Editorial Comment

POSSIBLE OVERLOADING OF SAILPLANE WINGS IN BENDING THROUGH SPOILER OPERATION AT HIGH SPEED

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The preceding article is of great importance and should be understood by all sailplane pilots who fly at or near V_{NE} speeds. The new high technology sailplanes being very clean aerodynamically, utilizing thin airfoil sections, and having inherently more flexible wings, are vulnerable to abuse at high speeds. Therefore, *Technical Soaring* is printing the article by Stafiej in addition to its previous publication in *Aero Revue*. All readers should be aware that the tests reported were conducted at one "g" flight conditions with no pull-up or input from gusts. The wing deflections shown are amazing, frightening - and real.

While the article deals with an unusual upper surface only spoiler configuration, the influence of conventional upper-lower wing spoilers at high speeds may still be present. In addition, these effects will be further accentuated by gusts and pull-up manevuers. In this light, some precautionary comments are offered which will hopefully serve to stimulate further thought on this important matter.

(1) A highly deflected wing of typical composite sailplane construction develops very high horizontal shear forces that could cause a hidden, and progressive, on-going failure of the spar shear web.

(2) The introduction of a gust or pull-up at the time of already high deflections as may be introduced by spoiler deflection, could be catastrophic. In addition, partial failure of the shear load carrying structure may change the flutter resistance characteristics of the wing, leading to the possibility of a later catastrophic flutter mode failure at a lower (than V_{NE}) speed.

(3) At high speeds, the spoilers destroy the lift at those wing stations spanned by the spoiler. This requires the generation of additional lift loading on the remaining wing panels (particularly those outboard of the spoilers) to maintain a given net lift value. The additional outboard loading transfer can be very abrupt if the spoilers have a tendency to go full open at high speeds, and may lead to rapid increases in wing root bending moments on "stiff" winged sailplanes.

(4) All "soft" fiberglass wing sailplanes should have a log book entry of the natural wing bending vibratory modes. This can be checked on the ground with the fuselage rigidly supported, and a wing bending oscillation introduced by pumping one tip "in phase." (Note: The temperature at the time the test is conducted should also be logged.) These oscillations are then counted. The first oscillatory mode varies between sailplanes from a low value on the order of 60 beats per minute to values of over 200 beats per minute. The latter value, of course, applies to a stiffer wing. At a later date, given any suspicion of spar web damage, this vibration mode can, and should, be rechecked. Any appreciable drop (change in the direction of reduced stiffness) is reason for concern and should be followed (before flight) by a careful inspection of the internal wing structure.