CHEROKEE - II

A Class I Sailplane Designed

By Stan Hall

ABOUT THE DESIGNER
Cherokee II was designed and engineered as a hobby by Stan Hall, and represents the spare-time work of approximately 3 years. Cherokee II is Hall's seventh design to reach actual construction. His glider building and piloting experience dates back to 1929. He has been active in the affairs of the Southern California Soaring Association, Inc. since its inception in the 1930's. He served two years as president of the S.C.S.A. and is currently one of its Directors.
He attended the University of California at Los Angeles and the University of Southern California. He is a Registered Professional Engineer in the State of California and has served as an engineer in the West Coast aviation industry for 20 years. He is currently on the Chief Engineer's Staff of the Missile Systems Division of the Lockheed Aircraft Corporation.
He holds a Commercial Pilot Certificate with single and multi-engine, instrument and glider ratings.

General Information

"Cherokee II" is a single place, Class I sailplane, as defined by the Civil Aeronautics Administration, and is designed specifically to meet the needs of the amateur constructor. Its design permits construction at minimum cost, with minimum skills and with locally available materials. Cherokee II's general dimensions and estimated performance are tabulated as follows:

Wing Span (full cantilever)	40 ft.
Total Wing Area	125 sq. ft.
Airfoil Designation	Gottingen 549
Wing Twist	0°
Angle of Incidence	3.5°
Fuselage Length	21.5 ft.
Fuselage Height	48 in.
Horizontal Tail Area	14.4 sq. ft.
Empty Weight	360 lbs.
Wing Loading	4.4 lbs./sq. ft.
Minimum Sinking Speed	2.9 ft./sec.
Stalling Speed	34 mph
Speed for Best L/D	46 mph
Maximum Design Speed	128 mph
Ultimate Load Factor, Wing	8.0

The sailplane is built entirely of marine spruce and plywood and utilizes the "stick and gusset" method of construction. It is covered with a fabric of unbleached muslin.

All metal fittings, except for a few critical ones, are made of SAE 1020 or 1025 cold rolled steel. Critical fittings are made of SAE 4130 chrome molybdenum steel. Commercial hardware is used wherever feasible. Glue is a synthetic resin available commercially under the trade name, "Weldwood."

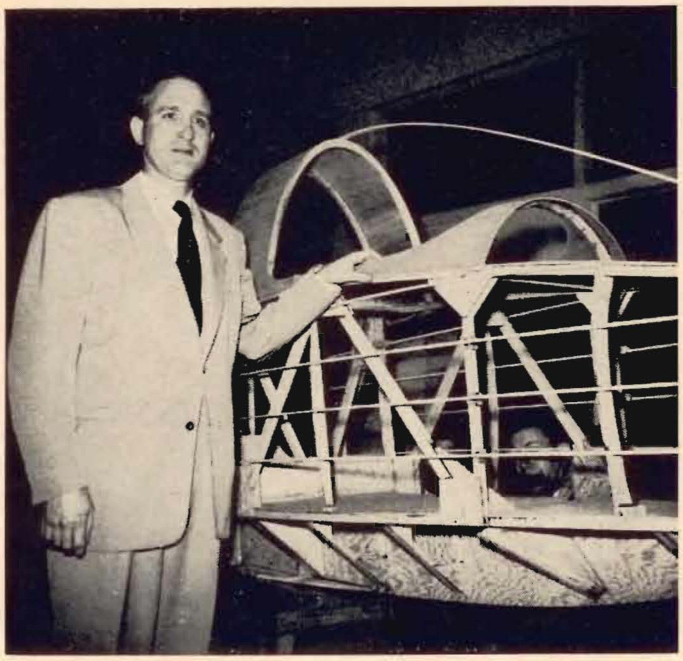
There are no wooden parts in the sailplane that cannot be made on a standard table saw and/or band saw. There are no parts that require intricate or extensive hand working. There are no intricate parts whatsoever. Welding is held to an absolute minimum.

No part of the sailplane is too long to be housed completely in a standard 20 ft. garage. In fact, the sailplane may be disassembled and stored in the ceiling of a garage, with room left for an automobile.

The sailplane has been stress analyzed on a rather comprehensive basis and critical parts and assemblies have been static tested. All design and testing conforms to the requirements of Part 05 of the Civil Air Regulations.

Aerodynamic Configuration

The aerodynamic configuration of Cherokee II has been chosen to yield the most satisfactory type of "Sunday Afternoon Soaring," with performance high enough to satisfy all but the most fanatical of cross-country aspirants, yet low enough to permit learners to fly with safety and confidence.



Stan Hall, designer of the Cherokee II, standing beside the prototype fuselage on display at the January SCSA meeting in the IAS building, Los Angeles.

Stability has been the keynote throughout design. The airfoil has a smooth stall, the fuselage is long and the horizontal tail large.

The aspect ratio of the wing (12.8) is moderate. It is large enough to yield a performance as high as any but the super-sailplanes yet is low enough to minimize structural, storage and handling problems common to very high aspect ratio wings.

The airfoil (Gottingen 549) was chosen on the bases (1) its performance is relatively invulnerable to small errors in manufacture; (2) it has a suitably high ratio of lift to drag; (3) the drag increment increase with lift increases at a reasonably low rate; (4) it demonstrates excellent stall characteristics; (5) it has an excellent tradition of performance the world over, dating back many years.

The taper ratio of the wing (2.5:1) is moderate. It is high enough to yield good spiralling characteristics, to keep wing bending moments reasonably low and Reynolds Number reasonably high at the tips, and low enough to minimize wing tip stalling. In fact, the particular combination of airfoil and taper ratio makes it un-