

# TBWall Report

## Project Information

Designed By  
 Organization  
 Date 7/2/2017  
 Project  
 Job #  
 Client

**Number of Tieback Levels** Three

**Units System** ft

## Geometry

a 7.0 ft  
 b 10.8 ft  
 c 10.8 ft  
 d 12.8 ft  
  
 h 41.3 ft  
 L 45.4 ft

## Properties

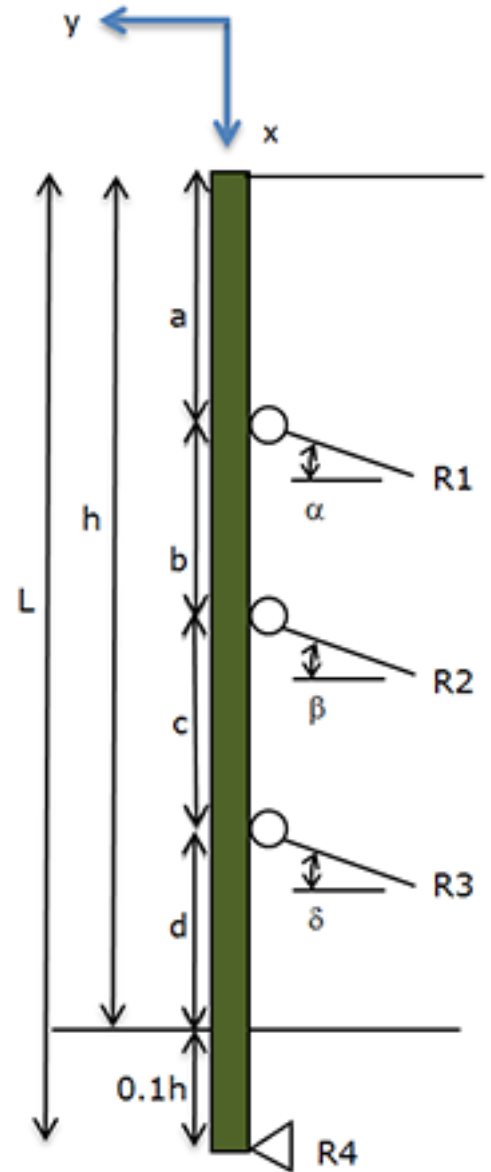
E 29000 ksi  
 fy 50 ksi

**Max. Deflection** 0.7 in

**Beam Shape** W16X57

## Tieback Data

Angle1 20  
 Angle2 20  
 Angle3 20



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## **Design Philosophy**

The analysis is based on "Equivalent Beam Method" first proposed by Blum and explained in detail in "Foundation Design" Teng, 1962, 1st & only edition or in "Foundation Engineering" Jumikis, 1987 2nd ed.

The design is based on classical structural analysis:

- \* This program uses classic-beam-theory beam elements to solve the multispans tieback design.
  
- \* The equivalent nodal loads for each span are determined by numerical integration of the beam equations to allow for the non uniform loads.
  
- \* The equivalent nodal loads, the stiffness matrix, and the support conditions are used to solve for the support reactions and the support rotations.
  
- \* The support reactions are then used to numerically integrate the entire span for values to display in the plots, and to find the max/min values.
  
- \* Steel Shapes only include compact sections, If noncompact sections are desired, additional design checks are required.
  
- \* The deflection output is based on structural analysis but an independent check should be made by Finite Element method or by site surveying.

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Reaction 1	Reaction 2	Reaction 3	Reaction 4
-97.50 kips	-41.95 kips	-119.54 kips	-45.92 kips

Maximum Shear	-67.5 kip at 28.50 ft
Maximum Moment	181.9 kip-at 28.50 ft
Maximum Deflection	-0.3076 in at 37.78 ft

Required Aw	3.37 in <sup>2</sup>	Adequate for Shear
Required Zx	72.89 in <sup>3</sup>	Adequate for Bending
Utilized Ix	46%	Adequate for Deflection

	R1	R2	R3
Tieback Force	103.8 kips	44.6 kips	127.2 kips
Unbonded Tieback Length	24.8 ft	18.6 ft	15.0 ft
Test Load	138.0 kips	59.4 kips	169.2 kips

#### Lateral Torsional Buckling Check

Lb	153 in
Cb	1
ry	1.60 in
ly	43.10 in <sup>4</sup>
h0	15.68 in
J	2.22 in <sup>4</sup>
rts	1.9 in
Lp	67.8 in
Lr	219.4 in
Fcr	60 ksi
Mn/Q	205 kip-ft

#### Axially-Loaded Member Check

P	0 kips
L	13 ft
K	0.8
A	16.8 in <sup>2</sup>
KL/r	76.5
Fe	49 ksi
Fcr	33 ksi
Pn/Q	328 kips

Required Embedment	25.16 ft
Tschebotarioff Check	21.86 ft

Combined Forces Utilization	89%
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