

MAIN LANDING GEAR SPREAD

The main landing gear strut for the Mark IV is a proprietary design of Co-Z Development. It was designed to be very strong (half way between the Long EZ and Defiant). It should not spread and take a permanent set over time. Camber was designed into the strut so that it would be negative (wheels tilted bottoms in) when the aircraft is empty, and close to zero when the aircraft is loaded to gross, and not too far positive when the gear spreads in a hard landing. It is a spring and should return when the aircraft is empty. Featherlite is the only supplier that has our permission to use our design, it is the only supplier highly recommended by Burt Rutan, their gear is the only gear we have tested, they are the only ones we have authorized to reproduce it, and their gear is guaranteed 100%. Recently a new builder asked the Internet group whether there was any difference between the struts made by Featherlite (FL) and unauthorized copies (UC) made by someone else. One builder, not yet flying, said he didn't think so (he had purchased a UC strut). A builder/flier David Domeier, said that after 5 months of flying he thought his gear had spread, because the wheel camber seemed to have changed. He said he had an UC strut, and asked if anyone else had the same experience.

We have the two oldest Mark IVs and were not aware of any gear spread in our prototype Mark IV, now 10 years old, nor have we noticed any in our plans model Mark IV, over 6 years old, both of which have Featherlite Mark IV struts, so we decided to make a quick survey. Most builders already flying do not participate in the internet group, so we did some telephoning. We called up 5 builder/fliers who had been flying around 2 years. We didn't find anyone with a Featherlite strut who thought his gear had spread, but we did locate two more builder/flyers with UC struts who thought their gear had spread and that they had lost wheel camber.

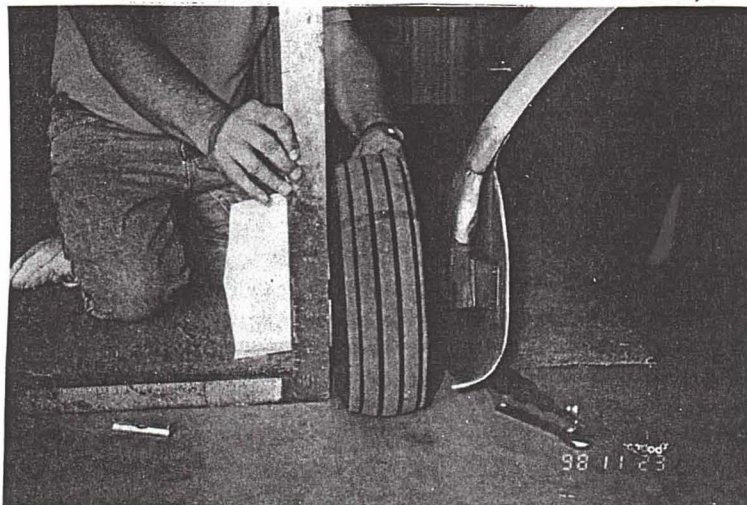
To avoid relying on opinion, it seemed prudent to get some actual data. There is a simple test to determine gear spread. If the gear spreads, wheel camber changes. So all you have to do is to measure camber when the airplane is new and empty, and each 100 hours or annual thereafter (at the same weight), and record it in your aircraft log book. Camber is easy to measure. Do not "set" the gear. Make sure the floor is level,

or level it. Then set a carpenter square against the wheel. A 5" Cleveland has a flat area on the rim which is 6" wide. Measure the distance from the square to the rim at the bottom of the wheel and at the top. Do this after pushing the airplane forward at least 5ft., and then after pushing it aft at least 5ft., and take the average, to eliminate the affect of toe-in. The wheel should be tilted bottom inboard (negative camber) when empty. A 1/4" difference between bottom and top of the wheel calculates to 2.5 degrees, and 5/16" is 3.0 degrees. Record this in your aircraft log book. Our plans model, after almost 500 hours logged and several hundred landings (some pretty hard) has an average camber of 2.7 degrees negative (bottom tilted inboard) when empty, which we think is about what it was 6 years ago (We hardly ever "set" the gear). We assume that the UC strut is a copy of our proprietary design, but we don't know if it is made the same way as Featherlite. We asked David Domeier and the two other builder/fliers with UC struts who thought they had spread to make the same measurement of wheel camber. Here are the results reported back to us:

Builder	Strut	Time Flying	Camber
Co-Z	FL	6 years	-2.7 deg.(bottom in)
DD	UC	5 mos.	+0.2 deg.(bottom out)
FB	UC	2 years	+1.9 deg.(bottom out)
TM	UC	2 years	+2.0 deg.(bottom out)

We don't know what the camber was on any of these aircraft when they were first completed, but if the struts were the same shape as ours, one would expect the wheel camber would have been the same as ours initially. If so, this data suggests that UC struts spread over time, and have taken a permanent set, as suspected (We don't know how much a strut would have to spread to change wheel camber by 4.5 degrees, but probably quite a bit.).

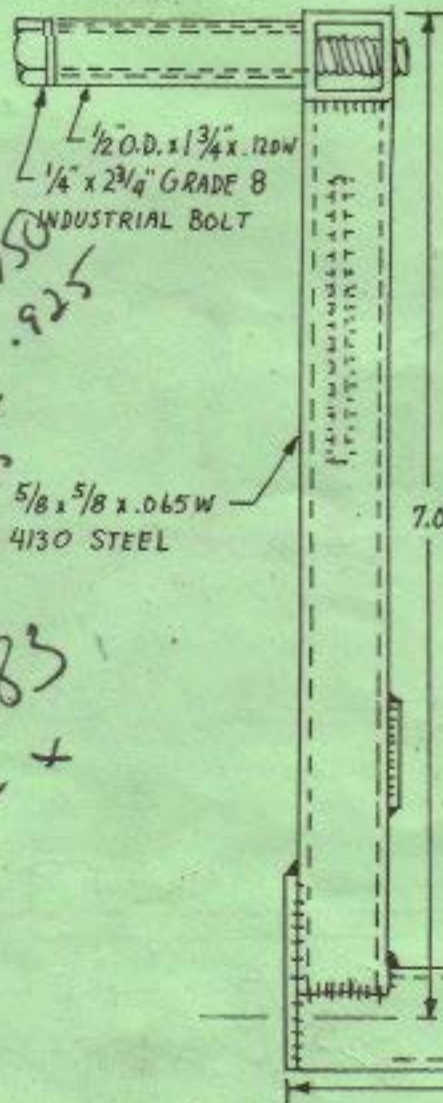
A main landing gear would be very difficult to replace. Featherlite has a very good track record for over 18 years making struts for the Varieze, Long EZ, Defiant, Grisley, other Rutan designs, and Cozys, so we have no reservations about their quality. We urge our builders to use only the Featherlite strut. We are asking Featherlite to keep Mark-IV struts on the shelf so builders will not have any reason to buy from anyone else.



David Domeier visited us to discuss landing gear spread. We let him check wheel camber on our MKIV N14CZ (6 years old,



460tt) left, and a new Cozy III not yet flown, right.



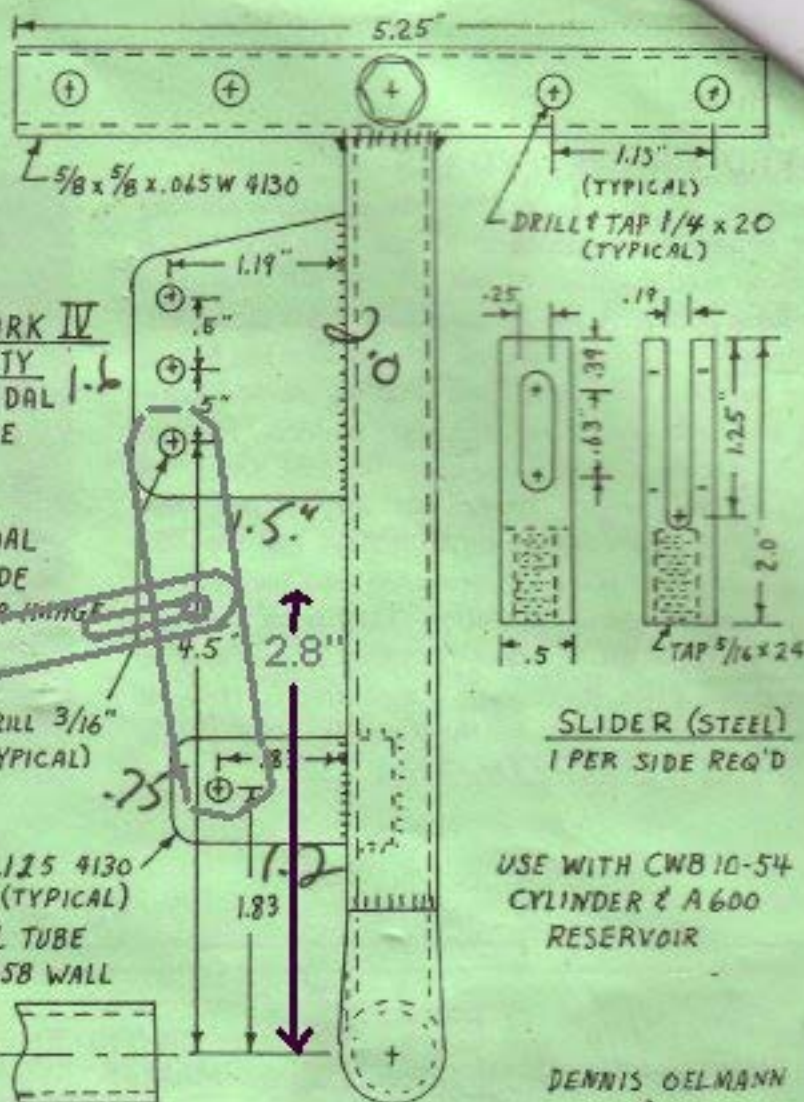
COZY MARK IV HEAVY DUTY RIGHT PEDAL 1.6 LEFT SIDE

NOTE:
LEFT PEDAL
RIGHT SIDE
IS MIRROR IMAGE

DRILL 3/16"
(TYPICAL)

.125 4130
(TYPICAL)

4130 STEEL TUBE
3/4" O.D. x .058 WALL



SLIDER (STEEL)
1 PER SIDE REQ'D

USE WITH CWB 10-54
CYLINDER & A600
RESERVOIR

DENNIS OELMANN
&
NAT PUFFER 10/1/79