

As you walk through the rows of aircraft on display at Oshkosh and other gatherings throughout the country, you will find quite a variety of tiedown methods. Some are good, while others leave a lot to be desired.

Every aircraft owner should be familiar with the information contained in Advisory Circular #20-35C titled "Tiedown Sense." It gives excellent advice on the proper way to secure your bird so that it will not wind up "gone with the wind." Page 11 contains a chart which lists the minimum breaking strengths of various types and sizes of rope. On the same page they recommend leaving about an inch of slack in the tiedown; however, my opinion is that while the rope should not be excessively tightened, all the slack should be taken up. The only exception would be for hemp rope (which shrinks when wet), but this rope is not longer widely used. (It has poor weathering characteristics.)

Now for a word about chain tiedowns. I don't like them! Some time ago I saw a Piper J-5 that was secured with loose chains which were anchored in concrete. After some pretty stiff winds had passed by, it was discovered that the strut attach fittings had been nearly pulled off by the sharp jerking when the slack was taken up by the wind gusts. Both spars were split and ruined. Other aircraft tied with rope were undamaged.

I use 3/8 inch nylon or poly rope of sufficient length that will provide tying to the stake, looping around the strut and tying back to the stake. Rather than trusting the tiedown loop, take the rope through the loop, around the strut and back through the loop. Some of these tiedown loops are welded on and I have seen them broken. Running them through the loop and then around the strut will keep the rope up at the top where it can do the most good - if you simply tie it around the strut, it can slide down and damage the strut should a wind gust jerk the wing upwards.

As you read AC #20-35C you will get the impression that the FAA doesn't like tiedown stakes that are driven into the ground because they tend to pull out easily when it gets wet. Also note that there is no mention of the screw type tiedown. After trying them I can easily understand why. The auger type will absolutely not go into the soil with any rocks, and if you do get it down, then you have a hole full of loose dirt. The spiral screw type is not much better, being more adapted to tethering a pooch



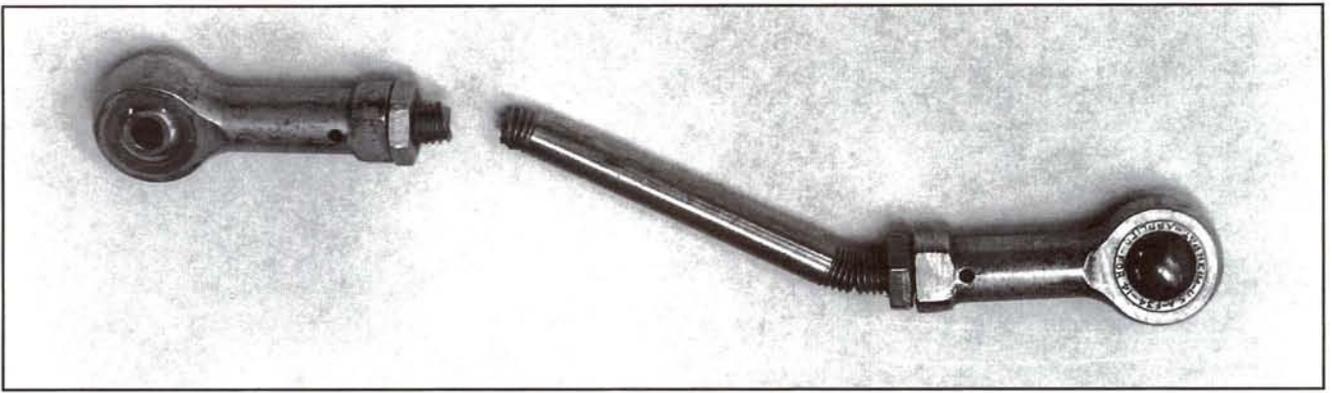
AIRCRAFT TIEDOWNS AND CONTROL LOCKS

by Harold Armstrong
A/C 746

than tying down an aircraft. (In fact, that is the purpose for which most are sold.) The end the rope is secured to is generally just a bent piece, and will open up in a hard wind gust. To make up a good set of stakes, use 1/2 inch diameter steel rod with a minimum length of 18 inches. Make a loop of 1/4 inch rod and weld near the top, and grind the other end to a point. When driven all the way in at an angle of at least 30 degrees from vertical, make the rope tie through the loop and around the stake. You now

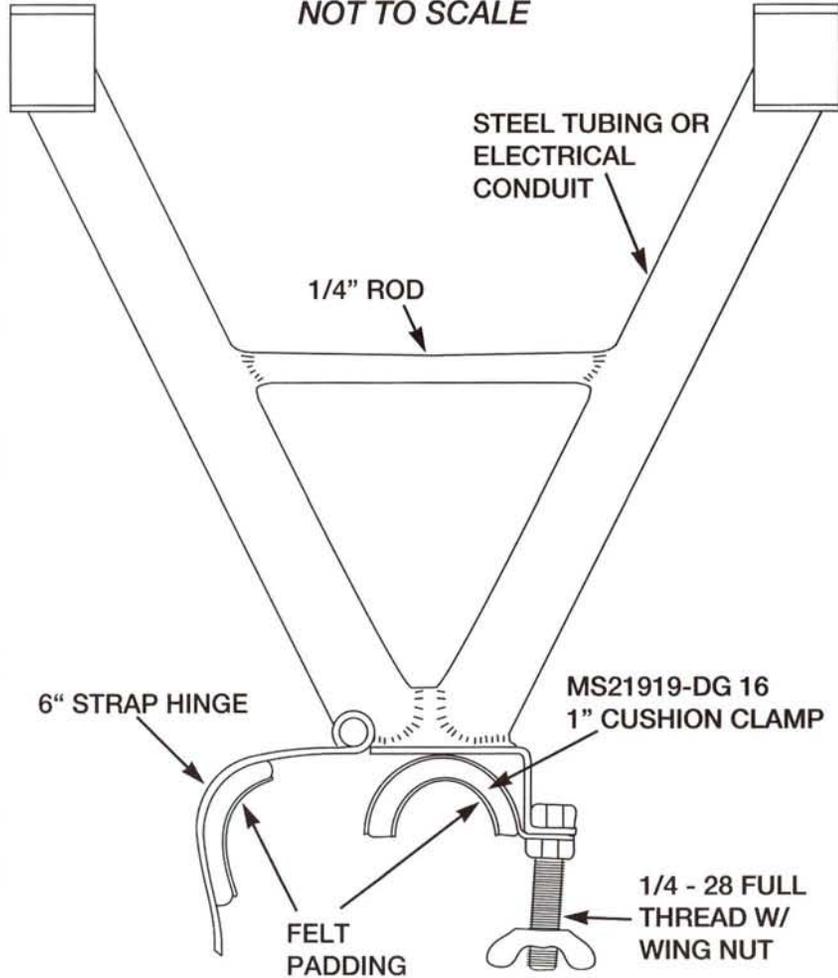
have a good tiedown. (For more on tiedowns, see Joe Dickey's tiedown ideas on page 11. - HGF)

Let's talk about control locks. The most commonly used method of securing the controls is to tie the stick full aft or forward. Many years ago a Taylor E-2 was tied down close to my father's dairy farm. It had the stick secured forward by the safety belt. The E-2 is very light on the tail and the wind managed to pull the tail stake and get the tail up high enough that the aircraft went on its nose



AERONCA 7AC CONTROL LOCK

NOT TO SCALE



This aileron bellcrank rod was broken when a control lock was not used on an Aeronca Champ. A fair wind can exert a lot of force.

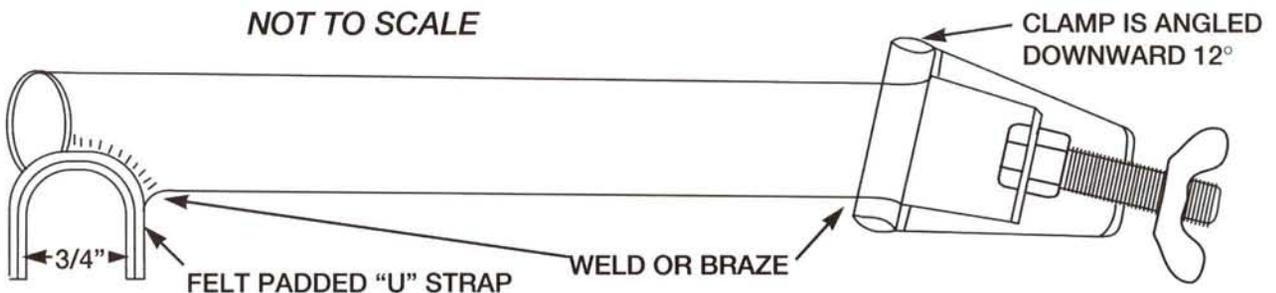
with the wings still tied! More recently, my nephew took his Champ to another airport for its annual inspection. After completion, the IA tied it down outside with the stick under the seat belt. The wind got up and the stick worked all the way to the left. The constant pressure and banging of the right aileron bent and eventually broke the actuator rod, leaving the aileron hanging loose. (See photo.)

While working on the restoration of my son's Champ, I designed a control lock that eliminates this type of problem. It clips on the front seat frame and secures the stick with both elevators and ailerons in a neutral position. The same concept could be adapted to other aircraft. (Refer to the drawings for construction details.) The rudder lock is made from a couple pieces of Masonite hardboard with felt padding.

One more word of wisdom—always tie down your aircraft and install control locks, but **DON'T FORGET** to remove them before flight.

The control lock shown in the drawings on this page can prevent expensive damage from occurring-use control locks whenever your airplane is tied down.

NOT TO SCALE



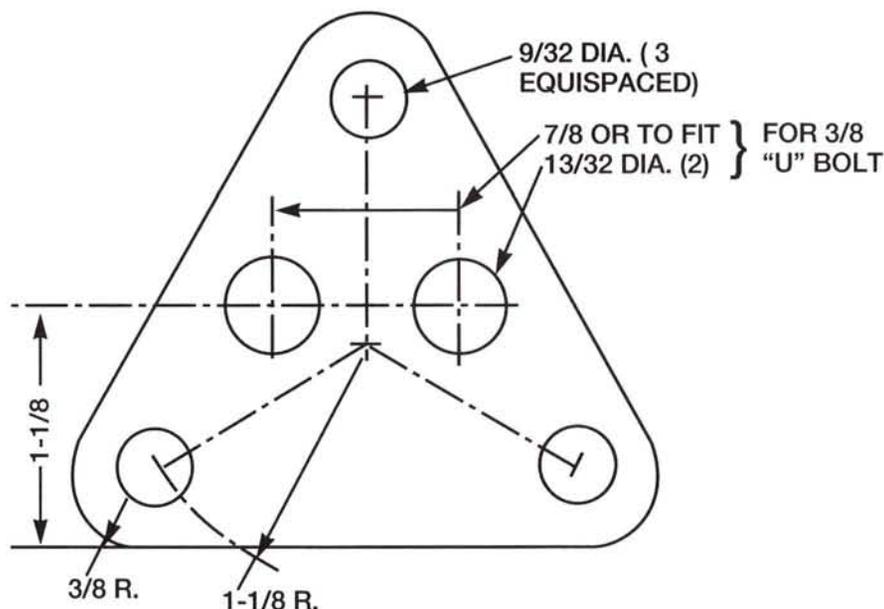
MORE ON AIRCRAFT TIEDOWNS

by H.G. Frautschy, based on the drawings and notes of A/C Advisor Joe Dickey

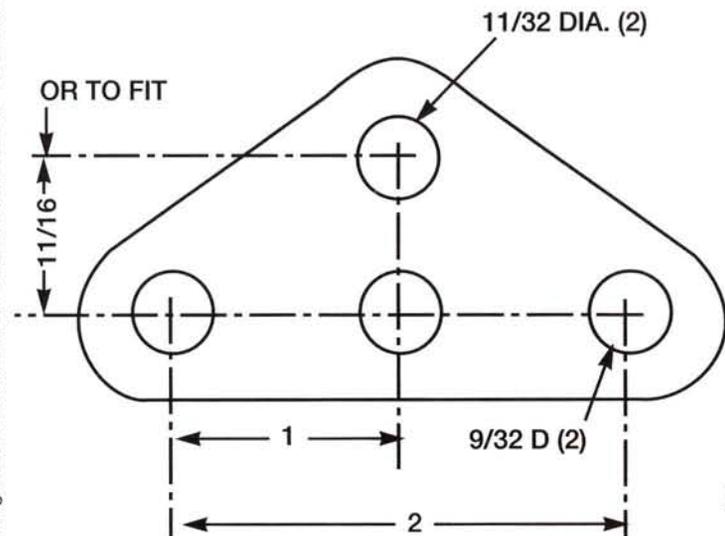
**ALL SIZES IN INCHES UNLESS OTHERWISE NOTED
FABRICATE FROM DRAWING DIMENSIONS - DRAWINGS NOT TO SCALE**

TIEDOWN BASE PLATES (MAKE FROM 1/8 STEEL)

WING PLATE - 2 REQD.

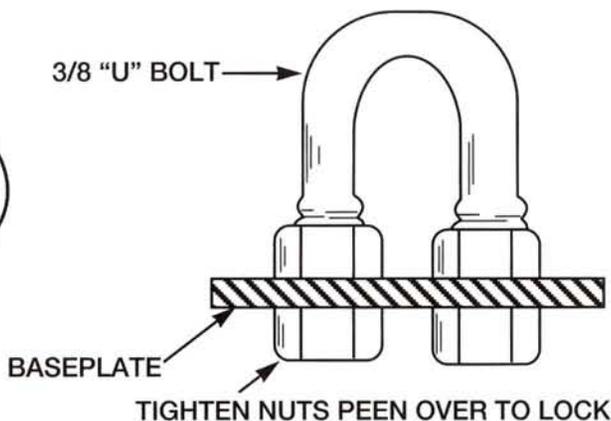


TAILPLATE - 1 REQD.

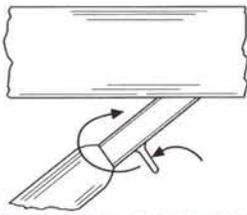


Tiedowns have always elicited a bunch of opinions, and one of my favorites is a compact set of tiedowns that Joe Dickey built up to secure his Aeronca Champ. Joe uses them to supplement "permanent" tiedowns at airports other than his home field, and as a sole means of constraint when he is at a fly-in. He has had good success with them, having never had them pulled out of the ground or breaking. The same can't be said for the "dog anchor" types of tiedowns, which have opened up and broken while Joe was tied down at a fly-in. (Remember the "big blow" at EAA Oshkosh '82?) The set pictured in the doodles on these pages have been used successfully in both rocky and loamy soil, and have proven to be very damage resistant. Small rocks are pushed aside, and impacting larger rocks or boulders results in a resounding "ring" when the rod is struck by the hammer. When that happens, just move the tiedown. A few whacks with the hammer will straighten the steel stake out. Just follow the dimensions shown on the drawings, and remember to always tie your light plane down - it helps when someone decides to run up a helicopter, jet or even another prop driven airplane with the wind blast pointed right at your pride and joy. Having your tail surfaces strained through a chain link fence will ruin a perfectly good summer, not to mention your checkbook!

BASEPLATE ASSEMBLY

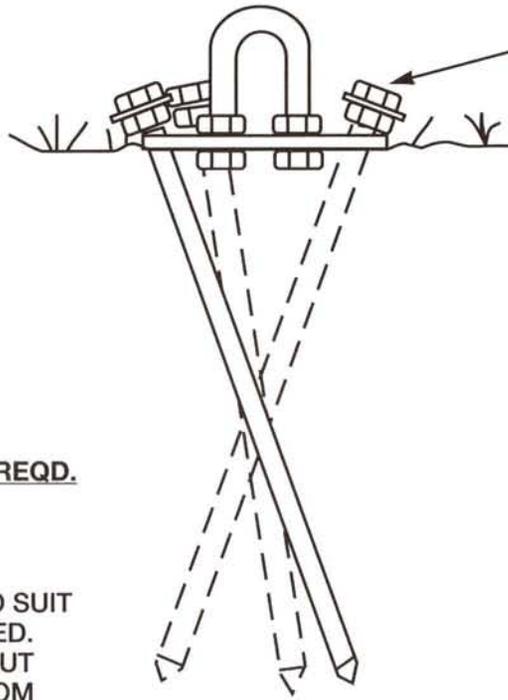


**AIRPLANES WITH WELDED ON
TIEDOWN RINGS**



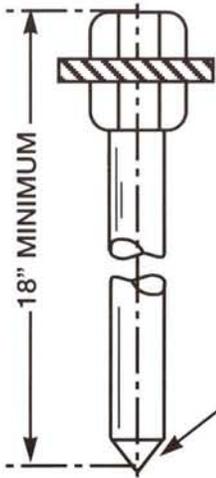
TAKE ROPE THROUGH RING,
AROUND STRUT AND BACK.
USE RING ONLY TO KEEP
ROPE FROM SLIPPING DOWN.

SETTING ANCHORS



DRIVE PINS IN ANGLED
TOWARD CENTER.

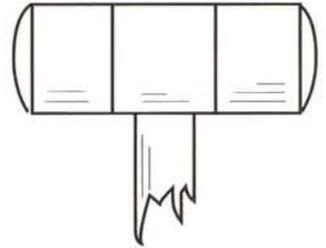
ANCHOR PINS - 8 REQD.



MAKE FROM
1/4" STEEL ROD
THREAD TOP TO SUIT
HARDWARE USED.
RUN BOTTOM NUT
SNUG TO BOTTOM
OF THREADS.
ADD WASHER (NEED-
ED TO PULL PIN) AND
TIGHTEN TOP NUT.
PEEN OVER TO
LOCK.

90° POINT - SHARP-
ER POINTS BLUNT
TOO EASILY

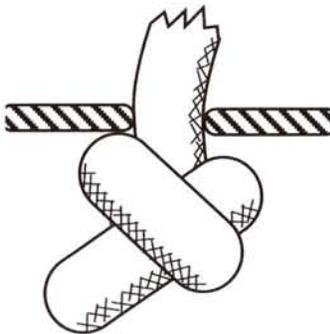
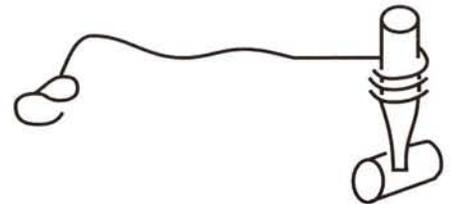
A GOOD HAMMER



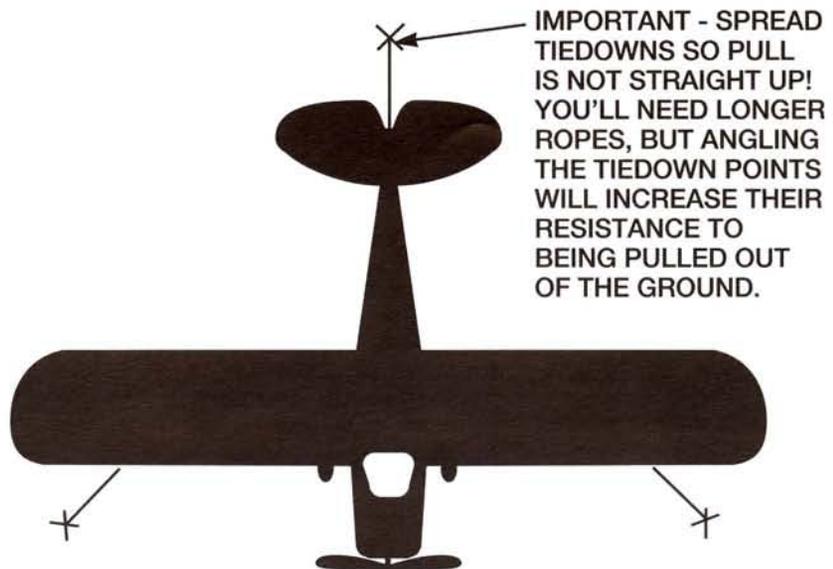
MACHINIST'S MALLET
WITH ONE PLASTIC HEAD
AND ONE STEEL HEAD.
DOESN'T WEIGH MUCH.
DRIVES TIEDOWN PINS.
PLASTIC TENT STAKES
AND THOSE WHO
IGNORE 'PLEASE DO NOT
TOUCH' SIGNS.

TO REMOVE PINS

USE HAMMER HANDLE
TO GRIP
SLIP LOOP UNDER
WASHER
450 LB. TEST NYLON
CORD WORKS WELL
USE ONE FOOT TO
HOLD BASEPLATE
DOWN, PULL
STRAIGHT IN LINE
WITH PIN.



THIS IS A MODIFICATION OF JOE'S
ORIGINAL DESIGN BY BION MCPEAK
- ELIMINATE THE "U" BOLT, AND ON
A NEW SET OF BASE PLATES, CARE-
FULLY RADIUS THE NEW HOLE FOR
THE ROPE TO PREVENT CHAFING.
THE HOLE SHOULD BE A TIGHT FIT
FOR THE ROPE. KNOT THE ROPE
AS SHOWN ON THE BACKSIDE OF
THE BASEPLATE. MELT OR GLUE
THE KNOT TO BE SURE IT WILL NOT
COME UNDONE. THIS BASEPLATE IS
NOT RECOMMENDED FOR USE WITH
POLYETHYLENE ROPE.



IMPORTANT - SPREAD
TIEDOWNS SO PULL
IS NOT STRAIGHT UP!
YOU'LL NEED LONGER
ROPES, BUT ANGLING
THE TIEDOWN POINTS
WILL INCREASE THEIR
RESISTANCE TO
BEING PULLED OUT
OF THE GROUND.