



Coastal Construction Manual

FORMULA CALCULATOR

11.8 Hydrodynamic Load

C_d :		F_{dyn} =	lb
ρ :			
V :			
A :			

(flow velocity greater than 10ft/sec)

$$F_{dyn} = (1/2)C_d\rho V^2A$$

F_{dyn} = horizontal drag force in lb acting at the stillwater mid-depth (half-way between the stillwater elevation and the eroded ground surface)

C_d = drag coefficient (recommended values are 2.0 for square or rectangular piles and 1.2 for round piles, or from Table 11.2 for larger obstructions)

ρ = mass density of fluid (1.94 slugs/ft³ for fresh water and 1.99 slugs/ft³ for salt water)

V = velocity of water in ft/sec (see Formula 11.2)

A = surface area of obstruction normal to flow in ft² = wd_s (see Figure 11-10) or wh