
PART 5: RUNUP2

for transect: YK-107

Station locations shifted by: -10.79 feet from their
original location to set the shoreline to
elevation 0 for RUNUP2 input

RUNUP2 INPUT CONVERSIONS

for transect: YK-107

Incident significant wave height: 5.74 feet

Peak wave period: 13.21 seconds

Mean wave height: 3.59 feet

Local Depth below SWEL: 22.69 feet

Mean wave height deshoaled using Hunt approximation for
celerity assuming constant wave energy flux.

References: R.G. Dean and R.A. Dalrymple. 2000. Water

Wave Mechanics for Engineers and Scientists. World
Scientific Publishing Company, River Edge New Jersey

USACE (1985), Direct Methods for Calculating Wavelength, CETN-1-17
US Army Engineer Waterways Experiment Station Coastal Engineering
Research Center, Vicksburg, MS

also see Coastal Engineering Manual Part II-3
for discussion of shoaling coefficient

Depth, $D = 22.69$

Period, $T = 11.23$

Waveheight, $H = 3.59$

Deep water wavelength, L_0 (ft)

$L_0 = g \cdot T^2 / 2\pi$

$L_0 = 32.17 \cdot 11.23^2 / 6.28 = 645.48$

Deep water wave celerity, C_0 (ft/s)

$C_0 = L_0 / T$

$C_0 = 645.48 / 11.23 = 57.49$

Angular frequency, σ (rad/s)

$\sigma = 2\pi / T$

$\sigma = 6.28 / 11.23 = 0.56$

Hunts (1979) approximation for Celerity C_{1H} (ft/s) at Depth D (ft)

$y = \sigma \cdot \sigma \cdot D / g$

$y = 0.56 \cdot 0.56 \cdot 22.69 / 32.17 = 0.22$

$C_{1H} = \sqrt{g \cdot D / (y + 1. / (1 + 0.6522 \cdot y + 0.4622 \cdot y^2 + 0.0864 \cdot y^4 + 0.0675 \cdot y^5))}$

$C_{1H} = 26.03$

Shoaling Coefficient K_{sH}

$K_{sH} = \sqrt{C_0 / C_{1H}}$

$K_{sH} = \sqrt{57.49 / 26.03} = 1.49$

Deepwater Wave Height H_{0_H} (ft)

$H_{0_H} = H / K_{sH}$

$H_{0_H} = 3.59 / 1.49 = 2.42$

Deepwater mean wave height: 2.42 feet

END RUNUP2 CONVERSIONS

RUNUP2 RESULTS

for transect: YK-107

RUNUP2 SWEL:

9.40

9.40

9.40

9.40

9.40
9.40
9.40
9.40
9.40

RUNUP2 deepwater mean wave heights:

2.30
2.30
2.30
2.42
2.42
2.42
2.54
2.54
2.54

RUNUP2 mean wave periods:

10.67
11.23
11.79
10.67
11.23
11.79
10.67
11.23
11.79

RUNUP2 runup above SWEL:

0.98
1.15
1.27
1.11
1.22
1.32
1.17
1.26
1.37

RUNUP2 Mean runup height above SWEL: 1.21 feet

RUNUP2 2-percent runup height above SWEL: 2.65 feet

RUNUP2 2-percent runup elevation: 12.05 feet-NAVD88

RUNUP2 Messages:

No Messages

_____END RUNUP2 RESULTS_____

_____ACES BEACH RUNUP_____

Incident significant wave height: 5.74 feet

Significant wave height is mean wave height divided by 0.626

Reference: D.2.8.1.2.1 Atlantic and Gulf of Mexico G&S Feb. 2007

Deepwater significant wave height: 3.86 feet

Peak wave period: 13.21 seconds

Average beach Slope: 1:56.82 (H:V)

ACES IRREGULAR WAVE RUNUP ON BEACHES

Reference:

Leenknecht, David A., Andre Szuwaiski, and Ann Sherlock. 1992.

"Automated Coastal Engineering System Technical Reference",

Coastal Engineering Research Center, Department of the Army

Waterways Experiments Station, Corps of Eniggneers, 3909 Halls
Ferry Road, Vicksburg, Mississippi 39180-6199.

INPUTS:

Acceleration Due to Gravity, g = 32.174
Deepwater Significant Wave height, Hs = 3.86
Wave Period, T = 13.21
Beach Slope, S = 0.018

EQUATIONS:

Runup, R = Hs * a * Irb^b
Iribarren, Irb = S/sqrt(Hs/L0)
Wavelength, L0 = g * T^2 / 2 / pi

COEFFICIENTS:

(Mase, H. 1989, "Random Wave Runup Height on Gentle Slopes,"
j. Waterway, Port, Coastal and Ocean Engineering Division,
ASCE, Vol 115, No. 5, pp 649-661.)

 [Rmax, R2%, R-1/3, R-1/10, R-mean]
a = [2.32, 1.86, 1.70, 1.38, 0.88]
b = [0.77, 0.71, 0.71, 0.70, 0.69]

RESULTS:

RUNUP = [3.2, 2.8, 2.6, 2.1, 1.4]

ACES RUNUP CALCULATED USING 'Aces_Beach_Runup.m'

ACES Beach 2-percent runup height above SWEL: 2.82 feet

ACES Beach 2-percent runup elevation: 12.22 feet-NAVD88

ACES BEACH RUNUP is valid

_____END ACES BEACH RESULTS_____

PART 5 COMPLETE_____