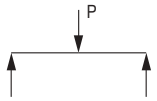
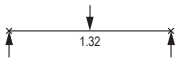
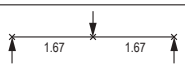
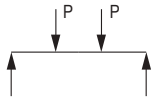
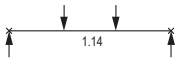
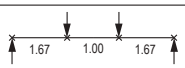
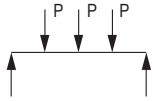
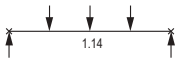
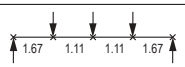
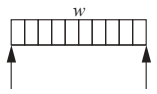
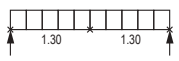
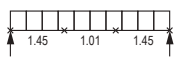
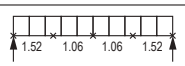
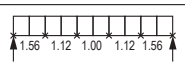
where

$Lc = KL$ = effective length of member (in.)

F_e = elastic buckling stress = $\pi^2 E/(KL/r)^2$

VALUES OF C_b FOR SIMPLY SUPPORTED BEAMS		
LOAD	LATERAL BRACING ALONG SPAN	C_b
	NONE LOAD AT MIDPOINT	
	AT LOAD POINT	
	NONE LOADS AT THIRD POINTS	
	AT LOAD POINTS LOADS SYMMETRICALLY PLACED	
	NONE LOADS AT QUARTER POINTS	
	AT LOAD POINTS LOADS AT QUARTER POINTS	
	NONE	
	AT MIDPOINT	
	AT THIRD POINTS	
	AT QUARTER POINTS	
	AT FIFTH POINTS	
NOTE: LATERAL BRACING MUST ALWAYS BE PROVIDED AT POINTS OF SUPPORT PER AISC *SPECIFICATIO*N CHAPTER F.		

Adapted from *Steel Construction Manual*, 14th ed., AISC, 2011.

Tension Members

Flat Bars or Angles, Bolted or Welded

Definitions

Bolt diameter: d_b

Nominal hole diameter: $d_h = d_b + \frac{1}{16}"$

Gross width of member: b_g

Member thickness: t

Connection eccentricity: $\overline{x}$

Gross area: $A_g = b_g\, t$ (use tabulated areas for angles)

Net area (parallel holes): $A_n = \left[b_g - \Sigma\left(d_b + \frac{1}{16}"\right)\right]t$

Net area (staggered holes):

$A_n = \left[b_g - \Sigma\left(d_b + \frac{1}{16}"\right) + \Sigma\frac{s^2}{4g}\right]t$

s = longitudinal spacing of consecutive holes

g = transverse spacing between lines of holes

Effective area (bolted members):

$A_e = UA_n$

- Flat bars: $U = 1.0$
- $U = 1 - \bar{x}/L$ All tension members where the tension load is transmitted to some but not all the elements by fasteners or welds

Effective area (welded members):

$A_e = UA_n$

- Flat bars or angles with transverse welds: $U = 1.0$
- Flat bars of width "w", longitudinal welds of length "L" only:
  - $U = 1.0$ ($L \geq 2w$)
  - $U = 0.87$ ($2w > L \geq 1.5w$)
  - $U = 0.75$ ($1.5w > L > w$)
- Angles with longitudinal welds only
  - $U = 1 - \overline{x}/L$

Limit States and Available Strengths

Yielding: $\phi_y = 0.90$, $P_n = F_y A_g$, $\Omega = 1.67$

Rupture: $\phi_f = 0.75$, $P_n = F_u A_e$, $\Omega = 2.00$

Block shear: $\phi = 0.75$, $\Omega = 2.00$

U_{bs} = 1.0 (flat bars and angles)

A_{gv} = gross area for shear

A_{nv} = net area for shear

A_{nt} = net area for tension

$$R_n = \text{Smaller} \begin{cases} F_u[0.6A_{nv} + U_{bs}A_{nt}] \\ [0.6F_y A_{gv} + U_{bs}F_u A_{nt}] \end{cases}$$