

THE

model 44 x 19 prop

# Weedhopper™

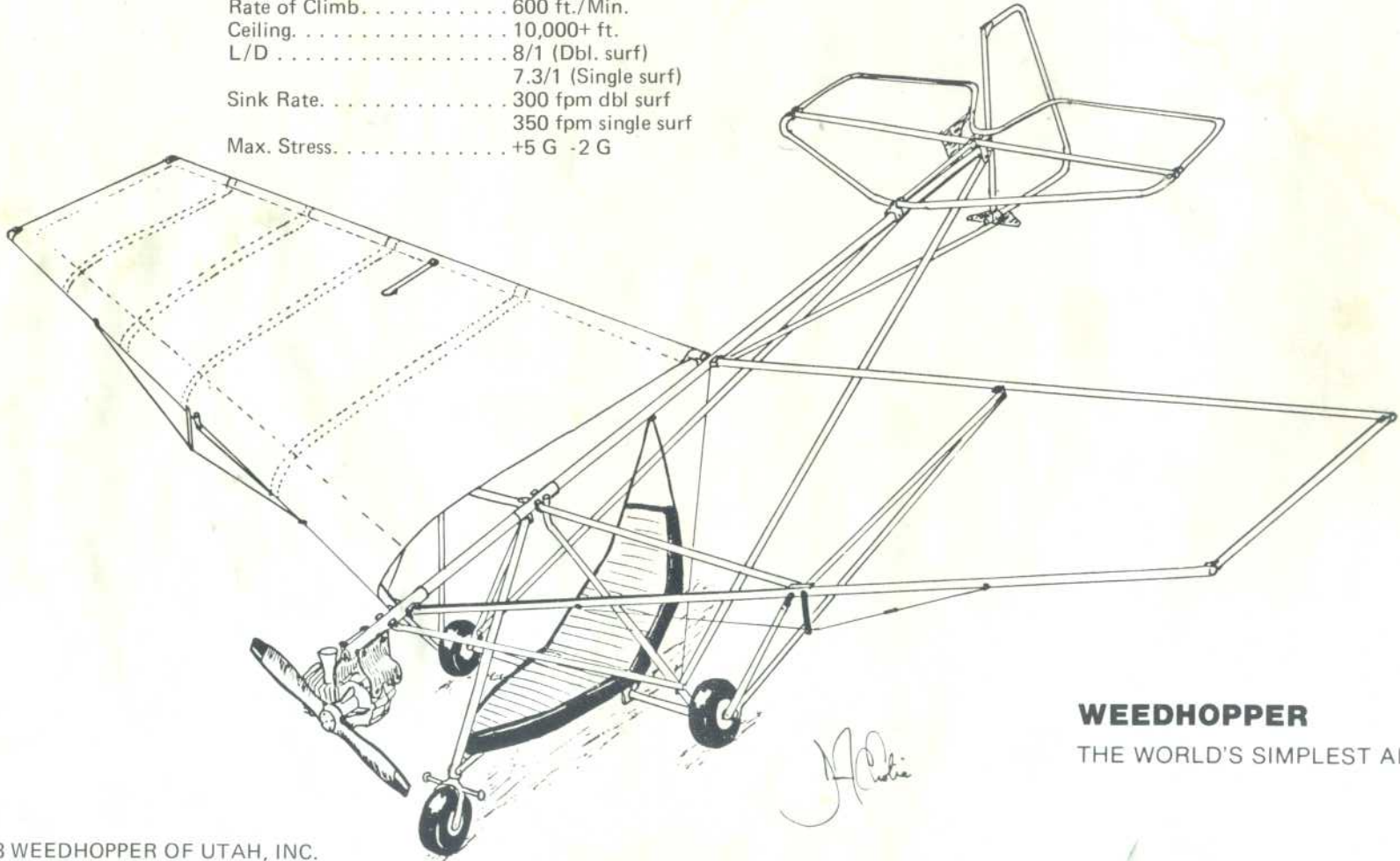
*"The Ultimate Fun Machine"*



**TRUE GRASS-ROOTS FLYING, LOW COST, SIMPLE AND FUN!  
BRINGS BACK THE FUN OF SLOW AND OPEN FLIGHT.**

© 1979 WEEDHOPPER OF UTAH, INC.

Span . . . . . 28 ft.  
 Area . . . . . 168 sq. ft.  
 Weight . . . . . 160 lb.  
 Max. load. . . . . 220 lb.  
 Cruise speed . . . . . 30 mph  
 Red line speed . . . . . 50 mph  
 Stall (160 lb. load). . . . . 22 mph  
 Range . . . . . 90 miles (with 3.5 gallon tank)  
 Engine. . . . . 456 cc., Chotia, 2 cycle, 25 hp, 4500 rpm  
 Takeoff Roll. . . . . 100 ft. or less  
 Rate of Climb. . . . . 600 ft./Min.  
 Ceiling. . . . . 10,000+ ft.  
 L/D . . . . . 8/1 (Dbl. surf)  
                   7.3/1 (Single surf)  
 Sink Rate. . . . . 300 fpm dbl surf  
                   350 fpm single surf  
 Max. Stress. . . . . +5 G -2 G



**WEEDHOPPER**  
THE WORLD'S SIMPLEST AIRPLANE!

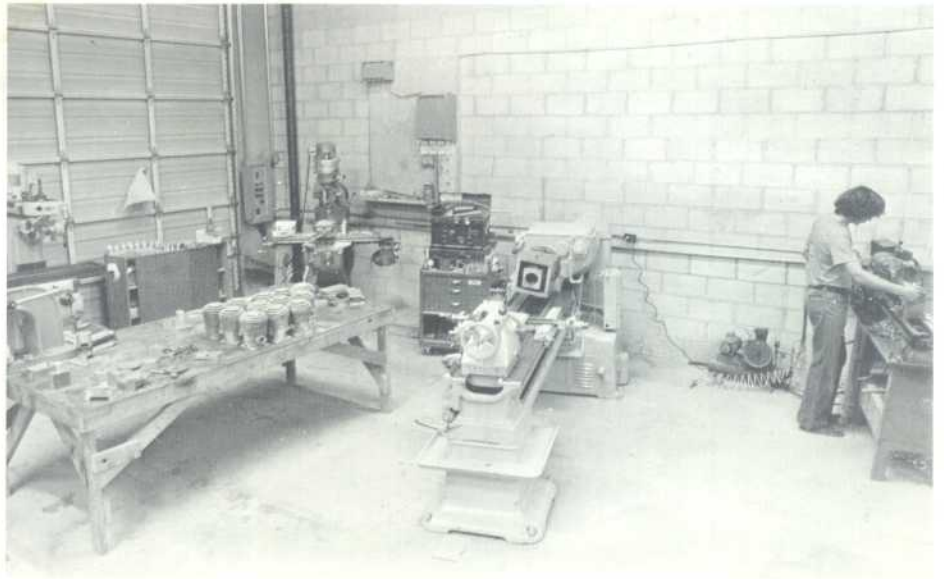


# WEEDHOPPER OF UTAH, INC.

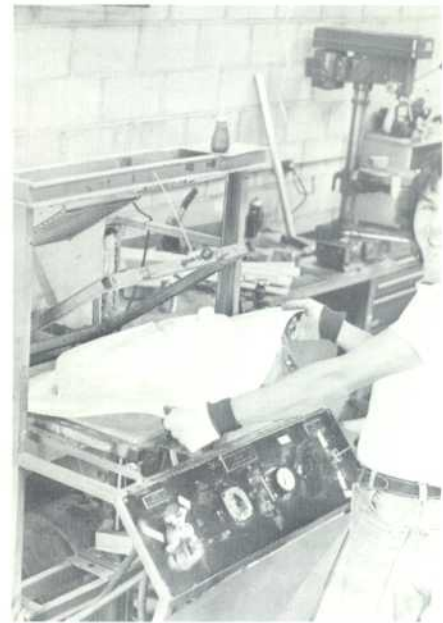


Our New Home, 11,575 sq. ft.

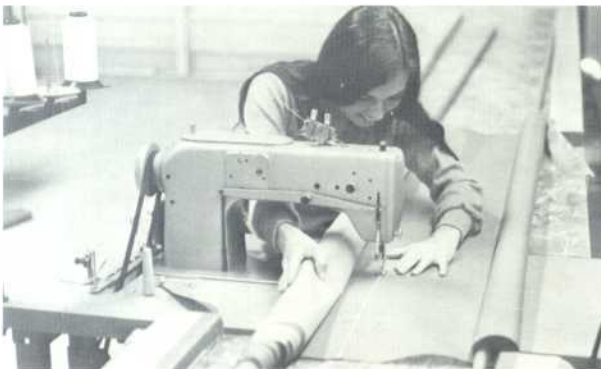
Just Part Of  
Our Very Complete  
Machine Shop



We Layout And Sew  
All Our Own Fabrics In Our Sail Loft



Vacuum Formed Plastics Are  
Done In-House For Tanks, Fenders,  
Instrument Panels, Etc.





## ABOUT THE DESIGNER:

John F. Chotia, Airplane Designer, Experimental Machinist, Moldmaker, Tool & Product Designer, Inventor, graduated from high school in 1964, then served a four year apprenticeship with NASA Ames Research Center to become an experimental machinist in 1968. His function with NASA was the design and fabrication of Aero-Space and Life-Science Research Equipment.

During his apprenticeship he operated a model race car business producing vacuum formed bodies with aerodynamic features which boosted performance as much as 25%. In the first race entered, such a car won a 25 lap race by **seven** laps! In 1968 he designed an aero assist body for the Formula 'A' SCCA National Champion (a full size car)

In early 1969 he designed and built a racing go kart with many novel features including aero assist body work, 4-speed transmission, and an all moveable wing.

In late 1969, John founded 'Advanced Dynamics', a plastic injection molding and tooling company. A.D.'s service was basically product and tooling design for molded plastic parts. This company grew and expanded employing as many as 21 people. Advanced Dynamics was sold in mid 1976. During the six and one-half years with Advanced Dynamics, he continued research on ultra light airplanes, building 17 of the 24 different designs created as of today.

John's aircraft interests started 23 years ago at age 9 with flying models. As of his Senior year in high school, he had built over 180 model airplanes; 115 of these were his own design. During his early high school years he did well at contests with a class 'A' .15 cu. in., a stunt plane of his own design. Later he did quite well with combat flying wings powered with his own specially modified engines, many components of which he built himself. In 1964, he designed a man powered airplane for the 1959 Kremer M.P.A. challenge, a 50,000 pound sterling British challenge, which in later developments in 1975, was identical in design concept to the one which finally succeeded in 1977 built by Paul McReady in Southern California.

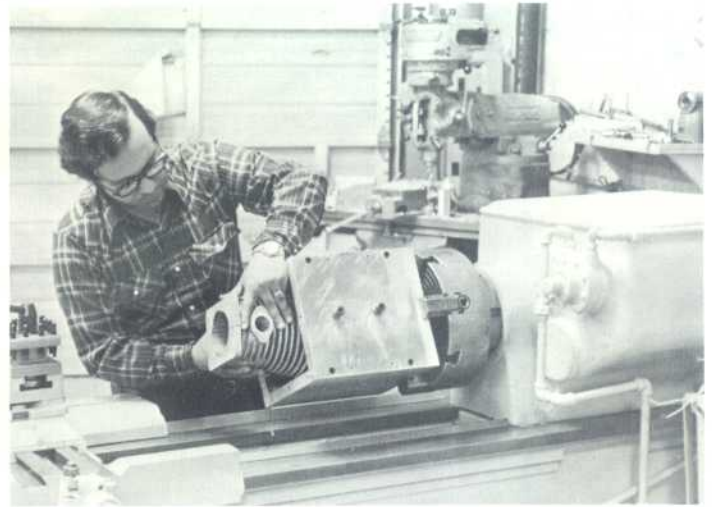
He built his own hang gliders in 1965, long before it was popular, and had many successful flights. He soloed in a sailplane in three and one-half hours instruction in 1965 also.

His interest in flying and his love of design challenge has led to a series of 24 full size ultralight airplane designs, always trying for a simpler, more effective way to do things. The result is the Weedhopper, an ultra-simple ultra-light airplane. The Weedhopper succeeds in providing his ideal fun flying machine. It is easy to fly, but also very maneuverable with plenty of reserve power. The stability on the ground is outstanding. In the air, it is responsive, yet predictable. The Ultimate Fun Machine.

This desire to do the job the best way has led to the design, tooling and development of the Chotia 460 engine at 31 1/2 lb. and over 30HP. It completes the Weedhopper performance package.



Our Props Are Birch With  
Varathane Finish, Carved In House



We Even Build Our Own  
Engines



Part Of The Shipping Dept.

## **WEEDHOPPER OF UTAH, INC.**

Employing ten people, as of early 1979, and growing. Weedhopper of Utah is a total facility. We make our own engines, carve our own props, do all our own machining, mold our own plastic tanks, sew our fabrics and do all our own pattern work for our castings. At this time, castings are the only thing we buy from outside sources, other than raw materials.

With a new building of over 11,500 sq. ft. we have room to grow and the capability to fill our customers needs. Our versatility and resourcefulness insure total quality control and we know our systems will work as intended.

The Weedhopper has been on the market since early 1978 and the kit instructions and construction details have been streamlined and simplified to give you, the customer, a well balanced, convenient and functional flying machine.

## THE DESIGNER'S COMPROMISE

When most people decide to learn to fly it is to have a good time. Thoughts of swooping, banking turning, diving and just generally zipping around are rapidly compromised to the reality of the modern lightplane trainer. Instruments, traffic patterns, radios and control towers quickly dampen and inhibit the ideal freedom of flight. The Weedhopper was designed to fill this idyllic desire for freedom. It is totally impractical in the business machine sense, yet as pure recreation, it is unequalled. Its light weight, low speed and tight maneuverability open a new era of bird-like flying, at bird-like altitudes.

All airplane designs are a balance of choices, if certain features are wanted others must be sacrificed. The goal of the WEEDHOPPER is a low cost, easy to build and easy to fly machine. To achieve this end we cannot have tremendous speed or range. The WEEDHOPPER is intended for pure fun flying and most pilots find the slow, highly maneuverable, and open cockpit type of plane the most fun.

The WEEDHOPPER has no ailerons, so the landing gear is extra wide and very low. Cross-wind take-offs and landings have proven to not be a problem, simply hold the nose down until take off speed is reached then rotate and correct heading with the rudder. The 12° dihedral and low center of mass combine with the rudder to give well co-ordinated turns. Take-offs and landings have been made in crosswinds up to 10 MPH, 90° to the runway.

The tractor engine position was chosen to get the empty plane to balance at the proper point for flight. This means we can locate the pilot's seat right on the C.G. and as a result the variable weight of the pilot does not affect the trim or safety of the plane. This is in direct contrast to the accepted pusher arrangement used in nearly all other ultralight designs. The central pilot position is also safer in the event of a crash than right on the nose! The pilot of the WEEDHOPPER also has better attitude reference, and a feeling of security from the structure surrounding him. All this, and the C.G. varies less than 1/2" with 0 lb. to 200 lb. pilots!

The aluminum tubing and dacron sailcloth structure has been well proven in tens of thousands of hang gliders. The WEEDHOPPER'S rigid airfoiled wing rolls up for car top transport!

## BUILDING THE WEEDHOPPER

The basic structure of the WEEDHOPPER is seamless drawn 6061 aluminum tubing with larger tubing and/or wood dowels to reinforce all attachment points. Pre-machined brackets or gussets are used to join the tubes. All bolts and hardware are aircraft quality. This construction method has proven very rugged and reliable. The WEED—HOPPER is strong and easy to build, and if needed, it is quick and easy to repair.

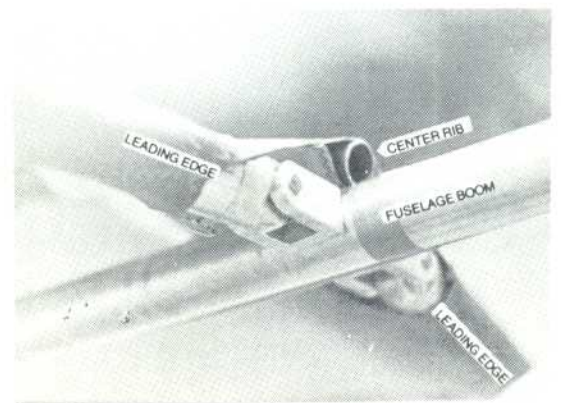
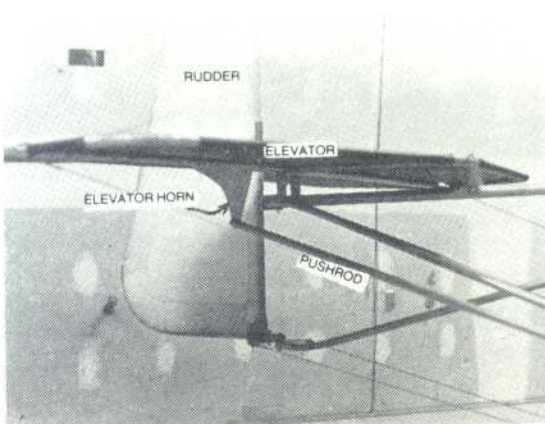
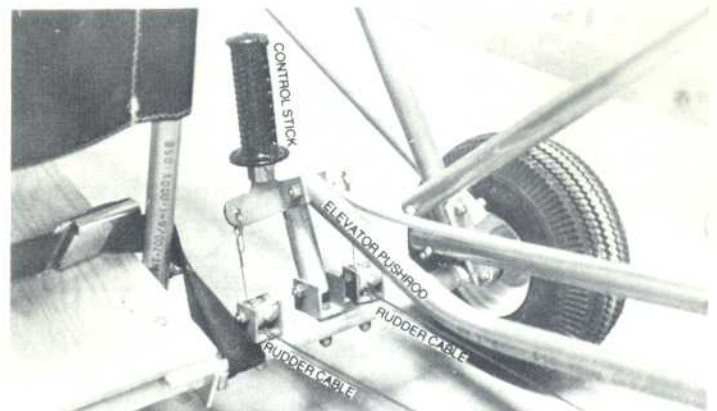
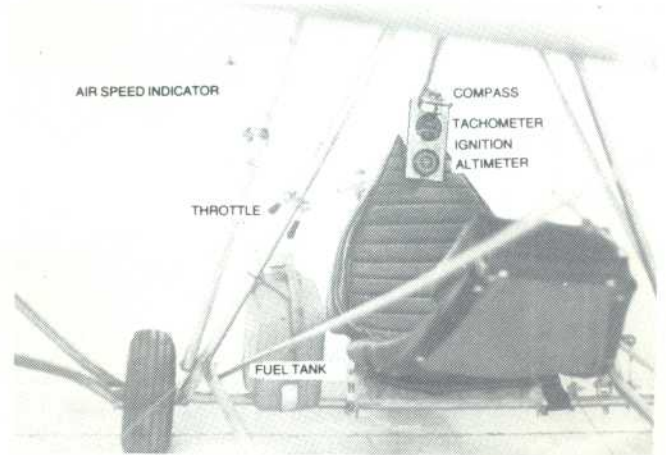
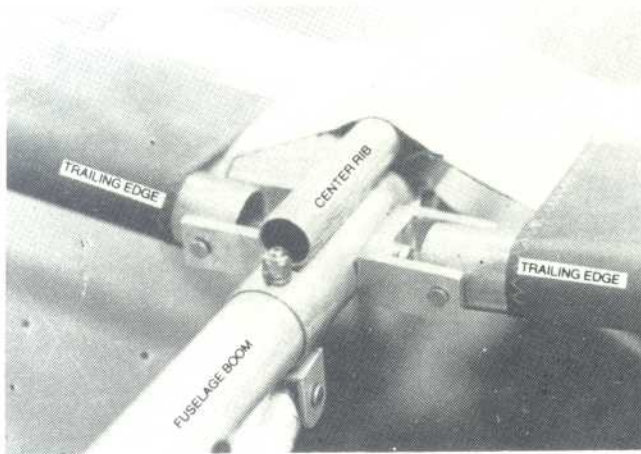
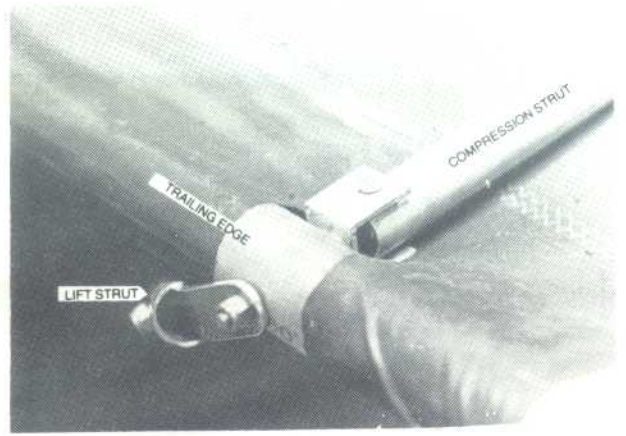
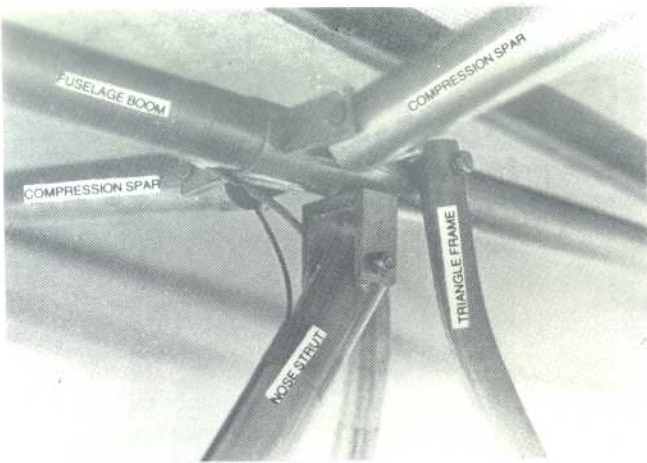
The covering is 3.8 oz. stabilized dacron sailcloth and is pre-sewn to slip in place. There is no sewing, gluing, or doping to be done. You simply order your sail with whatever color pattern you desire. The beautiful translucent colors seem to glow in the sunlight, almost as a reflection of the excitement and joy of flight.

The control system is simplicity itself. A direct pushrod activates the elevator, two cables run over pulleys and straight back to control the rudder. The foot rest steers the nose wheel.

All components which require bending, machining, or sewing are done for you. Some drilling is necessary, but a special fixture is included to make it easy to do accurately.

Every effort has been made to insure your successful completion of this project. You should be ready to fly in 40 hours of work or less. The only tools needed are a drill, hacksaw, hammer, file, pop rivet tool, a couple of wrenches, and a screw driver. The complete kit comes with all materials needed to build a complete WEEDHOPPER, aluminum tubing, pre-sewn sails, all hardware, wheels & tires, instruments, engine, prop, fuel tank, etc., EVERYTHING!





## THE WEEDHOPPER KIT INCLUDES:

Ready to use:

Plans & Instructions

Cast & Drilled engine mount

Cast & Drilled nose fork

Special wheel bushings--machine finished

Wheels & Tires

Exhaust Pipe

Propeller

Instruments--Air speed, Tach, Altimeter, Compass

Completely sewn, slip-on covering for wings & tail surfaces

Finish machined leading edge root fittings

Control Pulleys

Engine

Prop Hub

Fuel Tank

All Hardware

## PARTLY FINISHED PARTS:

ITEM	WE DO	YOU DO
Ele. & Rud., Control Horns, Stick Belcrank, Wing Strut Tangs, & Gussett Plates	Saw Out	File, Layout, Drill, Deburr, & Finish
1" Channel Bracket	Saw Off Extrusion	Layout, Drill, File, & Deburr
1 1/2" Channel Bracket	Saw & Machine to size	Layout, Drill, File, & Deburr
Rudder Hinge	Saw & Machine to size	Layout, Drill, File, & Deburr
Elevator Leading & Trail- ing Edges, Rudder Trail- ing Edge	Bend to Contour	Cut to length, Install rein- forcements, Layout, Drill, File, & Deburr
Front, Rear, Center, Fuse- lage Struts, Rudder Brace, Wing Struts	Bend one end	Cut to length, Install rein- forcements, Layout, Drill, File, & Deburr
Seat Bars, Back & Bottom	Saw & Bent to Contour	Cut Final Length, Layout, Drill, Deburr, & Rivet
Seat Bottom	Saw Out	Layout, Drill, Sand, & Finish
Instrument Panel	Saw Out	Layout, Drill, Sand, & Finish
Seat Back Gussets	Saw Out	File & Deburr, Layout & Drill for Rivets
Control Stick Base	Saw & Slot	File Radius, Deburr, Layout, & Drill
Wing Ribs	Cut & Bend	Deburr, Fit & Rivet to Rib Tips
Rib Tips	Molded Fiberglass	File & Sand Radius, Fit & Rivet to Ribs

For the following items we supply aluminum tubing and reinforcing dowels of the proper sizes, plus bolt bushing material, a special tool to install these bushings and a special fixture for drilling accurate holes. On these items, you will cut to length, cut and install reinforcement, layout, drill, and bush bolt holes, and file all edges smooth:

Leading Edge/Spars

Compression Struts

Leading Edge Wing Posts

Rudder Leading Edge/Spar

We also provide all cable, end fittings, and a special tool to swedge the end fitting for the following:

Rudder Control Cables

Elevator Brace Cables

Leading Edge Brace Cables

Trailing Edge/Spars

Wings Tips

Thrust/Drag Spar

Fuselage Main Boom & Fuselage Landing Gear Axle

This plus final assembly and engine hookup (Fuel, Throttle, Tach, and Kill Switch) and you are ready for final inspection and flying!

The complete construction manual with step by step instructions and overall incredible simplicity make building the WEEDHOPPER quick and enjoyable. And you learn your airplane insideout, a big safety advantage!



Side Mounted Control Stick Operates Large And Effective Rudder And Elevators.

## SAFETY

In all aircraft relative safety is dependent upon the pilot's skill and judgement. The Weedhopper can only be as safe as its pilot, yet there is always some risk involved. The pilot must control and minimize his risk. This involves pre-flighting and maintenance as well as knowing when or where not to fly. Since the engine is only machinery, it can fail, it is wise never to rely unnecessarily on the power plant. Always stay within gliding distance of a good landing area.

The Weedhopper's front engine and central pilot are a big safety plus. The pilot has some protective crushable structure around him and the front engine is unlikely to break loose and strike the pilot as a "pusher" installation could.

The aerodynamic design (dihedral, low C.G., swept back L.E., wing wash-out, low position rudder area, and large elevator) is aimed at a predictable, stable flying machine. The low wing loading makes this type of plane more sensitive to gusty winds, but the large, powerful controls of the Weedhopper minimize this. Still care should be exercised and winds over 15-20 MPH are best avoided since the very rough ride will diminish the fun aspect and also increases risk.



Wide landing Gear Gives Good Ground Stability. Ample Dihedral Assures Stability In The Air



Pilot Sits At C.G., Surrounding Structure Provides Some Protection

## FLYING THE WEEDHOPPER

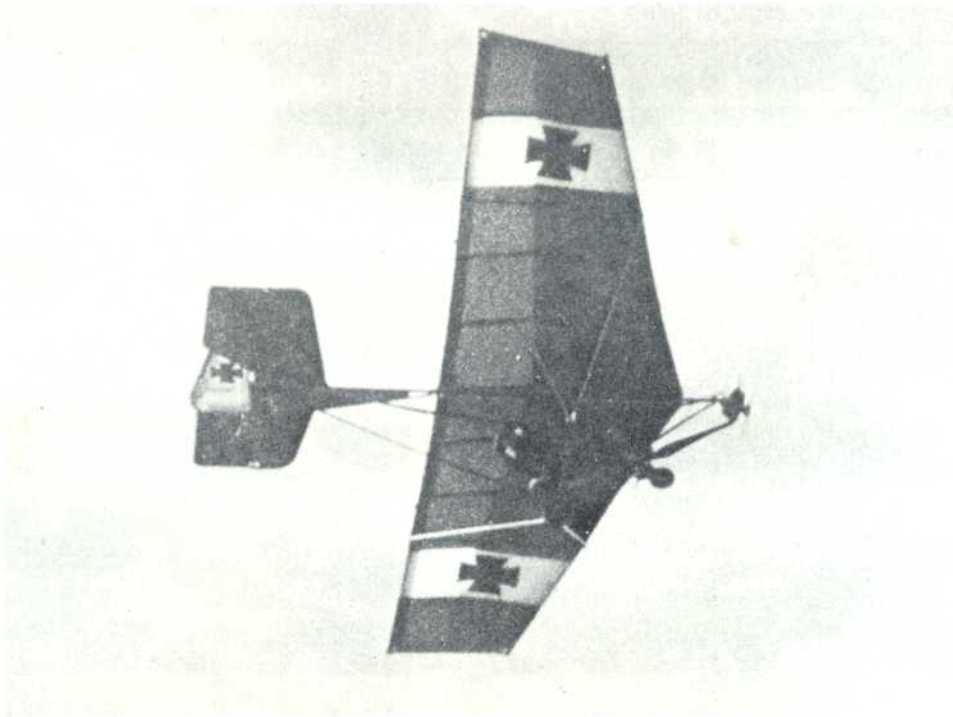
The wide tricycle landing gear and low C.G. make ground handling very easy. You can maneuver briskly with no fear of ground looping or tipping. The steerable nose wheel is controlled by the feet and will turn a very tight radius. Due to the small amount of weight on the nose wheel, the rudder is all the control that is needed during the takeoff roll. The nose wheel is only needed for slow tight maneuvers such as turning around.

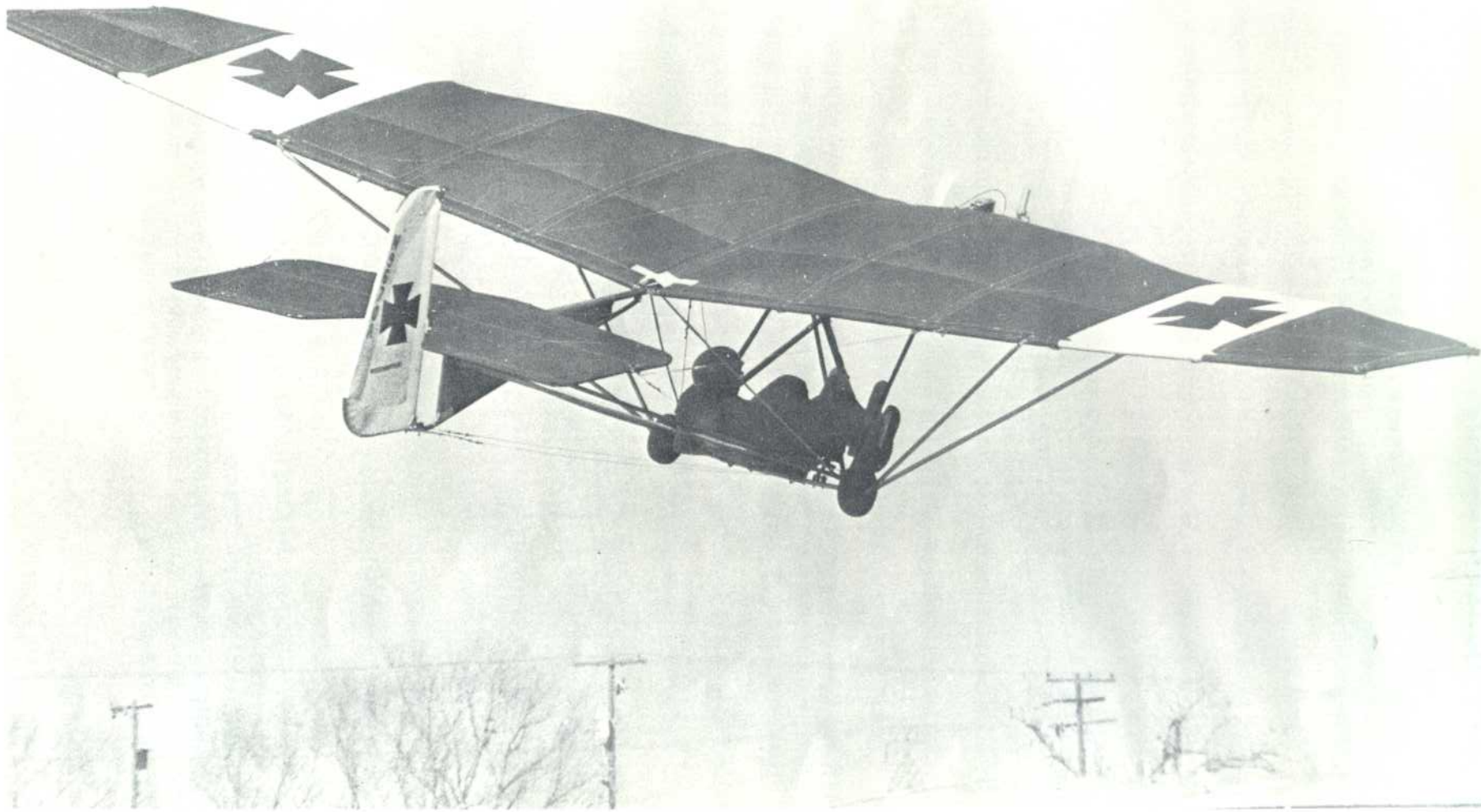
The reclining pilot position is very comfortable and the excellent over-the-nose visibility gives good attitude reference, especially on landings. In most regular airplanes you lose forward reference during the flare, not so on the WEEDHOPPER. The prop wash strikes the pilot during take-off so goggles are desirable. In flight, the prop wash goes over the pilot's head. Seat back position is fully adjustable.

When approaching a stall there is a slight elevator buffet about 3 mph before actual stall. Power-on stalls in straight flight mush straight through and lose about 10-15 ft. of altitude; power off loses about 20-25 ft. In banks over approximately 15° the inside wing drops and the plane slides to the inside, yawing into the slip and rolling its wings level on its own. There seems to be little tendency to spin inadvertently out of a banked turn or level flight stalls. Though the WEEDHOPPER appears very reluctant to spin at all, we do not recommend trying to provoke a spin since this is not an aerobatic airplane.

Control pressure is light but not sensitive in pitch. Rudder pressure is moderate and effective. The WEEDHOPPER is stable, hands-off in pitch, roll and yaw.

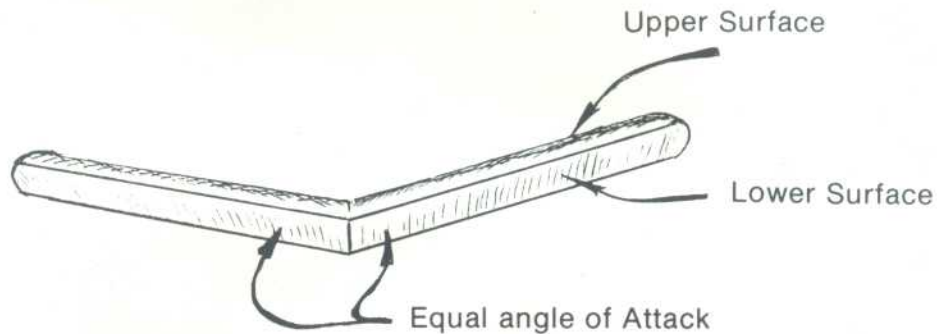
The engine down thrust controls climb without the need for trim changes, and the pre-set incidence and stable C.G. position gives near optimum power off glide without trim change, just like a well trimmed model plane!



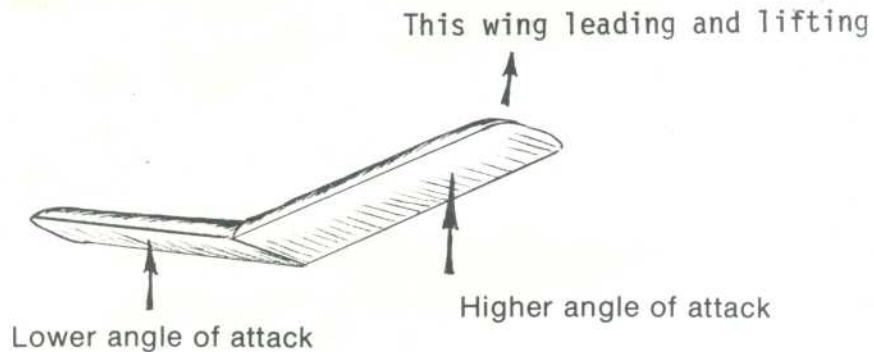


## HOW DO YOU CONTROL ROLL & BANK WITHOUT ALIERONS?

Picture a wing with dihedral ("V" bend) as viewed by the oncoming air. In straight flight each side of the wing has the same apparent "angle of attack."



Now, if the wing is flying slightly sideways in a "yaw" attitude, the oncoming air sees a higher angle of attack on one side in relation to the other.



The Weedhopper uses the rudder to induce a slight yaw and the dihedral produces a positive roll force. This control system works so well that radio controlled models can do barrel rolls with just rudder and elevator control. The Weedhopper also has a swept leading edge which presents a longer wing on the leading wing in a "yaw" attitude.

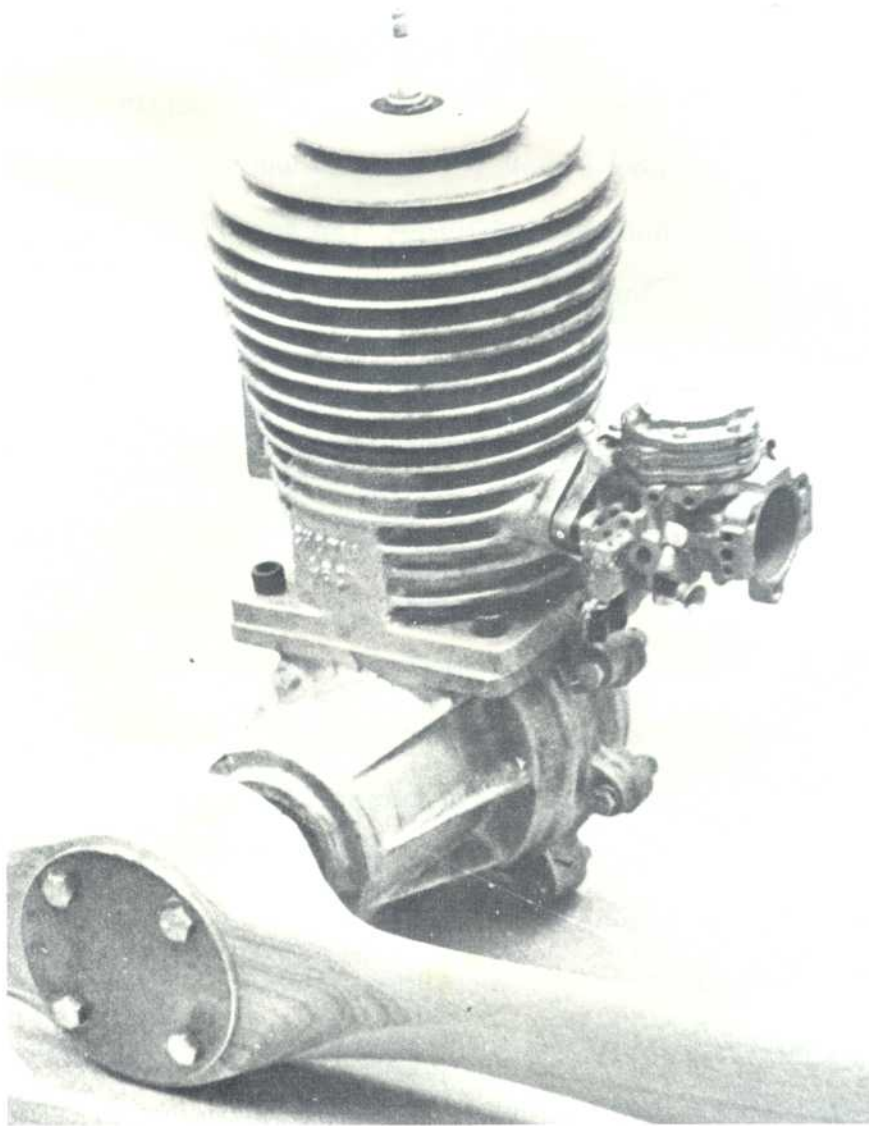
## LICENSING AND REGULATIONS

The WEEDHOPPER may be licensed in the homebuilt "EXPERIMENTAL" CATEGORY by the F.A.A. Contact your local General Aviation District Office (G.A.D.O.) They are listed under **United States Government** in the phone book. The G.A.D.O. will give you the correct forms to register your WEEDHOPPER. The cost is only \$5.00. The only requirement is that you build more than 50% of the plane, which you will, and the F.A.A. inspector will have to inspect and sign off your plane before you fly.

The **pilot** will need a student solo permit, for this you need to get a third class medical exam, the G.A.D.O. will tell you which local doctors can help you. Since the WEEDHOPPER is a single passenger plane, there is no way to get dual instruction in it. All that is required is to have an instructor observe you and endorse your student permit for this type aircraft. No dual instruction is "required" but it is a good idea to take a couple of hours if you have never flown before, most instructors will agree. If you have flown before, you will find the transition fairly easy, just a matter of getting used to the slower speed for the most part, and the lack of separate rudder control from bank (aileron) control. On the WEEDHOPPER the sideways control on the stick feels like aileron control because the wings immediately bank when the rudder is moved. The total cost of your student solo permit shouldn't be much over \$50.

Also, this isn't necessary, but we suggest you join the E.A.A., P.O.

Box 299, Hales Corners, Wisconsin, 53130. They have an excellent organization and publication, "Sport Aviation". Cost is \$25.00 a year and well worth it.



### **CHOTIA 460 AIRCRAFT ENGINE**

2 Cycle, Schnurle ported cylinder, piston valve induction; 3 ball bearings on crankshaft, needle bearings on rod and wrist pin.

Bore = 88mm  
Stroke = 75mm  
Displacement = 456cc

Rotation = reversible

Fuel/Oil Ratio = 50:1

Power = 25 hp @ 4500 rpm

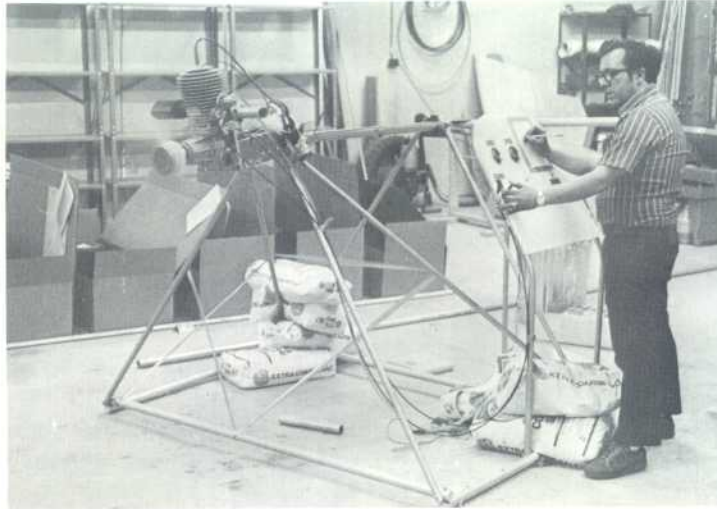
Weight = 31.5 lbs.

Overall Size (less Carb. = 16" H.  
12" L, 7" W

Mounting = Multiple choice, 10  
points

Ignition = Points/Battery  
Approx. 20 hrs. running per charge





John Chotia Testing  
The C-460 On Our  
Dynomometer

## THE CHOTIA 460 ENGINE

We are proud to introduce an engine of, our own design and manufacture. Designed and tooled by John F. Chotia (the Weedhopper's designer), it reflects the same overall balance of purpose, function, cost and long range goals as the design of the Weedhopper.

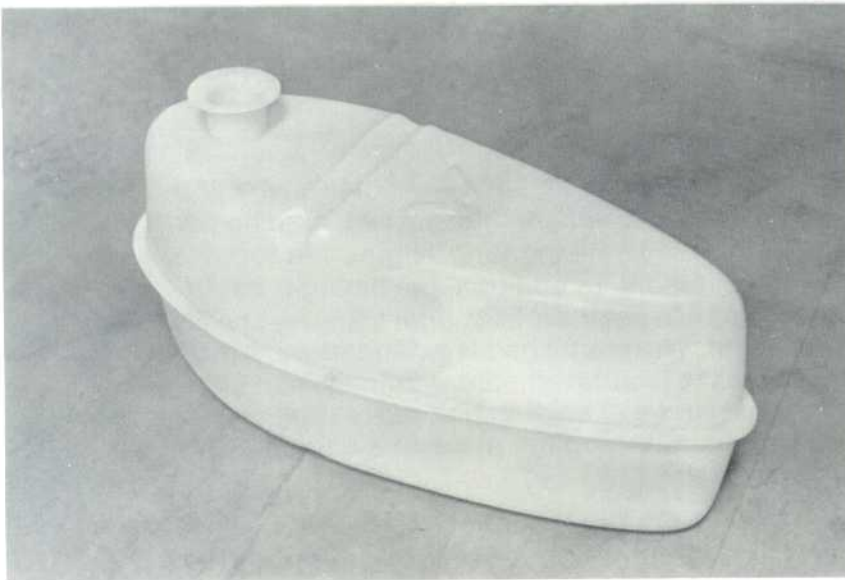
The Weedhopper was originally powered with a Yamaha Y292 snowmobile engine. This engine gave good performance with approximately 30 take off horsepower, but its high RPM (6000) made the propeller efficiency low, about 30%. The Chotia 460 produces approximately 25 hp at 4500 RPM. The lower RPM allows a larger, more effective prop of about 40-45%. The performance is outstanding, with 600 FPM climb at sea level. Add to this the lower noise level, lower fuel consumption, lower vibration levels, comparable weight, and it is easy to see why we decided to make our own engine suited to our own purpose!

The Chotia 460 is designed to meet its own requirements of horse power and RPM, as a result it is much lighter for its displacement than normal, high hp per cubic inch two cycle engines. The low RPM means long engine life too; we expect approximately 500 hrs. before overhaul. In addition, the timing is centrifugally advanced and retards the spark for easy starts and smooth idling, yet peaks the timing for max performance for flight. The crankshaft is extended and a third ball bearing is added in the extended case to support propeller loads and allow the prop to be further away from the cylinder. The direction of rotation can be easily reversed and the multitude of mounting points make this engine easily adaptable to many other airplanes as well.

This engine is the direct result of the Chotia-Weedhopper concept. "If we can't buy it, we will make it!" Ultra light designs of the past have suffered from using off-the shelf components which were not ideally suited to this type of flying. We will not accept any less than the right part to do the job correctly, even if it means designing, tooling and producing our own engine, props, and instruments (we make our own props and air speed indicators too)!

## OPTIONS:

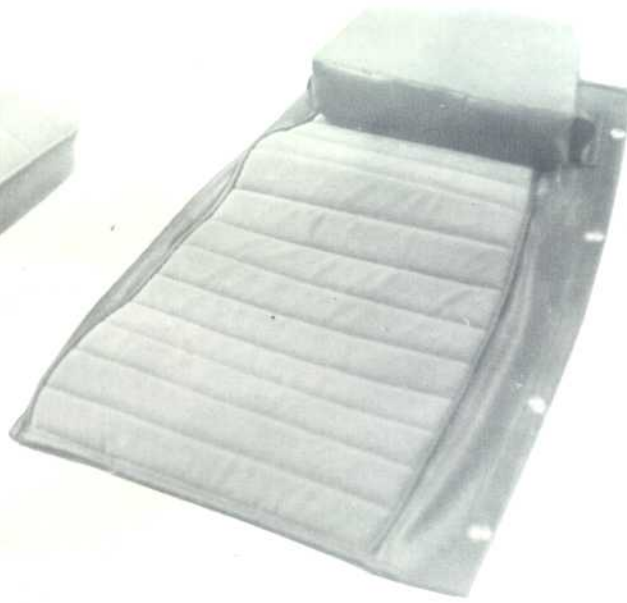
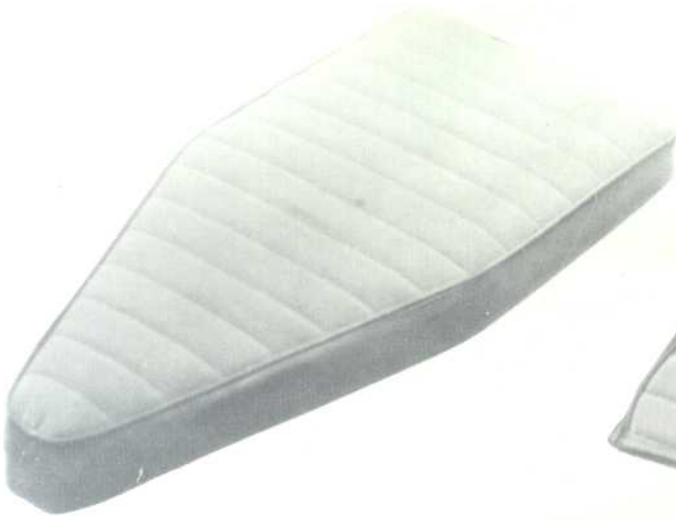
- \$10.00 A. Nose wheel fender . Protects the prop from debris thrown by the nose wheel on gravel or muddy strips.
- 85.00 B. Custom seat ..... Provides extra comfort and that "finishing touch", really enhances appearance. Tuck and rolled center section is available in gold, blue, or black. Outer edge is black naugahide.
- 35.00 C. Nose wheel brake .. Allows quicker stops and more controlled taxi on hard smooth surfaces.
- 190.00 D. Double surfaced wing Cuts drag to boost climb and extend glide. Highly recommended for pilots over 190 lbs. who will be flying off fields over 4000 ft. ASL. The double surfaced wing should be ordered with the original kit, or the sail must be returned to the factory and an additional \$50.00 fitting charge will be necessary. All other options may be added by the customer at any time.
- 65.00 E. 3.5 gallon fuel tank ... Gives longer range and duration. Molded high density polyethylene is very durable and resistant to vibration.
- 60.00 F. Storage bags ..... Protects the wing fabric against dirt and damage during transport or storage. Separate bag holds rigs and struts to avoid mis-placed parts.
- 5.00 G. "T" shirt ..... Small, Medium, Large & Extra Large



3.5 Gallon Optional Tank



4 Color 'T' shirt



Custom Upholstery



Front Fender (A)



Nose Wheel Brake (C)



Break down for transport takes one man 30 minutes.

Wing, wing ribs, and struts are in storage bags for protection.

Weedhopper is car topable though a small trailer is more convenient.

## PERFORMANCE

The WEEDHOPPER cruises at 30 MPH, tops out at over 50 MPH (red line) and stalls at 20 MPH. The glide ratio is 8/1 with the double surfaced wing and 7.3/1 with the single surface wing. Power off sink rate is 300 FPM double surfaced or 350 FPM single surface.

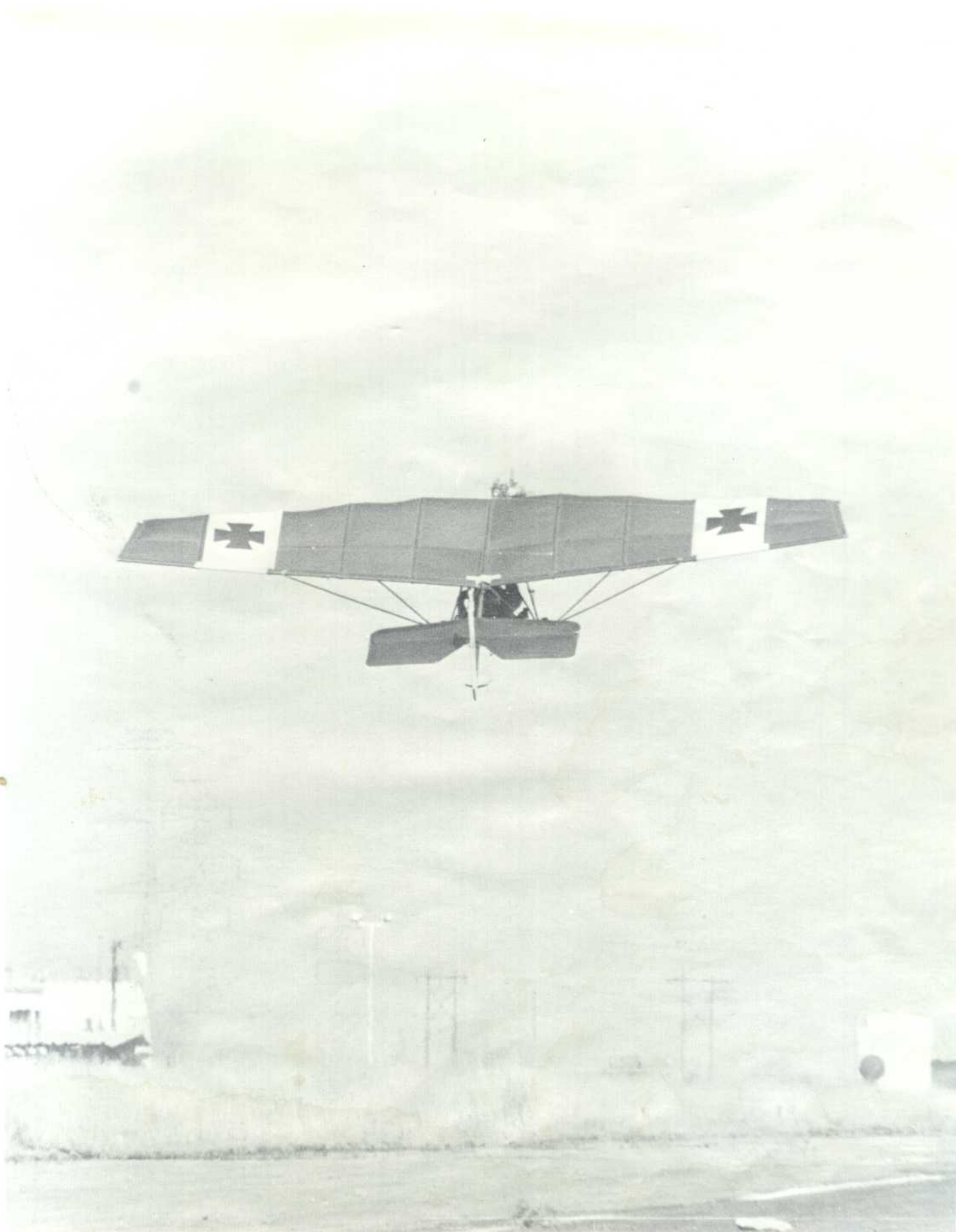
Take off roll at sea level and 160 lb. pilot is under 100 ft. and climb rate is around 600 FPM. At 4200 ft. with a 190 lb. pilot it rolls about 180 ft. and climbs approximately 300 FPM.

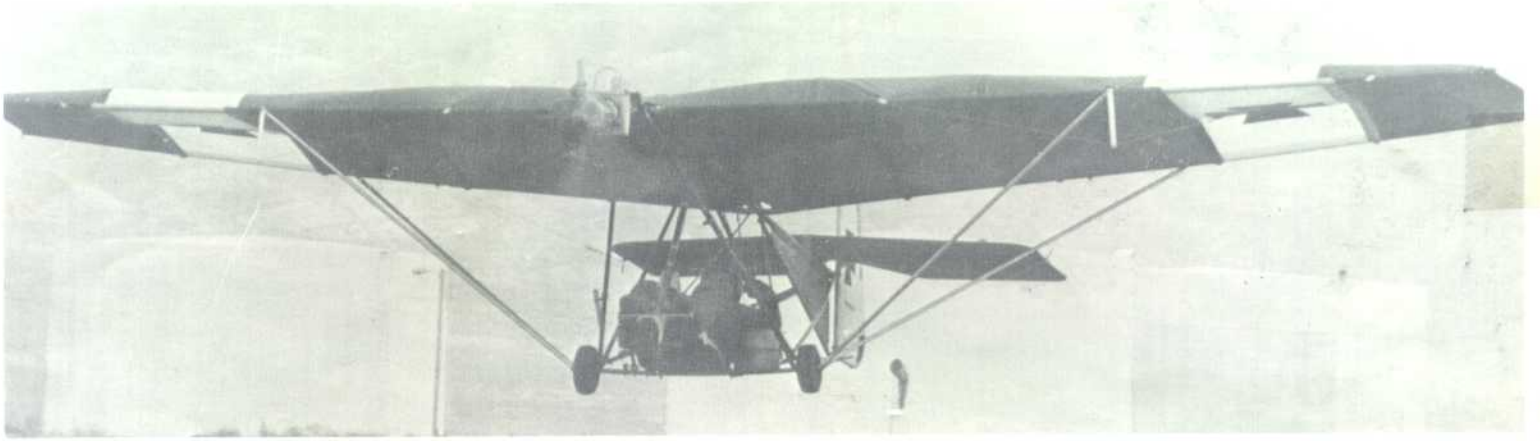
The WEEDHOPPER is **not** a marginal airplane. It will carry a full sized man and will offer brisk performance even fully loaded at high altitudes. Its excellent short field capability and tight maneuverability gives fun flying in any open, un-surfaced area away from crowded airports.

Power off, you can soar as well as a high performance hang glider; power on, you can maneuver and swoop and bank and feel a sense of freedom and control never before experienced in the aviation world.

The WEEDHOPPER provides practical, fun flying at the minimum of cost and effort, yet gives the maximum return in pure fun!







## **CHOTIA - 460 COMING OR GOING!**

The Chotia-460 is a major breakthrough for ultralight aircraft.

The smoothness, quiet and long engine life are unequalled in ultralight powerplants.

