FIRM:Your Firm　　　　　　　　JOB NO.　　　　　　SHEET NO: 1
MADE BY:KJH　DATE:05-13-2006　　CHECKED BY:　　　　DATE:
TITLE:Example SHTPILE calculation

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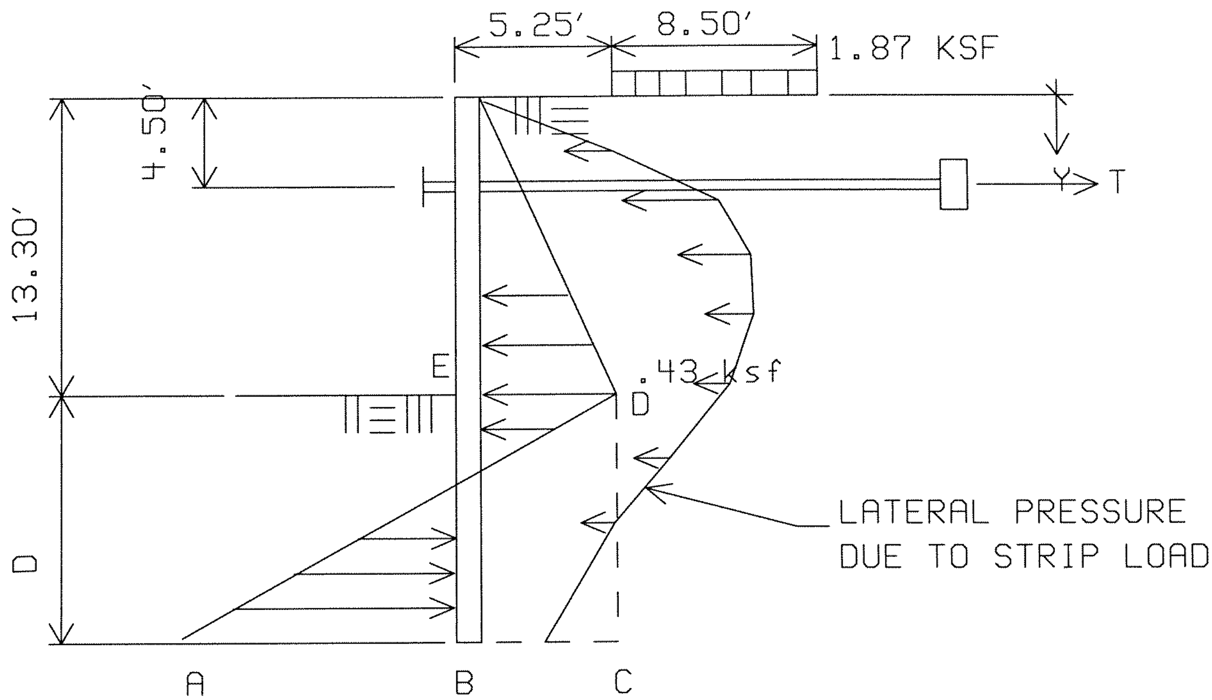
SHEET PILING DESIGN:



Design Data:

The following analysis uses the methods described in the US Steel publication, "Steel Sheet Piling Design Manual", printed 1975.

The user has elected to compute Coulomb coefficients for Ka and Kp.

The user has selected the following design modification factors:
  Passive pressure = 1.000 x ultimate passive pressure
  Final penetration= 1.299 x theoretical req'd penetration

Soil data above dredge line:

 Dry or moist unit weight = .125 kcf
 Saturated unit weight = .125 kcf
 Angle of internal friction, ϕ = 34.000°
 Friction angle against steel sheeting, δ =11.000°

 Coefficient of active earth pressure, in horizontal direction,

$$Ka = \frac{\cos 34.000^2}{\cos 11.00 \times \left| 1 + \left| \frac{\sin(34.00+11) \times \sin(34.00 - 0.00)}{\cos 11.00 \times \cos 0.00} \right|^{.5} \right|^2} = .262$$

SHEET PILING DESIGN:

Design Data (Cont'd)

Soil data below dredge line:

Description:Dry or moist medium sand
Dry or moist unit weight = .100 kcf
Saturated unit weight = .119 kcf
Submerged unit weight = .119 - 0.0624 = .057 kcf
Angle of internal friction, ϕ = 33.000°
Friction angle against steel sheeting, δ = 11.000°

Coefficient of active earth pressure, in horizontal direction,

$$Ka = \frac{\cos 33.000^2}{\cos 11.00 \times \left| 1 + \left| \frac{\sin(33.00+11) \times \sin(33.00 - 0.00)}{\cos 11.00 \times \cos 0.00} \right|^{.5} \right|^2} = .272$$

Coefficient of passive earth pressure, in horizontal direction,

$$Kp = \frac{\cos 33.000^2}{\cos 11.00 \times \left| 1 - \left| \frac{\sin(33.00+11) \times \sin(33.00 + 0.00)}{\cos 11.00 \times \cos 0.00} \right|^{.5} \right|^2} = 4.983$$

Coulomb theory overestimates the passive pressure component. For design, a reduction factor must be applied to Kp. Refer to USS design manual, p.10, Fig. 5(a) for table of reduction factors.

$-\delta / \phi$ = -11.00/33.00 = -.33
Read, R= .604

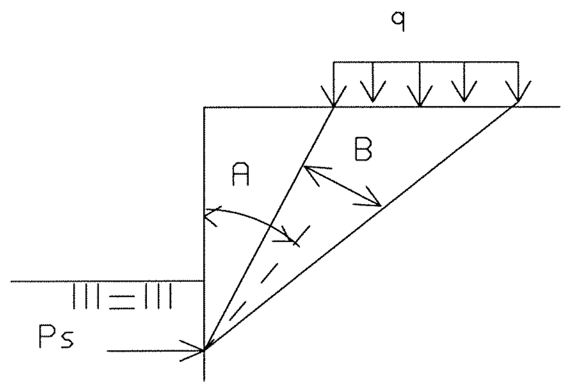
Therefore, reduced Kp= .604 x 4.983 = 3.012

SHEET PILE DESIGN:

Strip Loading Pressures:

Strip loading pressures are computed using the 1990 AREA specification formula (pages 8-20-4 and 8-20-11 of AREA "Manual for Railway Engineering"),

$$Ps = \frac{2q}{\pi} \left[(B + \sin B)*(\sin A)^2 + (B - \sin B)*(\cos A)^2 \right]$$



Strip Loading Table

Y (ft)	A (degrees)	B (degrees)	Ps (ksf)	V (k/ft)	M (k*ft/ft)
0	0.000	0.000	0.000	0.00	0.00
2	75.434	12.578	.487	.48	.48
4	63.237	21.083	.692	1.66	2.64
6	53.805	25.239	.678	3.03	7.35
8	46.541	26.533	.579	4.29	14.68
10	40.836	26.273	.469	5.34	24.33
12	36.258	25.258	.372	6.18	35.86
14	32.519	23.927	.293	6.85	48.90
16	29.420	22.509	.231	7.37	63.14
18	26.818	21.115	.184	7.79	78.31

Where V and M are the shear and moment taken at Y due to strip loading only.

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FIRM:Your Firm                            JOB NO.            SHEET NO:  4
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SHEET PILING DESIGN:
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Compute pressures above dredge line (excluding strip load pressure):
--------------------------------------------------------------------
Vertical and active horizontal pressures,

 At Y=13.30', pv=  .125 kcf x 13.30'=  1.662 ksf
             ph= .262 x  1.662 ksf =   .435 ksf

Compute pressures below dredge line (excluding strip load pressures):
---------------------------------------------------------------------
Theoretical required depth of embedment, D=  6.68'

Pressure at "d":

   Active pressure=  .272 x  1.662 ksf =   .453 ksf

Pressure at "a":

   Passive pressure= Passive ratio x Kp x D x Weight
                   = 1.000 x  3.012 x  6.682' x  .100 kcf =  2.012 ksf
   Active pressure=   .453 ksf +  .272 x  6.68'x  .100 kcf=  .635 ksf
   Net pressure=  2.012 -   .635 =  1.377 ksf
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FIRM:Your Firm JOB NO. SHEET NO: 5
MADE BY:KJH DATE:05-13-2006 CHECKED BY: DATE:
TITLE:Example SHTPILE calculation

SHEET PILING DESIGN:

Check equilibrium of wall

Forces and moments about tie:

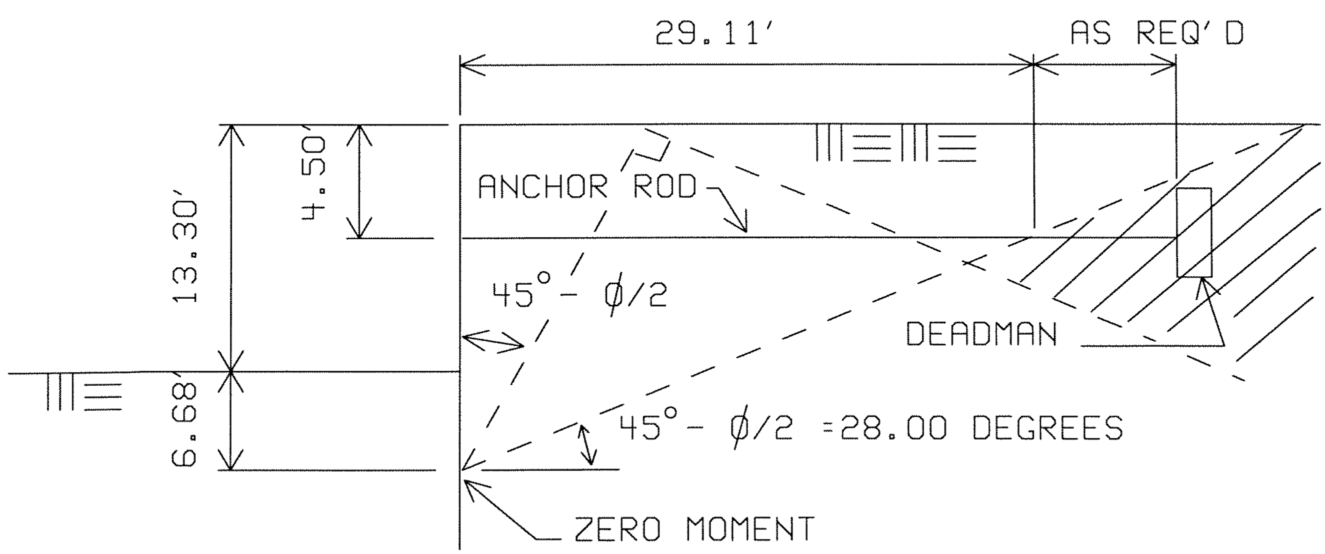
Area	Force (k/')	Arm (ft)	Mtie (k*ft/')
Above dredge line			
	1/2 x .43 x 13.30 = 2.8	4.36	12.6
edbc	.45 x 6.68 = 3.0	12.14	36.7
-adc	-1/2x(1.37+ .45)x 6.68= -6.1	13.25	-81.0
Strip load	8.1		31.6
	Sum = 7.9		0.0 (ok)

Therefore, theoretical embedment, D= 6.68 ft

Drive sheeting to 1.29 x 6.68 = 8.68 ft below dredge line.

Design tie for 1.20 x 7.93 = 9.52 k/ft

Maximum moment= 14.26 k*ft, occurring at y= 11.57 ft from top.



Location of Anchor for Required for Maximum Efficiency

(Design of deadman anchorage is outside the scope of this program)