

Schaufele Annotations

Chapter 13 Operational Envelope

Procedure for Estimating the Buffet Boundary

To estimate the buffet boundary related to $C_{L_{max}}$, the low speed $C_{L_{max}}$ must first be determined using the methods that are used to produce Fig. 11-3. Using the outer panel $(t/c)_{max}$, the outer panel airfoil section $C_{l_{max}}$ may be determined from Fig. 11-4, and this value is used in Fig. 11-5 to find the airplane $C_{L_{max}}$.

Using Fig. 13-8, for a given Mach number, the value of $(C_{L_{max}} \text{ at Mach}) / (C_{L_{max}} \text{ low speed})$ may be found, and hence $C_{L_{max}}$ at the given Mach number. This value is plotted as in Fig. 13-9 for a range of Mach numbers from about Mach 0.2 to 0.9.

To estimate the buffet boundary related to M_{DIV} , first plot the values of C_L as a function of M_{DIV} for the value of quarter chord sweep and average t/c for the design under evaluation, using Fig. 4-8. Then offset this line by a Mach increase of 0.03. This line is an estimate of the buffet boundary related to M_{DIV} . Fair the two buffet boundaries as shown in Fig. 13-9. Finally, show the design cruise point C_L (typically at start of cruise) at the selected cruise Mach number.