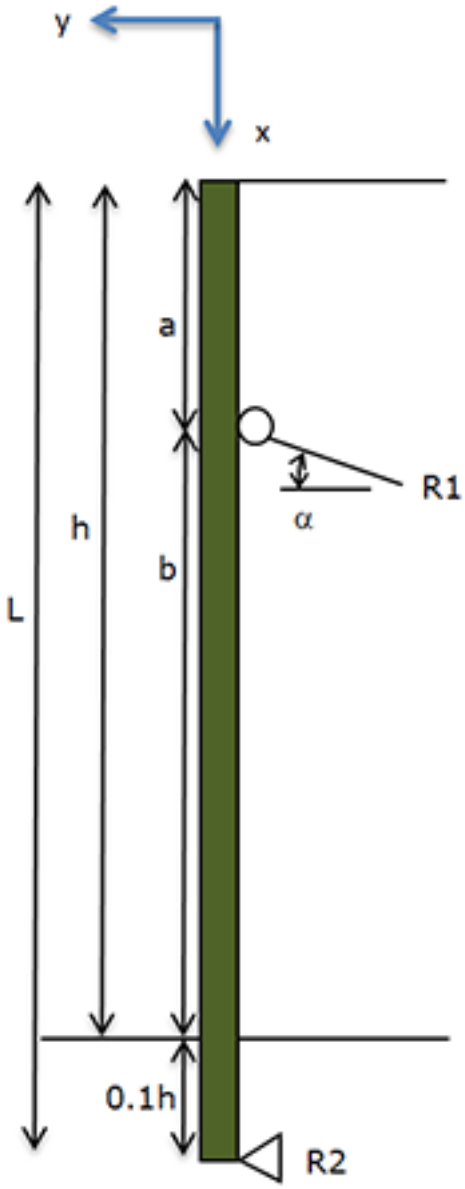
TBWall Report

Project Information

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



Number of Tieback Levels	**One**
Units System	**ft**

Geometry

a	7.0 ft
b	12.8 ft
h	19.8 ft
L	21.7 ft

Properties

E	29000 ksi
fy	50 ksi

Max. Deflection	**0.7 in**
Beam Shape	**W16X57**

Tieback Data

Angle1	20

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 multispan 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.

Reaction 1	Reaction 2
-51.60 kips	-18.35 kips

Maximum Shear	-29.1 kip at 7.00 ft
Maximum Moment	78.9 kip-at 7.00 ft
Maximum Deflection	-0.0727 in at 15.39 ft

Required Aw	1.45 in2	Adequate for Shear
Required Zx	31.62 in3	Adequate for Bending
Utilized Ix	11%	Adequate for Deflection

	R1
Tieback Force	54.9 kips
Unbonded Tieback Length	15.0 ft
Test Load	73.0 kips

Lateral Torsional Buckling Check

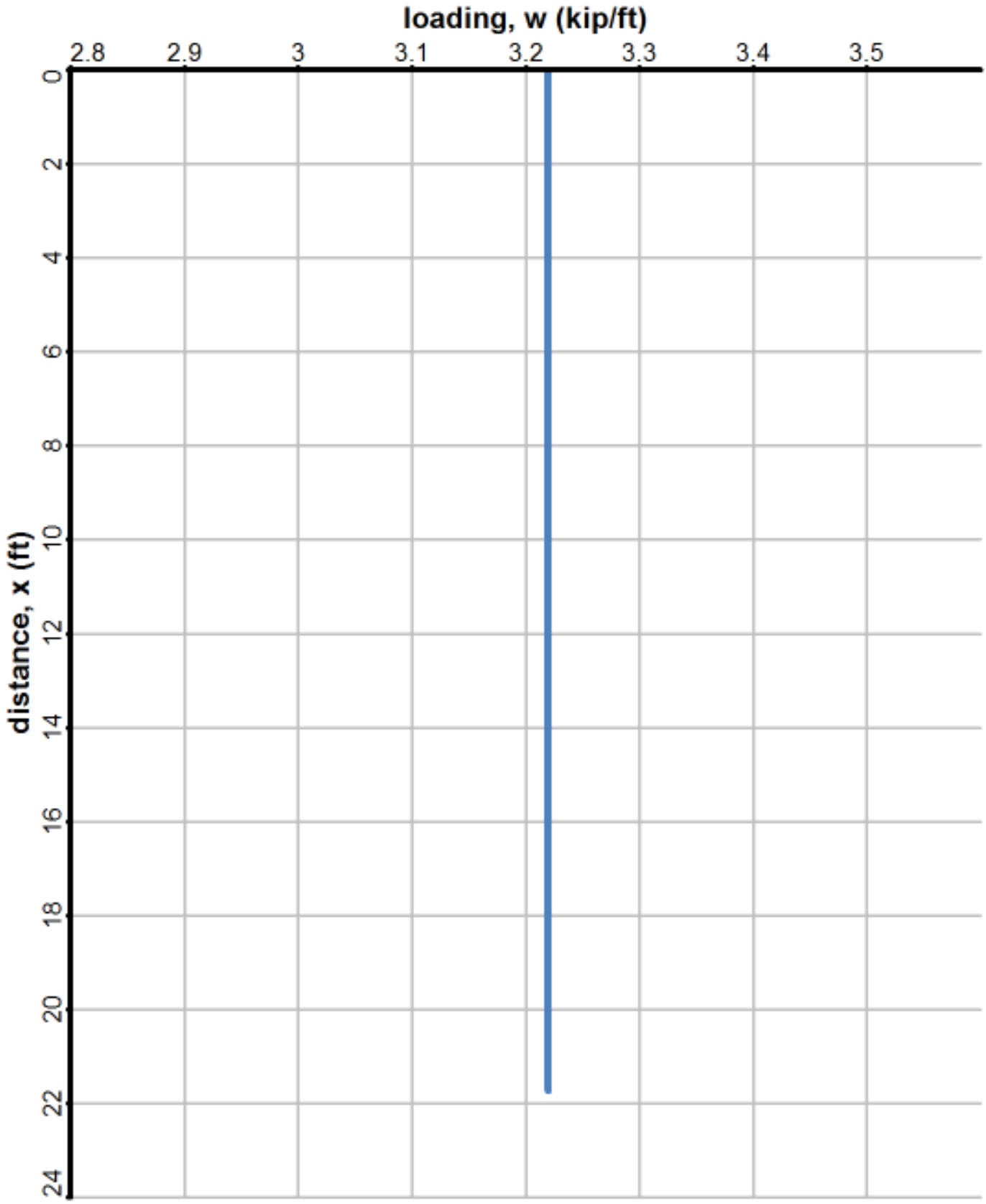
Lb	153 in
Cb	1
ry	1.60 in
Iy	43.10 in4
h0	15.68 in
J	2.22 in4
rts	1.9 in
Lp	67.8 in
Lr	219.4 in
Fcr	60 ksi
Mn/Q	205 kip-ft

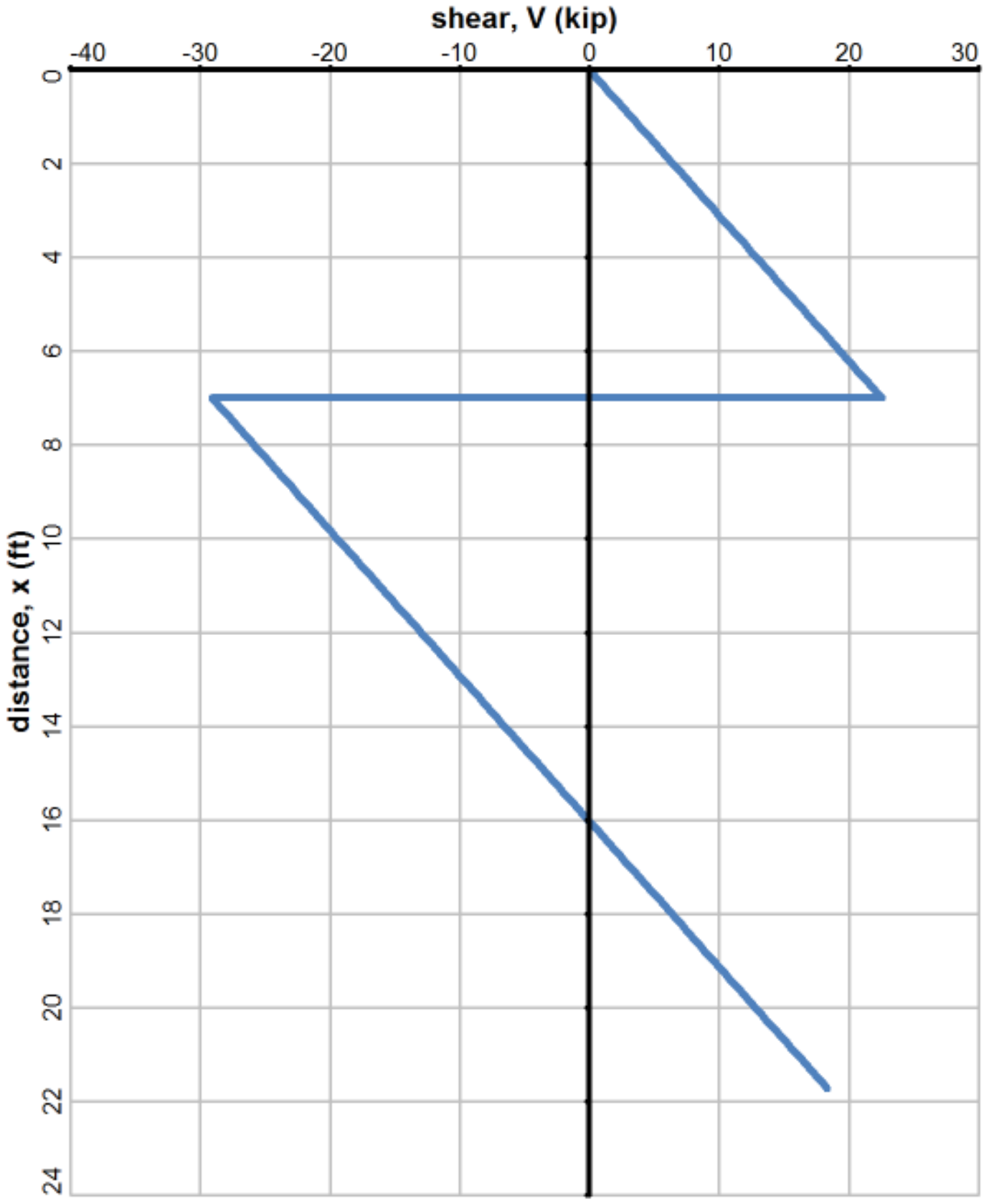
Axially-Loaded Member Check

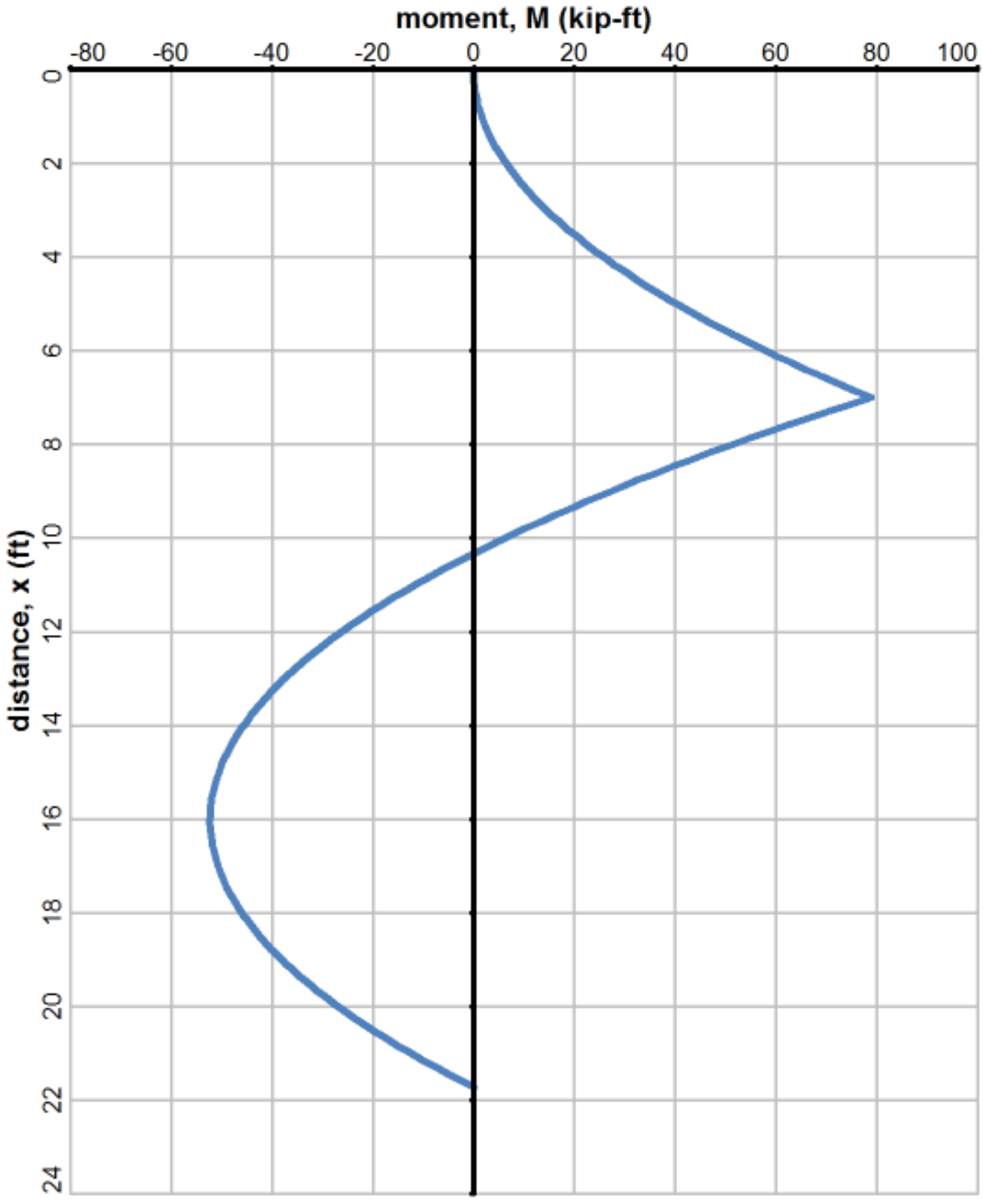
P	0 kips
L	13 ft
K	0.8
A	16.8 in2
KL/r	76.5
Fe	49 ksi
Fcr	33 ksi
Pn/Q	328 kips

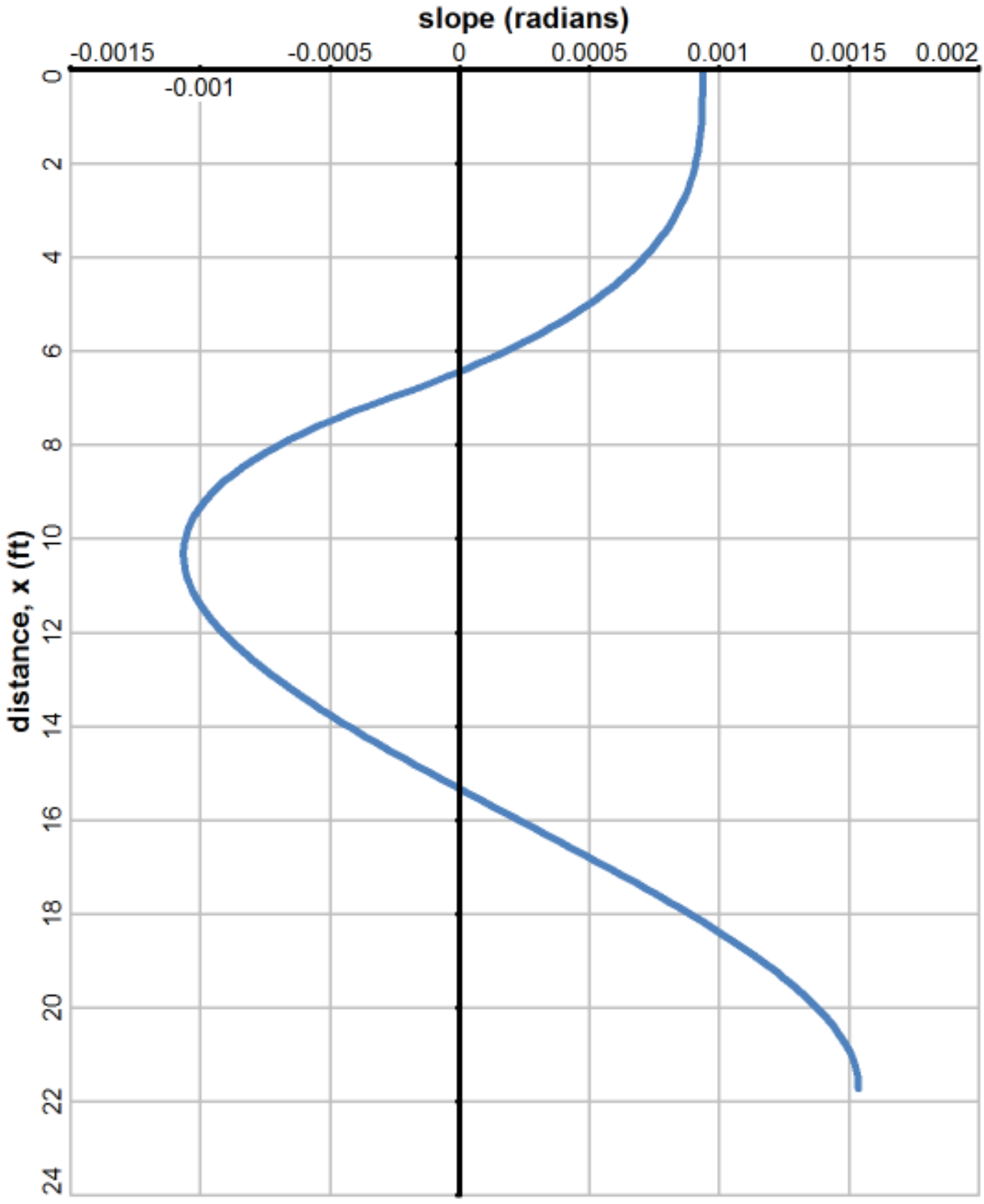
Required Embedment	12.05 ft
Tschebotarioff Check	10.47 ft

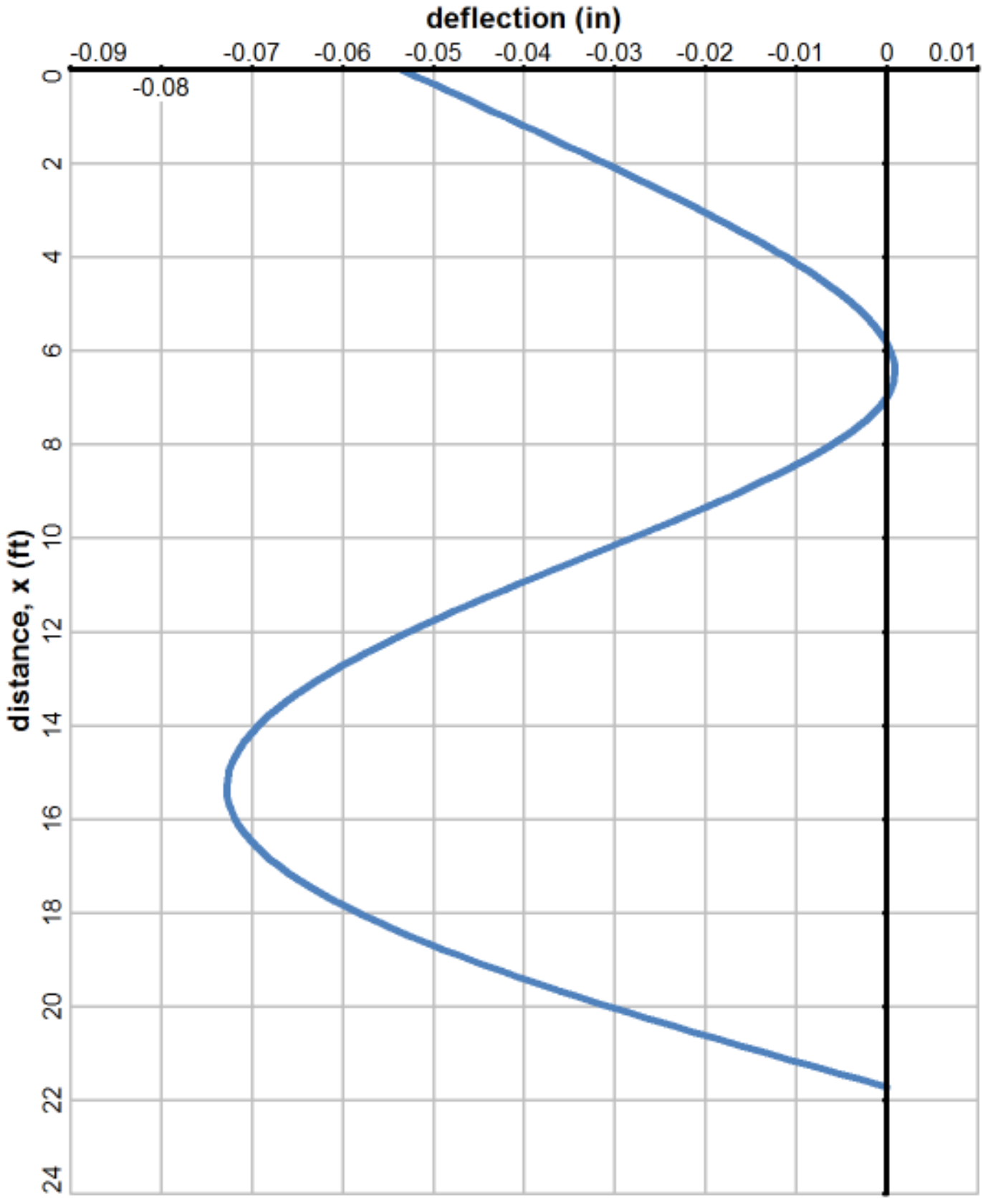
Combined Forces Utilization	38%


loading, w (kip/ft)
2.8
2.9
3
3.1
3.2
3.3
3.4
3.5
distance, x (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24


shear, V (kip)
-40
-30
-20
-10
0
10
20
30
distance, x (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24


moment, M (kip-ft)
-80
-60
-40
-20
0
20
40
60
80
100
distance, x (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24


slope (radians)
-0.0015
-0.0005
0
0.0005
0.001
0.0015
0.002
-0.001
distance, x (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24


deflection (in)
-0.09
-0.08
-0.07
-0.06
-0.05
-0.04
-0.03
-0.02
-0.01
0
0.01
distance, x (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24