LIST OF SYMBOLS

ρ	— Air density
W	— Weight
V_{bk}	— Terminal velocity with brakes extended
S	— Wing area
S_{bk}	— Brake area
C_D	— Drag coefficient, brakes retracted
C_{Dbk}	— Drag coefficient, brakes extended
ΔC_{Dbk}	— Increment of drag coefficient due to brakes
C_{DB}	— Drag coeffifficient of brake flaps
C_L	— Lift coefficient, brakes retracted
C_{Lbk}	— Lift coefficient, brakes extended
ΔC_{Lbk}	— Increment of lift coefficient due to brakes
C_{LB}	— Lift coefficient of brake flaps
ΔC_M	— Change in wing pitching moment due to brakes
C_{MB}	— Pitching moment coefficient of brake flaps
a_o	— Angle of attack for zero lift
Δa_o	— Change of angle of attack for zero lift
dC_L/da	— Slope of the lift curve

the control system need only be designed for the operating load, usually taken as 50 lbs.

When the gliding angle spoilers are extended the outer part of the wing carries more than its normal share of the load, which results in an increased wing bending moment. However, this is usually neglected in the design, as it has been shown that due to the damping effect of the brakes high acceleration loads can only with difficulty be obtained when they are in use. Also, the lift curve slope, dC_L/da is smaller with the normal brake arrangement than with the plain wing, thus reducing the effect of gusts.

Similarly, it is usual to neglect the twisting moment of the brakes, which should be small.

As far as drag loads on the wing are concerned, it is usually possible to so place the brakes along the span that the sum of the moments due to the brakes plus the wing profile drag at the braked terminal speed is less than the moment due to the profile drag alone at the terminal speed without brakes. However, as pointed out above, aerodynamic considerations will more often dictate the position of the flaps.

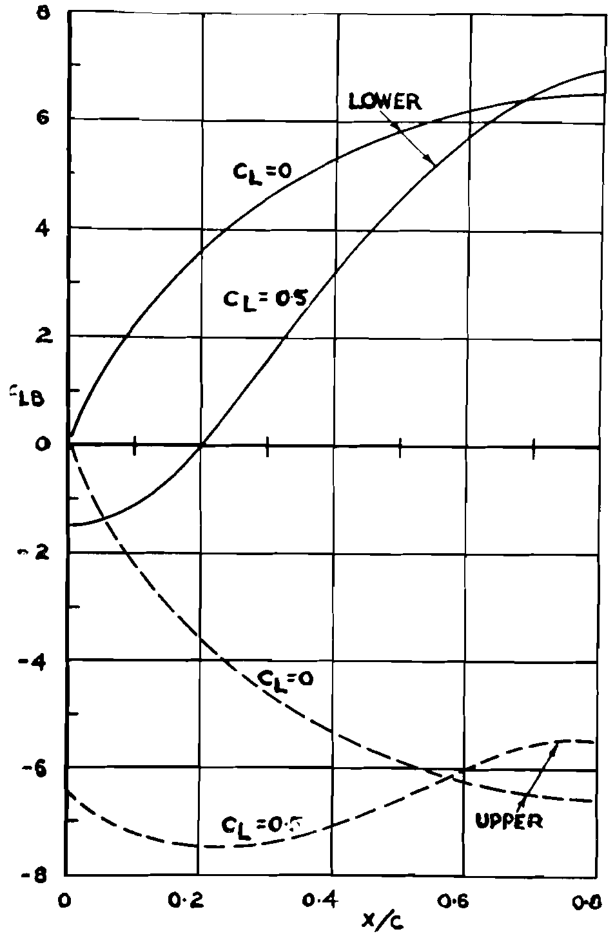

Fig. 8. Variation of brake flap lift coefficient with chordwise position on wing.

The ideal brake flap installation for any particular case can only be achieved by complete wind tunnel tests, but by following the simple rules outlined above it should be possible for the sailplane designer to produce a unit which will be quite satisfactory, limiting the diving speed as required and increasing the gliding angle very substantially. Equally important is the effect

(Continued on Page 14)

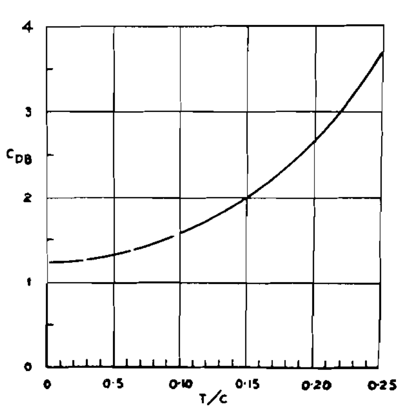

Fig. 6. Variation of brake flap drag coefficient with chordwise position on wing.

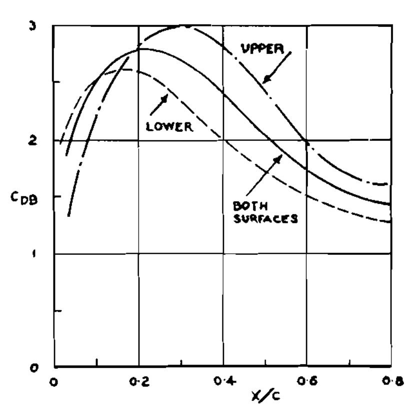

Fig. 7. Variation of brake flap drag coefficient with wing thickness. Upper and lower surface brakes at 0.4 chord,

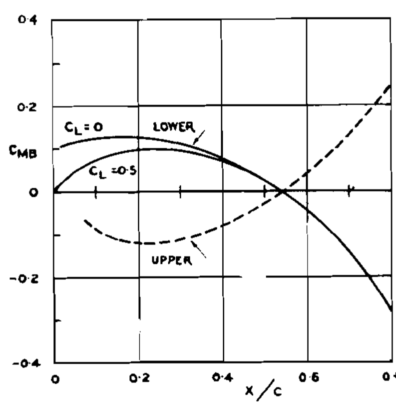

Fig. 9. Variation of brake flap pitching moment coefficient with chordwise position on wing.