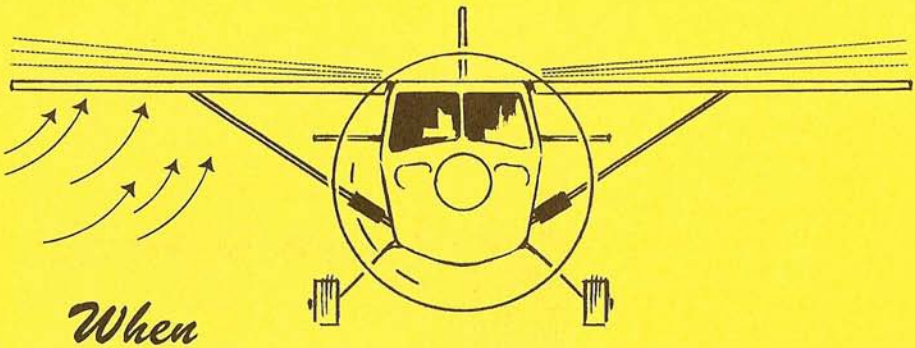

When

In Turbulence . . .

OUR GUST ALLEVIATION SYSTEM GIVES YOUR PASSENGERS A SMOOTHER - SAFER FLIGHT AND KEEPS YOU IN THE AIR

The Wings With Springs Story

Earl G. Metzler

In Charles A. Lindbergh's book describing his flight across the Atlantic Ocean in 1927 he expressed a fear that the wings may come off his plane as he encountered moderate turbulence near

Safer,

Smoother Flight

the coast of Newfoundland. This fear of wing separation in flight is a very real fear as the established standard requires only a 3.8 "G" load design factor. Mother Nature does not have the proper respect for our standards and sometimes it is possible to encounter turbulence beyond the thirty feet per second criteria. Most pilots feel if you slow the plane in rough air the wings will hold fast. This may or may not be the truth but it appears to be a poor substitute for gust alleviation that allows the wings to move away from the excessive loads created by vertical currents of air.

By installing our **hydraulic strut assembly** onto your airplane you experience a new concept in flying. When the wings are tilted upward by gusts the airflow on the bottom of the wings is "washed out" at the wing tip. The airflow at the top of the wing is drawn down toward the center by the extra wing tilt or dihedral. This aerodynamic reaction combined with the stretch in the strut assembly greatly reduces the loads on the struts and other load carrying members. This we can prove by our load measuring device which makes use of the formula: pressure times area equals force. The actual weight on the 170B strut with full gross load is about 1600 pounds. This is derived by taking the piston area 5.30 x 300 PSI which is the gauge pressure.

When we installed a "G" meter in our cabin we studied pressure loads and recorded "G" loads under certain conditions. We found we could make a tight turn that would show two and one half "G's" on the meter, but the pressure on the strut assembly only doubled. This indicates the movement of loads inboard when the dihedral increases. We also found that when the airplane was lightly loaded the "G's" were higher than when the plane was full gross. Since the "G" meter measures acceleration and not loads we arrived at the conclusion that the "G" meter can give a false impression. Our pressure system actually weighs the loads on the wings.

When an aircraft is equipped with our strut cylinders very steep and quick turns can be made with ease. This is in part due to the increased dihedral that occurs when the wheel is pulled back sharply to complete a tight turn. They assume a modified "V" shape and have some lift when the fuselage is vertical.

Some ask why do I claim slower landings? Visualize a bird as it touches down. It flaps its wings just as its feet touch the ground. This is much the same way our Cessna lands. First the weight of the fuselage minus the weight of the wings presses on the landing gear. Then the wings come down with the flap that gives a bit of lift at the right time. You have to see it to believe it, but we can really land short. After touching down the wings have a slight droop which aids in crosswind taxiing.

With our **hydraulic strut assembly** your aircraft is much more stable and smoother. Instrument flight is less difficult. Another

Flexibility

Without Fatigue

feature is the improved spiral stability. Since the dihedral angle increases in a turn the wing has less tendency to dip. The low wing has more lift so it wants to return to level flight. A person can be blind folded and still fly without making a steep turn. In a Taylorcraft, equipped with our cylinder kit, a friend of mine flew for twenty minutes with eyes covered.

Our program of development will soon include all Cessna models with struts and at a later date we will modify cantilever type wings to include shock absorbers. The cylinders will be internal in aircraft without struts.

The cylinder is filled with fluid. An accumulator which is inside the strut contains air or dry nitrogen under 200 PSI pressure. As the aircraft becomes airborne the pressure goes up to 300 PSI depending on the load. The $\frac{7}{8}$ diameter piston rod is drilled to allow the fluid to transfer from the cylinder to the pressure tube in the strut. The wings pivot on hardened bushings that are coated with Teflon for permanent lubrication. The strut assembly will stretch over eight inches and the wing tip will elevate to three and one half feet above the level position.

Wings With Springs

PLEASANT UNITY, PENNSYLVANIA 15676