



Wave Prediction Formulas

Calculators!

Examples!

Conversions!

Bookmark calculatoratoz.com, unitsconverters.com

Widest Coverage of Calculators and Growing - 30,000+ Calculators!

Calculate With a Different Unit for Each Variable - In built Unit Conversion!

Widest Collection of Measurements and Units - 250+ Measurements!

Feel free to SHARE this document with your friends!

Please leave your feedback here...





List of 15 Wave Prediction Formulas

Wave Prediction &

Predicting Waves in Deep Water

4) Cinnificant Ways Haight from Bustochusidan Empirical Balatian

1) Significant Wave Height from Bretschneider Empirical Relationships 🗹

$$ext{H}_{ ext{dw}} = rac{ ext{U}^2 \cdot 0.283 \cdot anh \left(0.0125 \cdot \left(rac{[ext{g}] \cdot ext{F}_1}{ ext{U}^2}
ight)^{0.42}
ight)}{[ext{g}]}$$

$$= \frac{ \left(25 \text{m/s} \right)^2 \cdot 0.283 \cdot \tanh \left(0.0125 \cdot \left(\frac{[\text{g}] \cdot 2\text{m}}{(25 \text{m/s})^2} \right)^{0.42} \right) }{ [\text{g}] }$$

2) Significant Wave Period from Bretschneider Empirical Relationships 🗗

$$ag{T} = rac{ ext{U} \cdot 7.54 \cdot anh igg(0.077 \cdot igg(rac{[ext{g}] \cdot ext{F}_1}{ ext{U}^2}igg)^{0.25}igg)}{[ext{g}]}$$

Open Calculator 🗗

Open Calculator

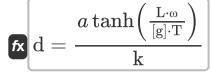
$$\mathbf{ex} \begin{bmatrix} 0.622726\mathrm{s} = \frac{25\mathrm{m/s} \cdot 7.54 \cdot \tanh\left(0.077 \cdot \left(\frac{[\mathrm{g}] \cdot 2\mathrm{m}}{(25\mathrm{m/s})^2}\right)^{0.25}\right)}{[\mathrm{g}]} \end{bmatrix}$$



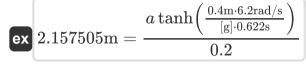


3) Water Depth given Wavelength, Wave Period and Wave Number 🖸

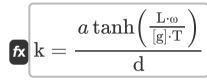




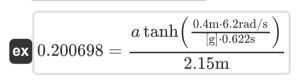
Open Calculator



4) Wave Number given Wavelength, Wave Period and Water Depth



Open Calculator



Wave Statistics Relationships 2

5) Average of Waves based upon Rayleigh Distribution 🗗



Open Calculator





6) Average of Waves given Significant Wave Height

 $\left| extbf{H}' = rac{ ext{H}_{ ext{s}}}{1.596}
ight|$

Open Calculator

 $\boxed{\textbf{ex}} \ 40.72682 = \frac{65 \text{m}}{1.596}$

7) Probability of Exceedance of Wave Height

 $ext{P}_{ ext{H}} = \left(e^{-2}
ight) \cdot \left(rac{ ext{H}}{ ext{H}_{ ext{s}}}
ight)^{2}$

Open Calculator

8) Root Mean Square Wave Height

 $0.205005 = \left(e^{-2}\right) \cdot \left(\frac{80 \mathrm{m}}{65 \mathrm{m}}\right)^2$

fx $H_{
m rms}=rac{\sigma_{
m H}}{0.463}$

Open Calculator 🖒

 $= 23 \over 0.463$

9) Root Mean Square Wave Height given Average of Waves based upon Rayleigh Distribution

 $ext{H}_{ ext{rms}} = rac{ ext{H}'}{0.886}$

Open Calculator 🗗







10) Root Mean Square Wave Height given Significant Wave Height based on Rayleigh Distribution

 $oldsymbol{H}_{
m rms} = rac{
m H_s}{1.414}$

Open Calculator

11) Significant Wave Height given Average of Waves

fx $H_{\rm s}=1.596\cdot H^{\prime}$

Open Calculator

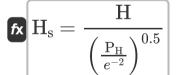
 $\texttt{ex} \ 63.84 \text{m} = 1.596 \cdot 40$

12) Significant Wave Height of Record based upon Rayleigh Distribution

fx $m H_s = 1.414 \cdot H_{rms}$

Open Calculator 🗗

13) Significant Wave Height of Record for Probability of Exceedance



$$ext{ex} 65.00078 ext{m} = rac{80 ext{m}}{\left(rac{0.205}{e^{-2}}
ight)^{0.5}}$$



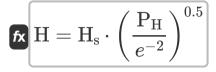
14) Standard Deviation of Wave Height



Open Calculator

 $\mathbf{ex} \ 20.835 = 0.463 \cdot 45 \mathrm{m}$

15) Wave Height of Record for Probability of Exceedance



 $oxed{ex} 79.99904 \mathrm{m} = 65 \mathrm{m} \cdot \left(rac{0.205}{e^{-2}}
ight)^{0.5}$

Open Calculator

Variables Used

- **d** Water Depth (*Meter*)
- **F**_I Fetch Length (Meter)
- **H** Wave Height (Meter)
- H' Average of All Waves
- **H**_{dw} Wave Height for Deep Water (*Meter*)
- H_{rms} Root Mean Square Wave Height (Meter)
- Hs Significant Wave Height (Meter)
- k Wave Number for Water Wave
- L Wavelength (Meter)
- P_H Probability of Exceedance of Wave Height
- T Wave Period (Second)
- **U** Wind Speed (Meter per Second)
- σ_H Standard Deviation of Wave Height
- ω Wave Angular Frequency (Radian per Second)





Constants, Functions, Measurements used

- Constant: [g], 9.80665
 Gravitational acceleration on Earth
- Constant: **e**, 2.71828182845904523536028747135266249 Napier's constant
- Function: atanh, atanh(Number)

 The inverse hyperbolic tangent function returns the value whose hyperbolic tangent is a number.
- Function: 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: Time in Second (s)

 Time Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Angular Frequency in Radian per Second (rad/s)

 Angular Frequency Unit Conversion





Check other formula lists

- Calculation of Forces on Ocean Structures Formulas
- Density Currents in Harbors
 Formulas
- Density Currents in Rivers
 Formulas
- Dredging Equipment Formulas Oceanography Formulas
- Estimating Marine and Coastal Winds Formulas

- Hydrodynamic Analysis and Design Conditions Formulas
- Hydrodynamics of Tidal Inlets-2
 Formulas
- Meteorology and Wave Climate Formulas
- Shore Protection Formulas
- Wave Prediction Formulas

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

5/21/2024 | 6:47:27 AM UTC

Please leave your feedback here...



