APPENDIX

I Cofferdams and Seal Courses

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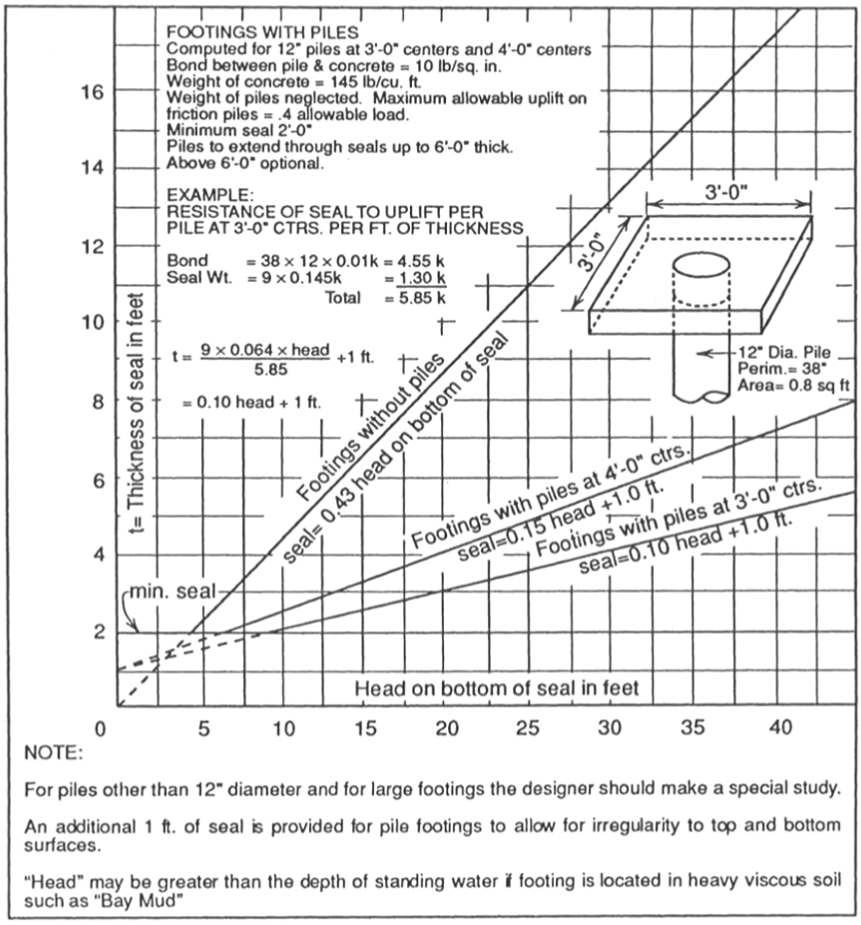
Seal Courses

A) General: The foundation report will give information relative to ground water conditions at the site and will indicate whether or not seal courses will be needed. If the foundation report indicates that seal courses will be needed the designer should show the seals on the plans, indicating the elevation of the bottoms of the seals and their thicknesses based on a careful consideration of foundation bearing value, anticipated hydrostatic head, and the permissible highest elevation of the top of the reinforced concrete footing.

B) Thickness: The figure shows the required thicknesses of seal courses for footings with and without piles.

Thickness of Seal Courses
Spread Footings and Friction Piles



NOTE:

For piles other than 12" diameter and for large footings the designer should make a special study.

An additional 1 ft. of seal is provided for pile footings to allow for irregularity to top and bottom surfaces.

"Head" may be greater than the depth of standing water if footing is located in heavy viscous soil such as "Bay Mud"

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Figure I-1. Seal Course Thickness Chart (BDA Section 2).

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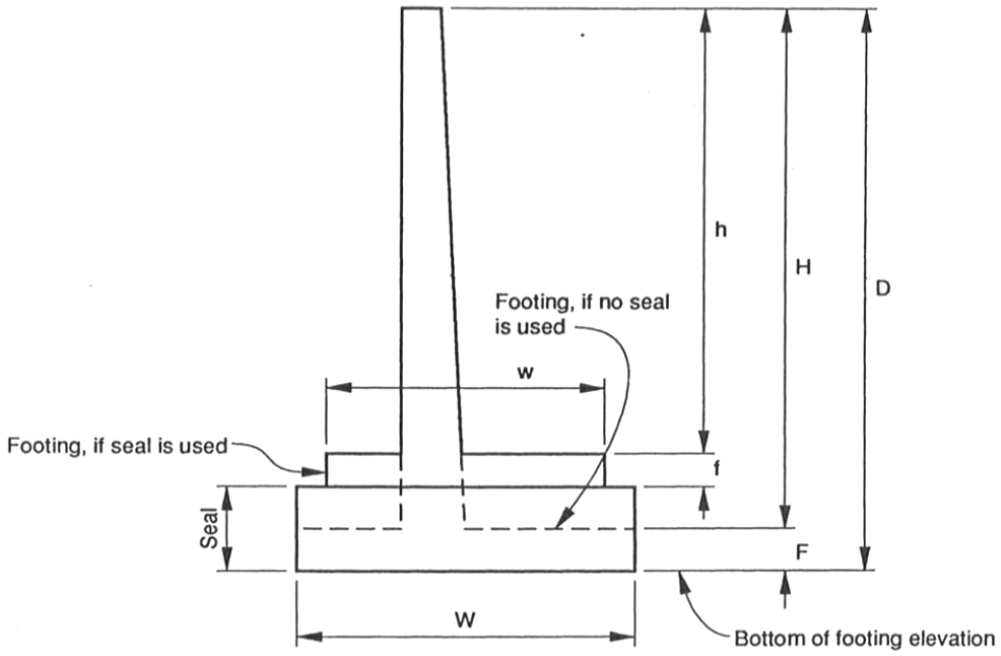
C) Width of Seal Courses: In some cases, particularly in the case of reaining walls, the width of the footing is a function of the height (h) of the wall above the top of the footing. When seal courses are shown on the plans to be placed below spread footings of retaining walls, the width (w) of the seal shall be the same as would be used if the seal were omitted and the retaining wall footing constructed with its bottom at the elevation shown for the bottom of the seal. If the seal is used, the width (w) of the footing slab (as constructed on top of the seal) shall be a function of the height (h) of the wall above the top of the footing slab. The designer should indicate clearly on the plans the procedure to be followed in the field in the event the elevation of the bottom of the seal is changed from that shown. Except in special cases where extremely deep footings or great seal thicknesses would be required, the above method of establishing footing dimensions shall be used.

Below is a sketch showing graphically the intent of this article.



W = Width of footing for H
F = Thickness of footing for H
H = D – F (Dimension from top of wall to bottom of footing elevation minus F)

Widths of Seal Course

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Figure I-2. Seal Course Width Chart (BDA Section 2).

SEAL COURSE PROBLEM

Given : 14" square piles, Spacing 3'-6" by 4'-0" centers, Hydrostatic head of 15'-0".

Assume: Unit Wt. Concrete 145.0 pcf, Unit Wt. Water 64.0 pcf, Friction Pile/Seal = 10.0 psi, Friction Seal/Sheet Pile = 0.0 psi.

Calculate required thickness of concrete to resist uplift than add 1'-0"for seal course thickness.

Uplift Force = Wt. water X Head X Pile Spacing
= 64.0 X 15.0 X 3.5 x 4.0
= 13,440 #

Resisting Force = weight of concrete + friction (pile/seal)

Weight of concrete (1.0 foot thick) = Unit Wt. Conc. X Pile Spacing X 1.0
= 145.0 X 3.5 X 4.0 X 1.0
Concrete = 2,030.0 #

Friction on 1'section of pile = Perimeter X Height X 10.0 psi
= 14.0 X 4 X 12.0 X 10.0
Friction = 6,720.0 #

(Friction + Concrete) X Thickness = Uplift
(2,030.0 + 6,720.0) T = 13,440.0
T = 13,440.0/8,750.0
T = 1.54 feet

Seal Course Thickness is 1.51 + 1.0 = 2.5 feet > 2.0 OK