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NOTATIONS

Preparation of Teaching Resource Material
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Workshops for University Faculty

A	Area or Gross area of a cross section
A_e	Effective area of a section
A_{eff}	Effective area
A_n	Net area of a section
A_{st}	Area of an intermediate stiffener
A_t	Tensile stress area of a bolt
a	Effective throat size of a fillet weld
a_1	Net sectional area of connected elements
a_2	Gross sectional area of connected
B	Overall width of an element
b	Flat width of an element
b_{eff}	Effective width of a compression element
b_{er}	Reduced effective width of a sub-element
b_{eu}	Effective width of an unstiffened compression element
C_b	Coefficient defining the variation of moments on a beam
C_T	Constant depending on the geometry of a T-section
C_W	Warping constant of a section
c	Distance from the end of a beam to the load or the reaction
D	Overall web depth
D_e	Equivalent depth of an intermediately stiffened web
D_2	Distance between the centre line of an intermediate web stiffener and the tension element
d	Diameter of a bolt or Diameter of a spot weld
d_e	Distance from the centre of a bolt to the end of an element
d_{eff}	Effective diameter of a circular plug or elongated plug weld
d_r	Recommended tip diameter of an electrode
d_w	Visible diameter of a circular plug or elongated plug weld.
E	Modulus of elasticity of steel
e	Distance between a load and a reaction
e_s	Distance between the geometric neutral axis and the effective neutral axis of a section
F_c	Applied axial compressive load
F_s	Shear force (bolts)
F_t	Applied tensile load
F_v	Shear force
F_w	Concentrated load on a web
f_a	Average stress in a flange
f_c	Applied compressive stress
G	Shear modulus of steel
g	Gauge, i.e. distance measured at right angles to the direction of stress in a member, centre-to-centre of holes in consecutive lines
h	Vertical distance between two rows of connections in channel sections
I	Second moment of area of a cross section about its critical axis
I_{min}	Minimum required second moment of area of a stiffener
I_s	Second moment of area of a multiple stiffened element
I_x, I_y	Second moment of area of a cross section about the x and y axes respectively
J	St Venant torsion constant of a section

K	Buckling coefficient of an element
l	Length of a member between support points
le	Effective length of a member
Lw	Length of a weld
M	Applied moment on a beam
Mb	Buckling resistance moment
Mc	Moment capacity of a cross section
Mcr	Critical bending moment to cause local buckling in a beam
Mcx	Moment capacity in bending about the x axis in the absence of Fc and My
Mcy	Moment capacity in bending about the y axis in the absence of Fc and Mx
ME	Elastic lateral buckling moment of a beam
Mp	Plastic moment capacity of a section
Mx, My	Moment about x and y axes respectively
My	Yield moment of a section
N	Number of 90 degree bends in a section
Pbs	Bearing capacity of a bolt
Pc	Buckling resistance under axial load
Pcs	Short strut capacity
Pe	Elastic flexural buckling load (Euler load) for a column
Pex, Pey	Elastic flexural buckling load (Euler load) for a column about x and y axes respectively
Pfs	Shear capacity of a fastener
Pft	Tensile capacity of a fastener
Ps	Shear capacity of a bolt or Shear capacity of a spot weld
PT	Torsional buckling load of a column
PT	Tensile capacity of a member or connection
PTF	Torsional flexural buckling load of a column
Pv	Shear capacity or shear buckling resistance
Pw	Concentrated load resistance of a single web
Pc	compressive strength
Pcr	Local buckling stress of an element
Po	Limiting compressive stress in a flat web
Pv	Shear strength
Py	Design strength of steel
Pw	Design strength of weld
Q	Factor defining the effective cross-sectional area of a section
qcr	Shear buckling strength of a web
r	Inside bend radius or Radius of gyration
rcy	Radius of gyration of a channel about its centroidal axis parallel to the web
ri	Radius of gyration of an I section
ro	Polar radius of gyration of a section about the shear centre
rx, ry	Radii of gyration of a section about the x and y axes respectively
Zp	Plastic modulus of a section
S	Distance between the centres of bolts normal to the line of applied force or, where there is only a single line of bolts, the width of the sheet or Leg length of a fillet weld or Standard deviation
Sp	Staggered pitch, i.e. the distance, measured parallel to the direction of stress in a member, centre-to-centre of holes in consecutive lines
t	Net material thickness
ts	Equivalent thickness of a flat element to replace a multiple stiffened element for calculation purposes
t1, t2	Thickness of thinner and thicker materials connected by spot welding
Us	Ultimate tensile strength of steel
u	Deflection of a flange towards the neutral axis due to flange curling
W	Total distributed load on a purlin
Wd	Weight of cladding acting on a sheeting rail
Ww	Wind load acting on a sheeting rail
w	Flat width of a sub-element or Intensity of load on a beam
ws	Equivalent width of a flat element to replace a multiple stiffened element for calculation purposes
x0	Distance from the shear centre to the centroid of a section measured along the x axis of symmetry

fy	Yield strength of steel
Ysa	Average yield strength of a cold formed section
Ysac	Modified average yield strength in the presence of local buckling
y	Distance of a flange from the neutral axis
Zc	Compression modulus of a section in bending