Nearshore Currents Formulas...





Nearshore Currents Formulas

Calculators!

Examples!

Conversions!

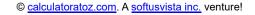
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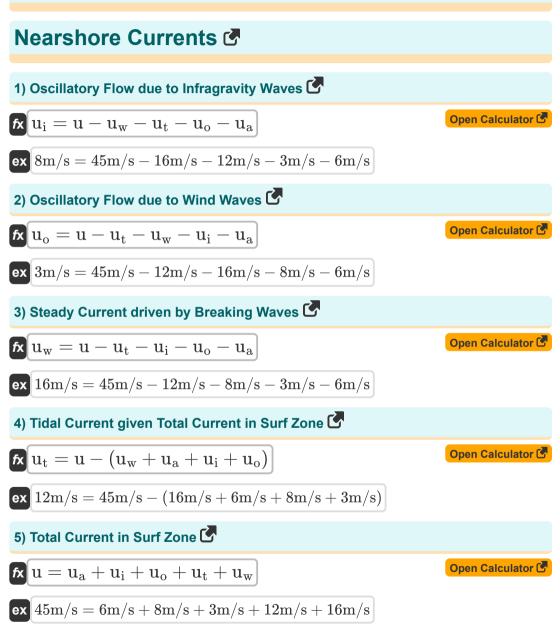
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List of 13 Nearshore Currents Formulas





Nearshore Currents Formulas...

6) Wind Driven Current given Total Current in Surf Zone 🕑

fx
$$\mathbf{u}_{\mathrm{a}} = \mathbf{u} - \mathbf{u}_{\mathrm{w}} - \mathbf{u}_{\mathrm{t}} - \mathbf{u}_{\mathrm{o}} - \mathbf{u}_{\mathrm{i}}$$

$$6m/s = 45m/s - 16m/s - 12m/s - 3m/s - 8m/s$$

Longshore Current 🕑

7) Beach Slope Modified for Wave Setup

fx
$$egin{aligned} eta^* &= a an \left(rac{ an(eta)}{1 + \left(3 \cdot rac{\gamma_{
m b}^2}{8}
ight)}
ight) \end{aligned}$$

ex
$$0.144531 = a an \left(rac{ an(0.15)}{1 + \left(3 \cdot rac{(0.32)^2}{8}
ight)}
ight)$$

8) Longshore Current at Mid-Surf Zone 🕑

fx
$$V_{
m mid} = 1.17 \cdot \sqrt{[{
m g}] \cdot {
m H}_{
m rms}} \cdot \sin(lpha) \cdot \cos(lpha)$$

$$\overbrace{\textbf{ex}} 1.098031 \text{m/s} = 1.17 \cdot \sqrt{[\text{g}] \cdot 0.479 \text{m}} \cdot \sin(60^\circ) \cdot \cos(60^\circ)$$





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Nearshore Currents Formulas...

9) Longshore Current Speed 🕑

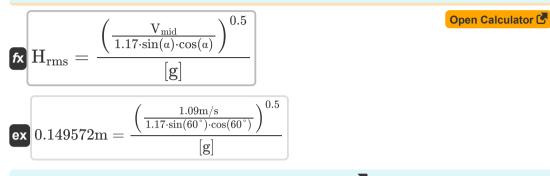
fx

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$$V = \left(5 \cdot \frac{\pi}{16}\right) \cdot \tan\left(\beta^{*}\right) \cdot \gamma_{b} \cdot \sqrt{[g] \cdot D} \cdot \sin(\alpha) \cdot \frac{\cos(\alpha)}{C_{f}}$$
ex
$$41.57468m/s = \left(5 \cdot \frac{\pi}{16}\right) \cdot \tan(0.14) \cdot 0.32 \cdot \sqrt{[g] \cdot 11.99m} \cdot \sin(60^{\circ}) \cdot \frac{\cos(60^{\circ})}{0.005}$$
10) Radiation Stress Component **C**
fx
$$S_{xy} = \left(\frac{n}{8}\right) \cdot \rho \cdot [g] \cdot (H^{2}) \cdot \cos(\alpha) \cdot \sin(\alpha)$$
fx
$$13.48941 = \left(\frac{0.05}{8}\right) \cdot 997kg/m^{3} \cdot [g] \cdot \left((0.714m)^{2}\right) \cdot \cos(60^{\circ}) \cdot \sin(60^{\circ})$$
11) Ratio of Wave Group Speed and Phase Speed **C**
fx
$$n = \frac{S_{xy} \cdot 8}{\rho \cdot [g] \cdot H^{2} \cdot \cos(\alpha) \cdot \sin(\alpha)}$$
Open Calculator **C**
fx
$$0.055599 = \frac{15 \cdot 8}{997kg/m^{3} \cdot [g] \cdot (0.714m)^{2} \cdot \cos(60^{\circ}) \cdot \sin(60^{\circ})}$$



12) Root Mean Square Wave Height at Breaking given Longshore Current at Mid-Surf Zone



13) Wave Height given Radiation Stress Component 🕑

fx
$$H = \sqrt{\frac{S_{xy} \cdot 8}{\rho} \cdot [g] \cdot \cos(\alpha) \cdot \sin(\alpha)}$$
ex
$$0.714914m = \sqrt{\frac{15 \cdot 8}{997 \text{kg/m}^3} \cdot [g] \cdot \cos(60^\circ) \cdot \sin(60^\circ)}$$

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Variables Used

- C_f Bottom Friction Coefficient
- **D** Water Depth (Meter)
- H Wave Height (Meter)
- Hrms Root Mean Square Wave Height (Meter)
- **n** Ratio of Wave Group Speed and Phase Speed
- S_{XV} Radiation Stress Component
- U Total Current in the Surf Zone (Meter per Second)
- **u**_a Wind Driven Current (Meter per Second)
- Ui Oscillatory Flow due to Infragravity Waves (Meter per Second)
- Uo Oscillatory Flow due to Wind Waves (Meter per Second)
- **U**t Tidal Current (Meter per Second)
- U_w Steady Current driven by Breaking Waves (Meter per Second)
- V Longshore Current Speed (Meter per Second)
- V_{mid} Longshore Current at the Mid-Surf Zone (Meter per Second)
- α Wave Crest Angle (Degree)
- β Beach Slope
- β^* Modified Beach Slope
- γ_b Breaker Depth Index
- ρ Mass Density (Kilogram per Cubic Meter)





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288 Archimedes' constant
- Constant: [g], 9.80665 Gravitational acceleration on Earth
- Function: atan, atan(Number) Inverse tan is used to calculate the angle by applying the tangent ratio of the angle, which is the opposite side divided by the adjacent side of the right triangle.
- Function: **cos**, cos(Angle) Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Function: sin, sin(Angle) Sine is a trigonometric function that describes the ratio of the length of the opposite side of a right triangle to the length of the hypotenuse.
- Function: 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.
- Function: tan, tan(Angle) The tangent of an angle is a trigonometric ratio of the length of the side opposite an angle to the length of the side adjacent to an angle in a right triangle.
- Measurement: Length in Meter (m) Length Unit Conversion
- Measurement: Speed in Meter per Second (m/s) Speed Unit Conversion
- Measurement: Angle in Degree (°) Angle Unit Conversion
- Measurement: Mass Concentration in Kilogram per Cubic Meter (kg/m³) Mass Concentration Unit Conversion



Check other formula lists

Nearshore Currents Formulas C

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