Using the Equation

It's your turn to calculate the weight of rock needed to resist the up-lift forces of waves

Hudson's Equation:

$$W_{50} = \frac{\gamma_r H^3}{K_D (S_r - 1)^3 \cot\theta}$$

We know:

The height of the wave (H): _____ in feet

The slope of the structure (cotangent Θ): 1.5 feet per foot (rise over run)

The unit weight of the rock (Υ_r): 165 pounds per cubic foot

The unit weight of water (Υ_w): 62.4 pounds per cubic foot

Stability Coefficient (K_D): 2 for rough stone on a slope

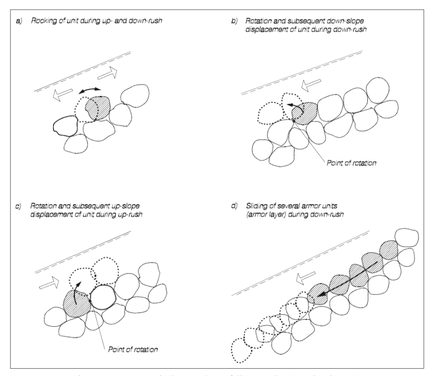

Figure VI-5-33. Typical armor layer failure modes (Burcharth 1993)

We calculate: (W_{50}): the median weight of rock in pounds

Wave H	Slope			Rock		
H	Cot Θ	W_{50}	W_{50}	Volume	Diameter	Comparable to
Feet	Feet/Foot	Pounds	Tons	$Feet^3$	Feet	
1	1.5	12	0.01	0.07	0.5	weight of 1.5 gallons of milk; size of a cantalope
2	1.5	99	0.05	0.60	1.0	weight 12 gallons of milk; size of a basketball
4	1.5	792	0.40	4.80	2.1	2 black bears
6	1.5	2673	1.34	16.20	3.1	1 mini cooper
8	1.5	6335	3.17	38.39	4.2	1 fully loaded F150