Sheetpile Wall Report

Project Information

Designed By: Pelelo
Organization:
Date: 08/07/2012
Project:
Job #:
Client:

Support condition = Cantilever

Unit system = English (ft, lb, sec)

Geometry and Loading

H (shored height): 11.5 ft

Properties

E: 29000 Ksi
Allow. Stress: 30 Ksi
yield Strength: 50 Ksi

Sheeting Size: PZ 27

Active Soil Data

Soil Type: Silty Sand
Fric. Angle: 28 deg. : 0.49 Rad.
Wet Unit: 118 pcf
Surcharge= (Ka*q)=Ps: 36.1 psf
Act. Coeff-Ka: 0.36
Pass. Coef-Kp: 2.46
Eq. Active Fluid Press.: 42.6 psf/ft
Eq. Pass. Fluid Press.: 290.74 psf/ft
Mom.of Inertia, I: 184.2 in^4
GWT, Hw: 11.49 ft
Surcharge: 100 psf:
Slope angle: 0.0 deg. : 0 Rad.

Passive Soil Data

Soil Type: SILT
Fric. Angle: 25 deg. : 0.44 Rad.

Design Philosophy

1) SHEETPILE WALL uses classic-beam-theory beam elements to solve the multispan anchored sheeting design, and uses cantilevered sheeting analysis.

2) The equivalent nodal loads for each span are determined by numerical integration of the equations to allow for the nonuniform loads.

3) The equivalent nodal loads, the stiffness matrix, and the support conditions are used to solve for the support reactions and the support rotations.

4) 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.

5) Steel Shapes are those common sheeting sections available in North America.

6) The program uses "Equivalent Beam Method" method which is based on the fixed earth support method of analysis.

7) By using the Equivalent Beam Method, we get a deeper embedment, so the only failure modes are by flexure or by excessive deflection. This method has several variations. We used Blum's.

8) A geotechnical engineer should be consulted for basal stability, rotational failure and any Bott. Of Excav. Instability checks.

9) On the 2 level and 3 level Anchor Design, construction stage should be checked for, prior to selecting the final sheeting section.

10) This is advanced analysis and design program involving geotechnical and structural fields. The user of this program must be competent in Tieback design.

11) The deflection output is based on structural analysis & independent check should be made in the field by instrumentation.

12) For the Cantilever Module, the design is based on Blum's Free Cantilever method.

13) For the Cantilever Module, required embedment is set equal to 1.3 x theoretical depth.

Results

Sheeting Length (L): 26.03 ft
Sheeting Inertia (I): 184.2 in^4
Active earth pressure moment arm (h/3): 3.83 ft
Depth to zero pressure height (m): 1.97 ft
Active earth pressure above b.o.e. (P1): 2817.05 lb/ft
Active earth pressure below b.o.e. (P2): 483.65 lb/ft
Height of passive resistance (t): 9.2 ft
h/3 + m + t (y1): 15.01 ft (see loading diag.)
0.667m + t (y2): 10.52 ft (see loading diag.)
t/3 (Yr): 3.07 ft (see loading diag.)
Passive resistance (Pr): 2282.89 psf
Theoretical Depth (dmin): 11.17 ft
Required Embedment (D=1.3(dmin)): 14.53 ft
Maximum Moment (Mmax): 30.76 k-ft
Max. Mom. Loc. from b.o.e. (Loc.): 6.49 ft
Required Section Modulus (Req. Sx): 12.3 in^3
Provided Section Modulus (Prov. Sx): 30.2 in^3 (PZ 27)

Reactions @ pile tip

Reaction @ sheetpile tip(RR): -8.59 K
Moment @ sheetpile tip(MR): 12.13 Ft-K

Maximum Moments

+M(max): 12.13 ft-k @ x = 0 ft
-M(max): -32.7 ft-k @ x = 18.74 ft

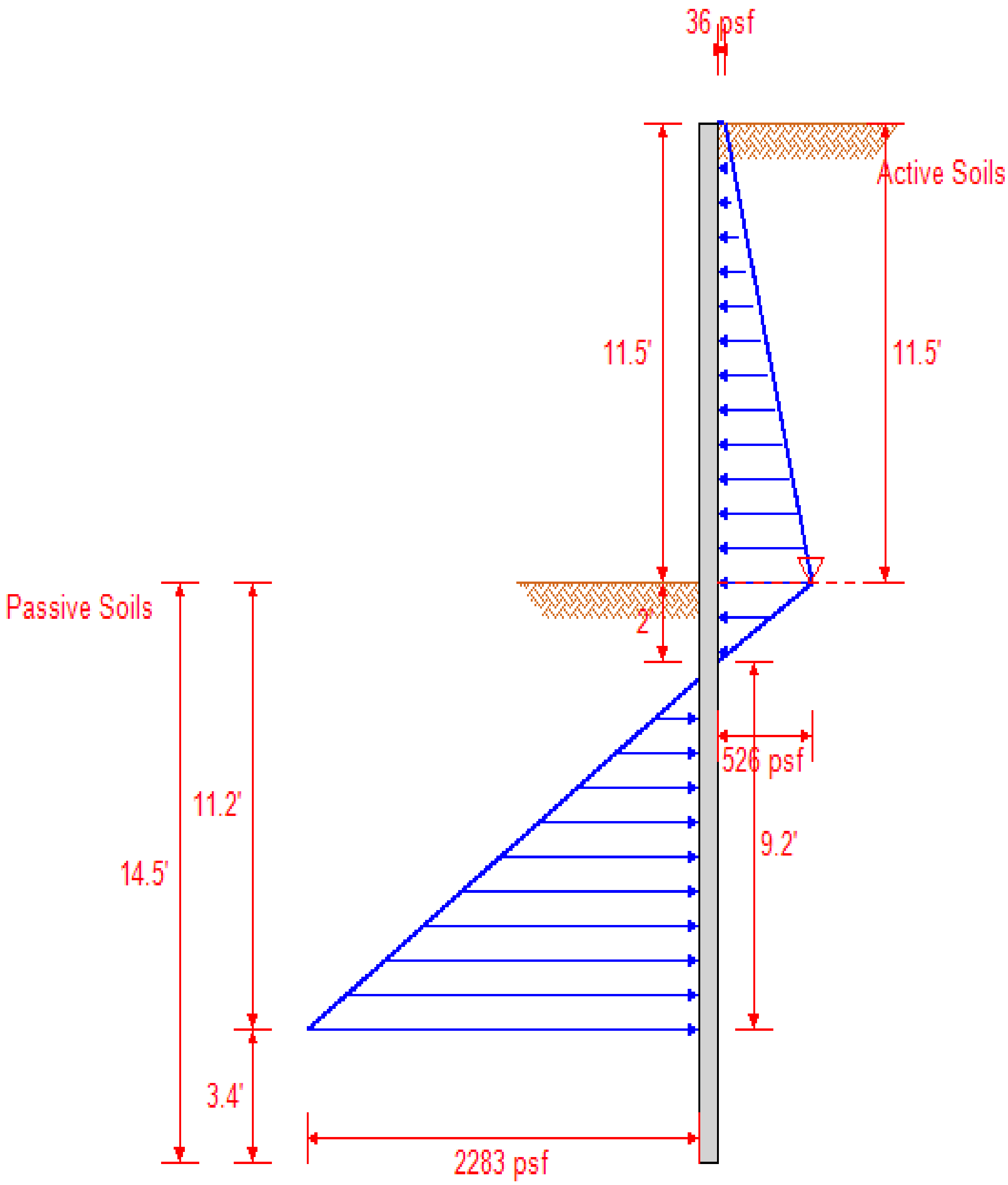
Maximum Deflections

- Delta (max): -1.8 in @ x = 0 ft
+ Delta (max): 0.01 in @ x = 23.42 ft
Delta (ratio): L/173

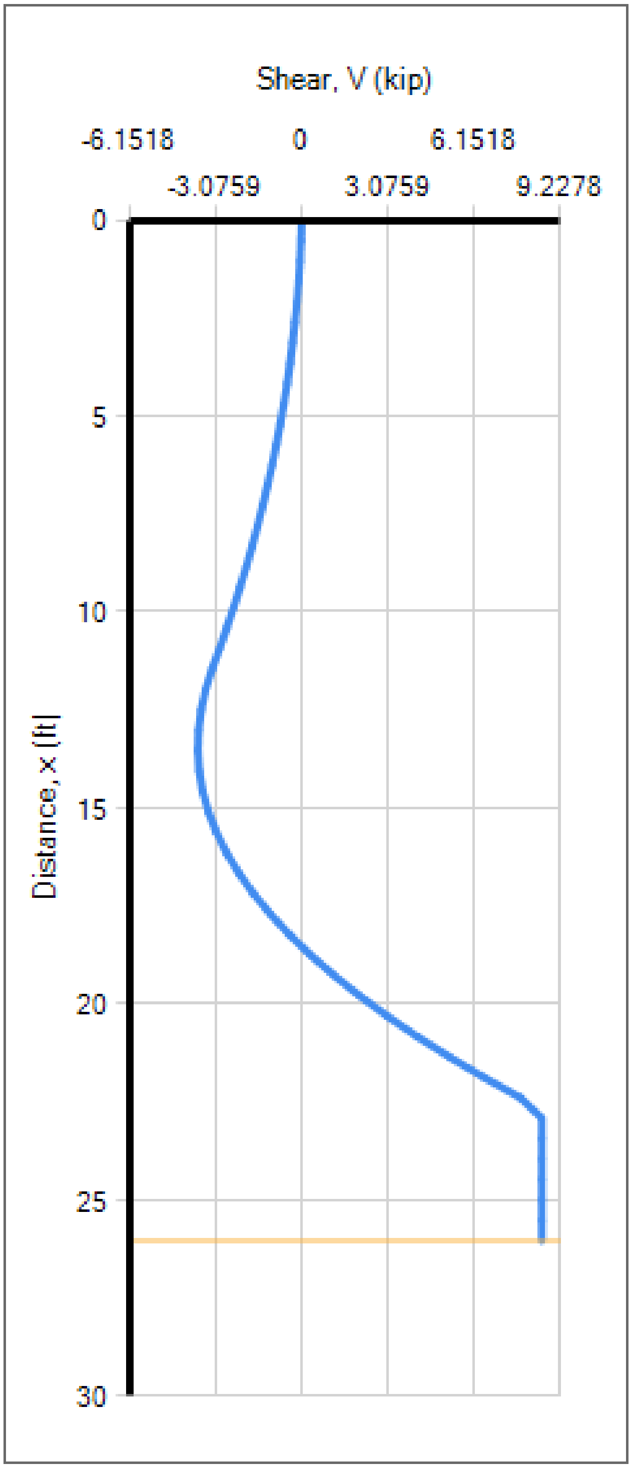
Distributed

	Start		End	
	begin(ft)	**wb(Kips/ft)**	**end(ft)**	**we(kips/ft)**
Active Pres. Top:	0	0	11.5	0.49
Passive Resist.:	13.47	0	22.67	-2.67
Pore Water Pres.:	11.49	0	11.5	0
Uniform Surch.:	0	0.04	11.5	0.04
Active. Pres. Bot.:	11.5	0.49	13.47	0

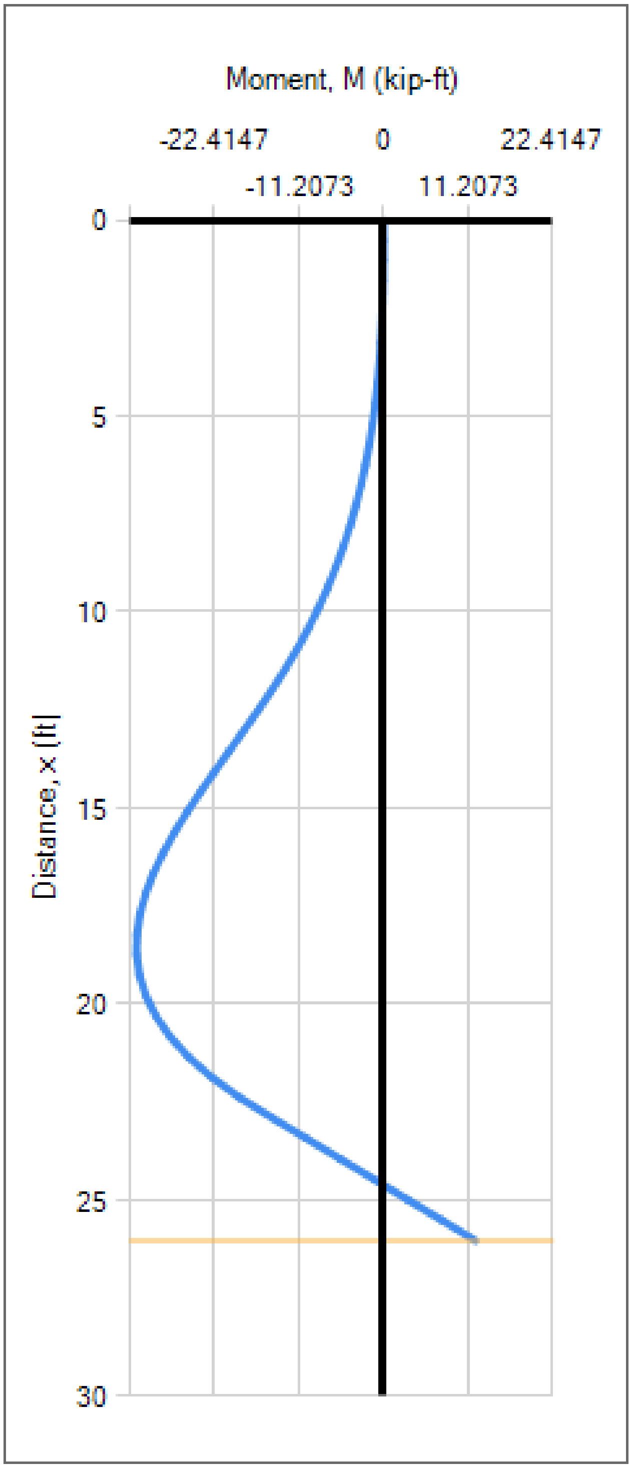
Loading Diagram



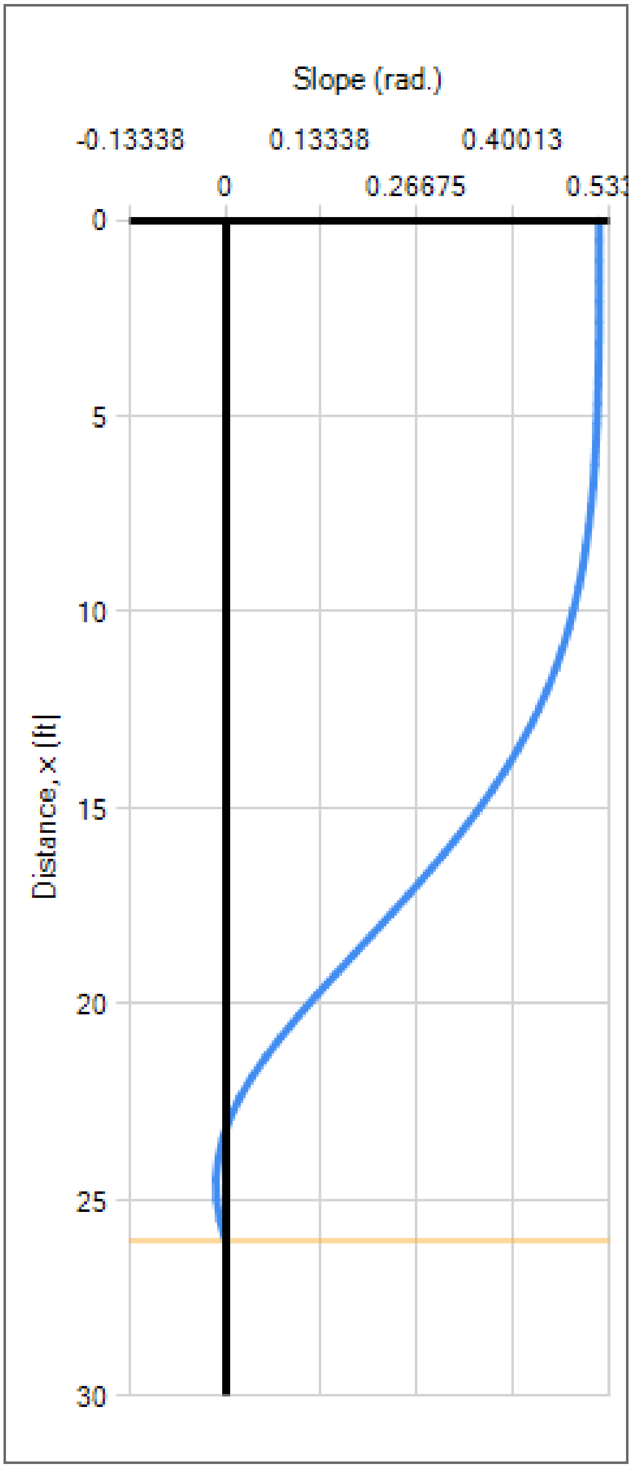
Shear Chart


Shear, V (kip)
-6.1518
0
6.1518
-3.0759
3.0759
9.2278
0
5
10
15
20
25
30
Distance, x (ft)

Moment Chart



Slope Chart


Slope (rad.)
-0.13338
0.13338
0.40013
0
0.26675
0.53
Distance, x (ft)
0
5
10
15
20
25
30

Deflection Chart