. The lift curve indicates a sharp stall but this was eliminated by using four degrees of washout at the tips with the result that there cannot be a sudden stall, since all points of the span are at different angles of attack, and with the added feature that in the stall the center section stalls first, leaving the ailerons still effective at slow speeds. Washout is thus used to accomplish a somewhat different purpose than to eliminate the tip stall in a tapered wing.