Important Shoaling, Refraction and Breaking Formulas PDF



2) Breaking Wave given wave height at Breaking Point Formula 🕝

Formula	Example with Units
$\xi = \frac{\beta}{\sqrt{\frac{H_w}{\lambda_o}}}$	$0.2291 = \frac{0.15 \text{rad}}{\sqrt{\frac{3 \text{m}}{7 \text{m}}}}$

3) Deepwater Wave Height for Shoaling Coefficient and Refraction Coefficient Formula 🕝

Evaluate Formula 🕝

Evaluate Formula

Evaluate Formula

Evaluate Formula

Formula	Example with Units
$\mathbf{H}_{o} = \frac{\mathbf{H}_{w}}{\mathbf{K}_{s}\cdot\mathbf{K}_{r}}$	21.746 <u>3</u> m
	$51.740 \text{ m} = \frac{0.945 \cdot 0.1}{0.945 \cdot 0.1}$

4) Deepwater Wavelength for Shoaling Coefficient in Shallow Water Formula 🕝 👘

	Formula			Example with Units
$\lambda_{o} = ($	$\left(\frac{K_s}{0.4466}\right)$	$\Big)^4 \cdot \mathbf{d}_{\mathbf{w}}$	8	$3.0189\mathrm{m} = \left(\frac{0.945}{0.4466}\right)^4 \cdot 0.4\mathrm{m}$

5) Deepwater Wavelength given Wave Breaking and Wave Height at Breaking Point Formula 🕝

Formula	Example with Units
$\lambda_{o} = \frac{\xi^{2} \cdot H_{w}}{\beta^{2}}$	$6.9921 \text{ m} = \frac{0.229^2 \cdot 3 \text{ m}}{0.15 \text{ rad}^2}$







12) Water Depth given Shoaling Coefficient in Shallow Water Formula

Evaluate Formula 🦳

Evaluate Formula

Formula	Example with Units
$d_{w} = \frac{\lambda_{o}}{\left(\frac{K_{s}}{0.4466}\right)^{4}}$	$0.3492 \mathrm{m} = \frac{7 \mathrm{m}}{\left(\frac{0.945}{0.4466}\right)^4}$

13) Water Depth when Reduced Shoaling Coefficient in Shallow Water Formula 🕝 👘

Formula	Example with Units
$d_{w} = \frac{\lambda_{o}}{\left(\frac{K_{s}}{0.2821}\right)^{2}}$	$0.6238\mathrm{m} = \frac{7\mathrm{m}}{\left(\frac{0.945}{0.2821}\right)^2}$



16) Wave Length for Reduced Shoaling Coefficient in Shallow Water Formula 🕝



Variables used in list of Shoaling, Refraction and Breaking Formulas above

- b Distance Between Two Rays (Meter)
- b₀ Distance Between Two Rays at Deepwater (*Meter*)
- C Celerity of the Wave (Meter per Second)
- Co Deepwater Wave Celerity (Meter per Second)
- d Coastal Mean Depth (Meter)
- d_w Water Depth in Ocean (Meter)
- Ho Wave Height in Deepwater (Meter)
- H_w Wave Height for Surface Gravity Waves (Meter)
- **k** Wave Number for Water Wave
- K_r Refraction Coefficient
- K_s Shoaling Coefficient
- n Ratio of Group Velocity to Phase Velocity
- β Beach Slope (Radian)
- λ_o Deep-Water Wavelength (Meter)
- ξ Breaking Wave

Constants, Functions, Measurements used in list of Shoaling, Refraction and Breaking Formulas above

- Functions: sinh, sinh(Number) The hyperbolic sine function, also known as the sinh function, is a mathematical function that is defined as the hyperbolic analogue of the sine function.
- Functions: sqrt, sqrt(Number) A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Functions: tanh, tanh(Number) The hyperbolic tangent function (tanh) is a function that is defined as the ratio of the hyperbolic sine function (sinh) to the hyperbolic cosine function (cosh).
- Measurement: Length in Meter (m) Length Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Angle in Radian (rad) Angle Unit Conversion



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