

Build your own set of Aircraft Jacks
 A DIY welding project
 Dave Barker EAA 587700



Low wing aircraft Jack

Everyone doing aircraft maintenance, inspection brakes, tire change or gear swing has to get the aircraft up off of its feet. This is a simple afternoon welding project that allows you to construct your own set of aircraft jackstands. The starting point is a pair of inexpensive automotive (Kragen or other) jackstands. I like the three-point tripod type that can frequently be found at yard sales for a couple of bucks.



Kragen et. al. Jackstands

The rectangular 4-point) jackstands can be used as well. The starting point is to cut off the U flange on the top of each



Original jack post (upside down)



U flange removed

stand leaving ~1/8" of flange overhang to keep the pipe from falling all the way thru the tripod sleeve tube. Next is the fabrication of the custom made Jack lift point receptacles. This will vary with the type of aircraft. When I built my stands years ago, I owned a Piper Comanche. It has the V shaped cones that project from the bottom of the wing. So I lathe turned 90° conical cavities



Lift point receptacle and end cap

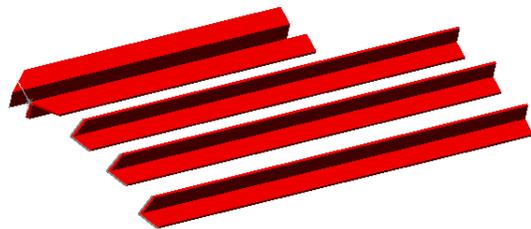
into a 2" diameter x 1" long piece of aluminum. It is bored thru and tapped with a 1/4-20 Thread. The top of the jackstand flange is drilled and the cone cap is bolted to the top of the stand. Some years later I bought a Mooney 231. The jack points for it are the tie-down eyelets. So I machined semi-circular grooves in the same cap pieces to adapt to both type of lift points. The other end of the pipe is fitted with another piece of 2" aluminum bar stock turned down along one shoulder to make a press fit into the end of the pipe. The backside of this piece is machined with a recess cavity to capture the top of the hydraulic jack.



Determine the maximum available height between the wing jack point and the floor. Set the leg length to easily slide the stand under the wing and clear the jack point.



The two jackstand frame extensions will require 6 pieces of 1" x 1" x 1/8" steel angle iron cut to ~18" in length. One end of each piece will need to be bevel cut (both faces) at ~ 65° (to the vertical) or 25° (to the floor) in order to sit flush on the floor. Clamp and tack weld one leg on to the jackstand. Attach the other two legs with C clamps and adjust the leg lengths to make the axis of the jackstand vertical before welding the other legs.



1 x 1" angle stock for bridge and legs
 Bridge nominal 13" length with 45° bevel on one end, Mirror for opposite side. Legs are 18" nominal length with ~ 25° beveled end to sit flush to floor.



Angle iron jackstand leg extensions.
 (Make good welds.) The health of your aircraft will depend on them. Then weld each leg in four places. Two welds at the top of the angle iron and 1” welds on the edges of the jackstand frame near the bottom. Next, reinforce the tripod base with 3 strips of 3/16” x 3/4” steel strap. The height above the floor for these reinforcing straps is a function of two variables:

1. The length of the jackstand sliding tube will vary from 8”– 12“ depending on product brand.
2. And on the height of the collapsed position of the hydraulic bottle jack.

The total length of the jackstand lift pipe plus the aluminum jack point insert and end cap plus the height of the hydraulic jack determine the height of the bridge which in turn will determine the location of the 3/4” horizontal steel straps. The bridge supports the hydraulic jack. It transfers the weight of the aircraft to the truss structure and on to the 3 legs of the aircraft jackstand. The bridge is construction to two pieces

of 1”x 1” angle stock welded together to make a “T” rail shape. One end is beveled to a 90° point and fitted to the interior angle of one leg and the bottom edge of the opposite side 3/4” horizontal strap. These are important welds (Do it right!) Next and very important is the truss. I used a couple of 3/8” rods to make a triangular truss. This transfers load off of the horizontal bar to the frame legs. This is very important structurally. Do not omit.



Bridge support truss detail

The 6” stroke hydraulic bottle jacks are available from Sears and other stores for about \$12 ea.



6” stroke Bottle jack

Finally the third item required is a means of holding down the tail of tricycle gear

airplanes while jacking up the wing. In

my situation, the Mooney hangar is on the second floor. (No typo. The hangar is built into the side a backfilled hill.) So I use a chain anchored permanently into the hangar floor support beams.



However, many aircraft service shops employ a large weight in the form of a wooden box filled with concrete and mounted on casters for ease of movement. A chain or vertical pipe and locking pin cast into the cement is used to anchor the tail in position. This weight may have to be on the order of several hundred pounds depending on the aircraft type. That part of the project is left to the innovation of the reader.

Bill of materials

~ 160" of 1" x 1" x 1/8" angle stock
~ 84" of 3/4" x 3/16" flat steel strap
~ 40" of 3/8" rod or flat stock for truss straps.
~ 5 " of 2" diameter aluminum bar stock
2 ea. 6 " stroke hydraulic bottle jacks.
Paint

Tools Required

Arc welder
Chop saw, cutting torch or plasma cutter
Lathe to machine end caps and jack point receptacle cup.

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www.barkeraircraft.com