

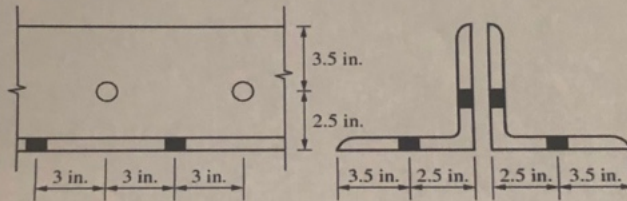
Find solutions for your homework

Search

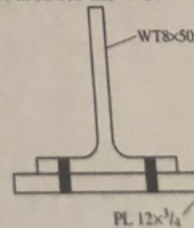
home / study / engineering / civil engineering / civil engineering questions and answers / 1. determine the tensile design strength (lrfd) and allowa...

## Question: 1. Determine the tensile design strength (LRFD) and allowable...

1. Determine the tensile design strength (LRFD) and allowable tensile strength (ASD) of a WT7x41 tension member with three lines of standard holes for 3/4 in. bolts. Assume block shear does not control. Each element of the WT will be attached to the connection.
2. Determine tensile design strength (LRFD) and allowable strength (ASD) for a double-angle tension member composed of two L6x6x5/8 shapes as shown with holes for 3/4 in. bolts staggered in each leg.



3. A single L6x6x1 is used as a tension brace in a multi-story building. One leg of the angle is attached to a gusset plate with a single line of three 7/8 in. bolts at a spacing of 3 in. Determine the shear lag factor (consider Case 2 and Case 8), effective net area, and tensile strength (LRFD).
4. A WT8x50 tension member is welded along the tips of the flange for a length of 12 in. on each flange. Determine the shear lag factor (Case 2) and effective net area for the WT.



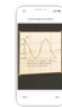
Show transcribed image text

### Post a question

Answers from our experts for your tough homework questions

### Continue to post

16 questions remaining



### Snap a photo from your phone to post a question

We'll send you a one-time download link

888-888-8888

Text me

By providing your phone number, you agree to receive a one-time automated text message with a link to get the app. Standard messaging rates may apply.

### My Textbook Solutions



Engineering  
Mechanics -...  
10th Edition



Vector  
Mechanics...  
12th Edition



University  
Physics  
14th Edition

[View all solutions](#)

## Expert Answer



Anonymous answered this  
3,446 answers

Was this answer helpful?



1. Capacity of WT is controlled by net tensile capacity.

LRFD Strength = 528.89 kips

ASD strength = 352.5925 kips



Gross Area =  $A_g = 12 \text{ in}$   
 Thickness of flange =  $0.855 \text{ in}$   
 Thickness of web =  $0.51 \text{ in}$

Bolt dia =  $3/4 \text{ in}$   
 Bolt hole dia =  $(3/4 + 1/16) \text{ in} = 13/16 \text{ in}$

$F_y = 50 \text{ ksi}$   
 $F_u = 65 \text{ ksi}$

a) Gross Tensile strength  
 $P_n = A_g \times F_y = 12 \times 50 \text{ kips} = 600 \text{ kips}$

LRFD,  $\phi = 0.9$ ,  $\phi P_n = 0.9 \times 600 \text{ kips} = 540 \text{ kips}$   
 ASD,  $\Omega = 1.67$ ,  $P_n/\Omega = 600/1.67 \text{ kips} = 359.28 \text{ kips}$

b) Net Section Capacity  
 Since load is transmitted to both flange & web,  
 Shear lag factor is 1.

$A_n = A_g - \text{bolt holes} = 12 - (2 \times 0.855 + 0.51) \times (3/4 \times (13/16))^2$   
 $A_n = 10.849 \text{ in}^2$   
 $P_n = F_u \times A_n \times U = 65 \times 10.849 \text{ kips} = 705.185 \text{ kips}$

LRFD,  $\phi = 0.75$ ,  $\phi P_n = 0.75 \times 705.185 \text{ k} = 528.89 \text{ kips}$   
 ASD,  $\Omega = 2$ ,  $P_n/\Omega = \frac{705.185 \text{ k}}{2} = 352.5925 \text{ k}$

Comment >

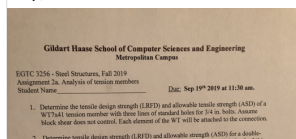
### Up next for you in Civil Engineering

4. Determine the minimum length of a crest vertical curve connecting a +4%

4. Determine the minimum  
The design speed is 50  
grade considerations w  
S>L assumption is cor

See answer

Gildart Haase School of  
Computer Sciences and  
Engineering Metropolitan  
Campus EGTC 3256-Steel



See answer

See more questions  
for subjects you study

### Questions viewed by other students

Q: Gildart Haase School of Computer Sciences and Engineering Metropolitan Campus EGTC 3256-Steel Structures, Fall 2019 Assignment 2a. Analysis of tension members Student Name Due: Sep 19th 2019 at 11:30 am. 1. Determine the

A: [See answer](#)

Q: WT 50 The WT8x50 from Problem 1 is welded (instead of bolted) longitudinally along the tips of the flange for a length of 12 inches on each side. Determine the shear lag factor and effective net area of the WT

A: [See answer](#) 100% (3 ratings)

[Show more](#) 

---

COMPANY 

---

LEGAL & POLICIES 

---

CHEGG PRODUCTS AND SERVICES 

---

CHEGG NETWORK 

---

CUSTOMER SERVICE 

---



© 2003-2021 Chegg Inc. All rights reserved.