

Delta Engineers, PC
 184 Court Street
 Binghamton, NY 13901
 (607)231-6600 Fax (607)231-6650

Stem Vert. Moments.

Design Height, hw= 13.00 ft
 Force, P1= 3789.89 lbs/ft
 Cantilever Moment, Ma= 16416.69'-lbs/ft
 Mu= 27.74
 Stem d= 8.125 in

Project: County of Orleans VT105
 15' x 9' Culvert
 Client: Camp Precast
 Job Number: 2007.004.002
 File Name: Cantwall.xls
 Entered By: CJB /SDG
 Checked By: RE
 Date: 5/24/2007
 Sheet: 11 of 11

Trial Bar Size and Spacing As= 0.88 in.sq/ft.
 Rho 0.009062287 Rho*n= 0.06520425
 a=As*Fy/.85*fc*b 1.039 in
 ΦMn 30.24 kip-ft
 k= 0.302
 j= 0.899
 fs= 30.51 ksi
 dc= 1.875 in
 A= 22.5 sq.in
 Z= 108.1 kips/in

> Mu(27.74 kip-ft) ,OK
 Use # 6 @ 6 in

Heel Reinf.

Total Weight= 2044.32 lbs/ft
 Design Span, s= 6.50 ft.
 Cantilever Mom., Mdl= 48105.72 ft-lbs/ft
 Mu= 62.54
 Heel d= 16.0625 in

Trial Bar Size and Spacing As= 1.20 in.sq/ft.
 Rho 0.006239382 Rho*n= 0.04489311
 a=As*Fy/.85*fc*b 1.415 in
 ΦMn 83.10 kip-ft
 k= 0.258
 j= 0.914
 fs= 32.70 ksi
 dc= 1.9375 in
 A= 23.25 sq.in
 Z= 116.2 kips/in

Use # 7 @ 6 in

> Mu(62.54 kip-ft) ,OK

Toe Reinf.

Design Span, s= 1.00 ft.
 Cantilever Mom., Mdl= 1242.08 ft-lbs/ft
 Mu= 1.61
 Toe d= 16.25 in

Trial Bar Size and Spacing As= 0.20 in.sq/ft.
 Rho 0.001006921 Rho*n= 0.00724492
 a=As*Fy/.85*fc*b 0.231 in
 ΦMn 14.26 kip-ft
 k= 0.113
 j= 0.962
 fs= 4.85 ksi
 dc= 1.75 in
 A= 42 sq.in
 Z= 20.3 kips/in

Use # 4 @ 12 in

> Mu(1.61 kip-ft) ,OK

Check Shear Stresses

Stem wall Vu= 6404.92 lbs Vn= 11720.29 lbs OK
 Heel Vu= 19554.49 lbs Vn= 23170.12 lbs OK