

## ERCOUPE: LOW TAIL SYNDROME AS A SAFETY ISSUE



Main Landing Gear Oleo Assembly with Spacers Installed

**APPLICABLE TO:** Ercoupe 415-C, CD, D, E, G, F-1, F-1A and Alon Aircraft that are equipped with either the welded steel or aluminum trailing link MLG assemblies; serial numbers 112 and up.

### BACKGROUND

Ercoupe aircraft are designed with a number of unique safety features that add to their stability on the ground and in the air. Among those features are their ability to run on the ground, either during takeoff or landing, at a speed up to 60 mph without flying off prior to the pilots deliberate rotation, and especially upon landing to run out on the ground with firm nose wheel contact insuring positive directional control.

This feature is a function of a design that places the wings static angle of attack at a slightly negative angle (-3.5 degrees) when running on the ground.

This negative angle of attack is only assured when the aircraft is rigged correctly with the designed static tail height of 75". Any appreciable loss of static tail height which results in the static angle of attack moving positive will negate this design feature.

### **Why has this become a problem worth addressing?**

The original Ercoupe design was an 800-pound aircraft standing on 4" tires and wheels, and the NLG and MLG being virtually the same height with the tail at its 75" design height.

In this configuration any loss of tail height was normally due to worn MLG taxi stack donuts which could be corrected by the replacement of the MLG taxi stack donuts to restore the static angle of attack.

### **The Safety Issue**

Over the years, in addition to worn taxi stack donuts, the addition of dual fork nose gear assemblies, 500x5 nose tires and 600x6 MLG tires have had a negative effect on the tail height of the aircraft and thus the wings static angle of attack. As a result, many aircraft are experiencing a tail low condition even with the MLG taxi stack in serviceable condition.

In this tail low configuration, the 3.5 degrees negative angle of attack moves to the positive and the aircraft has a tendency to fly off prematurely during takeoff and lacks firm ground contact and directional control needed during the landing roll.

Not a good situation when trying to hold the runway centerline in a gusting crosswind.

### **Solutions**

Lacking any desire to return to 4" wheels and tires, the first solution is to ensure that the MLG taxi donut stack is at its proper height and the correct NLG taxi spring is installed in the NLG oleo assembly.

The MLG taxi donut stack can be inspected by jacking the aircraft slightly, removing the load from the donut stack and inspecting for vertical play in the donuts. If the donuts freely move up and down on the oleo cylinder their replacement will increase the tail height. The ratio is about 1" of play removed equals a 6" to 8" rise at the tail. As a side benefit, weight is shifted forward further compressing the NLG taxi spring.

The NLG should be inspected, and verification made that the correct taxi spring is installed. There were several spring lengths produced to accommodate the original ERCO nose gear, Forney dual nose fork and Univair dual nose fork STC. Lower the nose – raise the tail. Same ratio: nose down 1" equals a 6" to 8" rise at the tail. With those two possible maintenance related issues addressed, the remaining solution is to shim the left and right MLG taxi stacks by adding spacers between the top of the taxi stack and the oleo piston stop collar. This is accomplished through the addition of bushings available by STC or the installation of clamping collars installed as a Minor Change as approved and logged by your A/P rated mechanic.