

Command: RFCOLSTF

Calculate column stiffener requirements (load not at top of column).

Enter column data:

Enter SIZE: W14x211

W14X211 D= 1'-3 3/4" Bf= 1'-3 3/4" Tf= 1 9/16" Tw= 1"  
k= 2 7/8" k1= 1 3/4" T= 10" D-2tf= 1'-0 5/8" a= 7 3/8"

Enter Fy <36>:50

Enter beam data:

Enter SIZE: W27x84

W27X84 D= 2'-2 3/4" Bf= 10" Tf= 5/8" Tw= 7/16"  
k= 1 9/16" k1= 1 1/8" T= 1'-11 5/8" D-2tf= 2'-1 7/16" a= 4 3/4"

Enter Fy <36>:50

Enter moment (kip-ft) <586.85885436>:450

Pbf = 345.22 PwoPwi = 735.74 Pwb = 2728.65 Pfb = 760.50

NO STIFFENER REQUIRED.

Command: RFCOLSTF

Calculate column stiffener requirements (load not at top of column).

Enter column data:

Enter SIZE: W14x176

W14X176 D= 1'-3 1/4" Bf= 1'-3 5/8" Tf= 1 5/16" Tw= 13/16"  
k= 2 5/8" k1= 1 11/16" T= 10" D-2tf= 1'-0 5/8" a= 7 3/8"

Enter Fy <50>:

Enter beam data:

Enter SIZE: w27x84

W27X84 D= 2'-2 3/4" Bf= 10" Tf= 5/8" Tw= 7/16"  
k= 1 9/16" k1= 1 1/8" T= 1'-11 5/8" D-2tf= 2'-1 7/16" a= 4 3/4"

Enter Fy <50>:

Enter moment (kip-ft) <586.85885436>:450

Pbf = 345.22 PwoPwi = 571.25 Pwb = 1657.69 Pfb = 536.28

NO STIFFENER REQUIRED.

Command: RFCOLSTF

Calculate column stiffener requirements (load not at top of column).

Enter column data:

Enter SIZE: W14x132

W14X132 D= 1'-2 5/8" Bf= 1'-2 3/4" Tf= 1" Tw= 5/8"  
k= 2 5/16" k1= 1 5/8" T= 10" D-2tf= 1'-0 5/8" a= 7"

Enter Fy <50>:

Enter beam data:

Enter SIZE: w27x84

W27X84 D= 2'-2 3/4" Bf= 10" Tf= 5/8" Tw= 7/16"  
k= 1 9/16" k1= 1 1/8" T= 1'-11 5/8" D-2tf= 2'-1 7/16" a= 4 3/4"

Enter Fy <50>:

Enter moment (kip-ft) <586.85885436>:450

Pbf = 345.22 PwoPwi = 393.53 Pwb = 777.94 Pfb = 331.53  
Minimum stiffener = 0.3200 x 2.9975 x 12.6250  
Stiffener required per AISC equation K1-1.

Command: RFCOLSTF

Calculate column stiffener requirements (load not at top of column).

Enter column data:

Enter SIZE: w14x99

W14X99 D= 1'-2 1/8" Bf= 1'-2 5/8" Tf= 3/4" Tw= 1/2"

k= 2 1/16" k1= 1 1/2" T= 10" D-2tf= 1'-0 5/8" a= 7"

Enter Fy <50>:

Enter beam data:

Enter SIZE: w27x84

W27X84 D= 2'-2 3/4" Bf= 10" Tf= 5/8" Tw= 7/16"

k= 1 9/16" k1= 1 1/8" T= 1'-11 5/8" D-2tf= 2'-1 7/16" a= 4 3/4"

Enter Fy <50>:

Enter moment (kip-ft) <586.85885436>:500

Pbf = 383.58 PwoPwi = 265.60 Pwb = 330.75 Pfb = 190.13

Actual stiffener area required per K1-9 = 3.2773 (A36) and 2.3597 (A572-50).

Stiffener = 0.3459 x 4.7375 x 12.6250 A36 (3.2773 sq. in.)

Stiffener = 0.3200 x 4.7375 x 12.6250 A572-50 (3.0320 sq. in.)

Minimum stiffener = 0.3200 x 3.0775 x 12.6250

Stiffener required per AISC equation K1-9, K1-8 and K1-1.

Command: (webstress) null function\*Cancel\*

Command:

Command: (if (not C:PRying) (load "PRying09")) nil

Command: PRying

Connection type ---

(W) or (T)ee shape, (2) Plates, or (D)ouble clips <D>: D

Enter axial load <10.00000000>:40

Enter bolt gage <4">:

Enter total number of bolts <6>:8

Enter bolt diameter <3/4">: Select bolt grade - A(3)25 or A(4)90 <3>: 3

Connection type ---

(F)riktion, (N) threads included, or (X) threads excluded <F>: N

Enter bolt pitch <3">:

Enter Fy <36>:

Enter beam size or C/R: W21x44

Enter clip L leg width <4">:3

Enter clip L thickness <1/2">:3/8

Select option to revise entry or to calculate required tf -

(1) Flange thickness = 0.3750

(2) Flange width = 6.3500

(3) Web thickness = 0.3500

(4) Axial load = 40.0000

(5) Flange gage = 4.0000

(6) Number of bolts = 8

(7) Bolt diameter = 0.7500

(8) Bolt pitch = 3.0000

(9) Fy = 36

E --- Execute calculations <E>: E

Required flange thickness = 0.4798

Prying force = 2.2429 kips

Load per bolt including prying = 7.2429 kips

Fitting flange stiffness NOT adequate.

Bolt IS adequate for total tension load.

Type a character to continue <N>:

Check bolt interaction formula <Y>: Y

Enter shear load per bolt <1.25000000>:5

Allowable tension stress = 37.0633 ksi

Actual tension stress = 16.3947 ksi

Connection IS adequate for shear load.

Enter total vertical shear <40.00000000>:

Enter total axial load <40.00000000>:

V = 40.00 kips

H = 40.00 kips

Resultant = 56.57 kips

Check beam web shear stress by vector analysis <Y>: Y

Enter additional moment (kip-in.) <0.00000000>:

Enter fitting length <1'>:

Enter fitting leg width <3">:

Enter member setback <1/2">:

Enter Fy of web <36>:50

Shear stress = 14.9780 ksi. Stress is OK.

Command: PRYING

Connection type ---

(W) or (T)ee shape, (2) Plates, or (D)ouble clips <D>: D

Enter axial load <40.00000000>:

Enter bolt gage <4">:5.5

Enter total number of bolts <8>:

Enter bolt diameter <3/4">: Select bolt grade - A(3)25 or A(4)90 <3>: 3

Connection type ---

(F)riktion, (N) threads included, or (X) threads excluded <N>: N

Enter bolt pitch <3">:

Enter Fy <50>:

Enter beam size or C/R: w21x44

Enter clip L leg width <3">:4

Enter clip L thickness <3/8">:1/2

Select option to revise entry or to calculate required tf -

- (1) Flange thickness = 0.5000
- (2) Flange width = 8.3500
- (3) Web thickness = 0.3500
- (4) Axial load = 40.0000
- (5) Flange gage = 5.5000
- (6) Number of bolts = 8
- (7) Bolt diameter = 0.7500
- (8) Bolt pitch = 3.0000
- (9) Fy = 50

E --- Execute calculations <E>: E

Required flange thickness = 0.5120

Prying force = 2.1181 kips

Load per bolt including prying = 7.1181 kips

Fitting flange stiffness NOT adequate.

Bolt IS adequate for total tension load.

Type a character to continue <N>: b

Select option to revise entry or to calculate required tf -

- (1) Flange thickness = 0.5000
- (2) Flange width = 8.3500
- (3) Web thickness = 0.3500
- (4) Axial load = 40.0000
- (5) Flange gage = 5.5000
- (6) Number of bolts = 8
- (7) Bolt diameter = 0.7500
- (8) Bolt pitch = 3.0000
- (9) Fy = 50

E --- Execute calculations <E>: 9

Enter Fy <50>:36

Select option to revise entry or to calculate required tf -

- (1) Flange thickness = 0.5000
- (2) Flange width = 8.3500
- (3) Web thickness = 0.3500
- (4) Axial load = 40.0000
- (5) Flange gage = 5.5000
- (6) Number of bolts = 8
- (7) Bolt diameter = 0.7500
- (8) Bolt pitch = 3.0000
- (9) Fy = 36

E --- Execute calculations <E>: E

Required flange thickness = 0.6034

Prying force = 2.8472 kips

Load per bolt including prying = 7.8472 kips

Fitting flange stiffness NOT adequate.

**Bolt IS adequate for total tension load.**

**Type a character to continue <N>: h**

**Select option to revise entry or to calculate required tf -**

- (1) Flange thickness = 0.5000**
- (2) Flange width = 8.3500**
- (3) Web thickness = 0.3500**
- (4) Axial load = 40.0000**
- (5) Flange gage = 5.5000**
- (6) Number of bolts = 8**
- (7) Bolt diameter = 0.7500**
- (8) Bolt pitch = 3.0000**
- (9) Fy = 36**

**E --- Execute calculations <E>: 1**

**Enter flange thickness <1/2">:5/8**

**Select option to revise entry or to calculate required tf -**

- (1) Flange thickness = 0.6250**
- (2) Flange width = 8.3500**
- (3) Web thickness = 0.3500**
- (4) Axial load = 40.0000**
- (5) Flange gage = 5.5000**
- (6) Number of bolts = 8**
- (7) Bolt diameter = 0.7500**
- (8) Bolt pitch = 3.0000**
- (9) Fy = 36**

**E --- Execute calculations <E>: E**

**Required flange thickness = 0.5808**

**Prying force = 1.4453 kips**

**Load per bolt including prying = 6.4453 kips**

**Fitting flange IS adequately stiff.**

**Bolt IS adequate for total tension load.**

**Type a character to continue <N>: n**

**Check bolt interaction formula <Y>: N**

**Command: BOLTMOM**

**CALCULATE AXIAL LOADS ON BOLTS IN CLIP ANGLE CONNECTIONS WITH END MOMENTS.**

**Enter clip angle end moment (kip-inches) <100.00000000>:480**

**Enter number of rows of bolts <8>:**

**Enter bolt pitch <3">: I= 756.00 S= 72.00 F= 6.67 Mrem= 200.00**

**I= 315.00 S= 42.00 F= 4.76 Mrem= 57.14**

**I= 90.00 S= 20.00 F= 2.86 Mrem= 5.71**

**I= 9.00 S= 6.00 F= 0.95 Mrem= 0.00**

Maximum tension load at extreme bolts = 6.67

Command: UNIFLOAD

Enter SIZE: W21x44

W21X44 D= 1'-8 5/8" Bf= 6 1/2" Tf= 7/16" Tw= 3/8"

k= 1 1/8" k1= 7/8" T= 1'-6 3/8" D-2tf= 1'-7 3/4" a= 3 1/8"

Enter Fy <50>:

Wc= 1822 KIP-FT.

Enter beam span (in inches): 240

End reaction for allowable uniform load (50% of UL) = 45.6 kips

End reaction @ 85% = 77.4 End reaction @ 60% = 54.7

Enter bolt grade <A325>:

Connection type ---

(F)riktion, (N) threads included, or (X) threads excluded <N>: N

Enter bolt size <3/4">:

45.6 / 9.28 = 4.91 5 bolts single shear, or 3 bolts double shear.

Command: (if (not C:BV) (load "UNIFLOAD")) nil

Command: BV Bolt grade (GRADE-TYPE-HL COND): A325-f-ssl

Boltsize <3/4">: A325-F-SSL = 6.6268

Command: BV Bolt grade (GRADE-TYPE-HL COND): A325-N

Boltsize <3/4">:

A325-N = 9.2775

Command:

BV Bolt grade (GRADE-TYPE-HL COND): a325-x

Boltsize <3/4">:1

A325-X = 23.5619