

Free Variables	Units	Description
A_{0h}	m^2	Horizontal bending area constant A0h
$A_{1h_{Land}}$	m	Horizontal bending area constant A1h (landing case)
$A_{1h_{MLF}}$	m	Horizontal bending area constant A1h (max aero load case)
$A_{2h_{Land}}$	[-]	Horizontal bending area constant A2h (landing case)
$A_{2h_{MLF}}$	[-]	Horizontal bending area constant A2h (max aero load case)
A_{floor}	m^2	Floor beam x-sectional area
A_{fuse}	m^2	Fuselage x-sectional area
$A_{hbendb_{Land}}$	m^2	Horizontal bending area at rear wingbox (landing case)
$A_{hbendb_{MLF}}$	m^2	Horizontal bending area at rear wingbox (max aero load case)
$A_{hbendf_{Land}}$	m^2	Horizontal bending area at front wingbox (landing case)
$A_{hbendf_{MLF}}$	m^2	Horizontal bending area at front wingbox (max aero load case)
A_{skin}	m^2	Skin cross sectional area
A_{vbendb}	m^2	Vertical bending material area at rear wingbox
B_{0v}	m^2	Vertical bending area constant B0
B_{1v}	m	Vertical bending area constant B1
$C_{D_{fuse}}$	[-]	Fuselage drag coefficient
D_{fuse}	N	Fuselage drag
$I_{h_{shell}}$	m^4	Shell horizontal bending inertia
$I_{v_{shell}}$	m^4	Shell vertical bending inertia
$L_{ht_{max}}$	N	Horizontal tail maximum load
$L_{vt_{max}}$	N	Vertical tail maximum load
M	[-]	Cruise Mach number
M_{floor}	$N \cdot m$	Max bending moment in floor beams
P_{floor}	N	Distributed floor load
R_{fuse}	m	Fuselage radius
S_{bulk}	m^2	Bulkhead surface area
S_{floor}	N	Maximum shear in floor beams
S_{nose}	m^2	Nose surface area
V_{∞}	$[\frac{m}{s}]$	Cruise velocity
V_{bulk}	m^3	Bulkhead skin volume
V_{cabin}	m^3	Cabin volume
V_{cone}	m^3	Cone skin volume
V_{cyl}	m^3	Cylinder skin volume
V_{floor}	m^3	Floor volume
V_{hbendb}	m^3	Horizontal bending material volume b
V_{hbendc}	m^3	Horizontal bending material volume c
V_{hbendf}	m^3	Horizontal bending material volume f
V_{hbend}	m^3	Horizontal bending material volume
V_{nose}	m^3	Nose skin volume
V_{vbendb}	m^3	Vertical bending material volume b

V_{vbend_c}	m^3	Vertical bending material volume c
V_{vbend}	m^3	Vertical bending material volume
W_{apu}	lbf	APU weight
W_{buoy}	lbf	Buoyancy weight
W_{cone}	lbf	Cone weight
W_{fix}	lbf	Fixed weights (pilots, cockpit seats, navcom)
W_{floor}	lbf	Floor weight
W_{fuse}	lbf	Fuselage weight
W_{hbend}	lbf	Horizontal bending material weight
W_{insul}	lbf	Insulation material weight
W_{lugg}	lbf	Passenger luggage weight
W_{padd}	lbf	Misc weights (galley, toilets, doors etc.)
W_{pass}	lbf	Passenger weight
$W_{payload}$	lbf	Payload weight
W_{seat}	lbf	Seating weight
W_{shell}	lbf	Shell weight
W_{skin}	lbf	Skin weight
W_{tail}	lbf	Total tail weight
W_{vbend}	lbf	Vertical bending material weight
W_{window}	lbf	Window weight
λ_{cone}	[-]	Tailcone radius taper ratio
ρ_∞	$[\frac{kg}{m^3}]$	Freestream density
ρ_{cabin}	$\frac{kg}{m^3}$	Cabin air density
σ_x	$\frac{N}{m^2}$	Axial stress in skin
σ_{M_h}	$\frac{N}{m^2}$	Horizontal bending material stress
σ_{M_v}	$\frac{N}{m^2}$	Vertical bending material stress
σ_θ	$\frac{N}{m^2}$	Skin hoop stress
τ_{cone}	$\frac{N}{m^2}$	Shear stress in tail cone
c_0	m	Root chord of the wing
h_{fuse}	m	Fuselage height
l_{cone}	m	Cone length
l_{floor}	m	Floor length
l_{fuse}	m	Fuselage length
l_{shell}	m	Shell length
n_{rows}	[-]	Number of rows
n_{seat}	[-]	Number of seats
t_{shell}	m	Shell thickness
t_{skin}	m	Skin thickness
w_{aisle}	m	Aisle width
w_{floor}	m	Floor half-width
w_{fuse}	m	Fuselage half-width

x_b	m	x-location of back of wingbox
x_f	m	x-location of front of wingbox
$x_{hbend_{Land}}$	ft	Horizontal zero bending location (landing case)
$x_{hbend_{MLF}}$	ft	Horizontal zero bending location (maximum aero load case)
x_{shell1}	m	Start of cylinder section
x_{shell2}	m	End of cylinder section
x_{tail}	m	x-location of tail
x_{vbend}	ft	Vertical zero bending location
x_{wing}	m	x-location of wing c/4
