



Low-speed normal force and pitching moment of slender wings in ground effect

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LOW-SPEED NORMAL FORCE AND PITCHING MOMENT OF SLENDER WINGS IN GROUND EFFECT

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LOW-SPEED NORMAL FORCE AND PITCHING MOMENT OF SLENDER WINGS IN GROUND EFFECT

1. NOTATION AND UNITS

		<i>SI</i>	<i>British</i>
A	aspect ratio		
a	normal force curve slope at zero incidence in free air ($dC_N/d\alpha$) $_{\alpha=0}$	rad^{-1}	rad^{-1}
C_m	pitching moment coefficient in free air based on S and c_r , positive nose-up		
ΔC_m	total increase in C_m due to ground effect		
δC_{mt}	correction term for wing thickness in Equation (2.3)		
C_N	normal force coefficient in free air based on S		
ΔC_N	total increase in C_N due to ground effect		
δC_N	increase in C_N due to ground effect for thin wing		
δC_{Nt}	correction in ΔC_N for wing thickness		
c_r	centreline chord of wing	m	ft
F	ratio of actual value to "slender wing" theoretical value for normal force curve slope in free air, $(2/\pi A)(dC_N/d\alpha)$.		
h	height above ground of quarter-chord point of aerodynamic mean chord	m	ft
S	planform area of wing	m^2	ft^2
S_f	frontal area of wing at $\alpha = 0$	m^2	ft^2
s	semi-span of wing	m	ft
x	chordwise distance rearwards from wing apex	m	ft
α	incidence of wing	rad	rad
ξ	x/c_r		