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PART 5: RUNUP2

for transect: YK-99

Station locations shifted by: -1.19 feet from their  
original location to set the shoreline to  
elevation 0 for RUNUP2 input

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RUNUP2 INPUT CONVERSIONS

for transect: YK-99

Incident significant wave height: 14.35 feet

Peak wave period: 13.19 seconds

Mean wave height: 8.98 feet

Local Depth below SWEL: 36.55 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,  $D = 36.55$

Period,  $T = 11.21$

Waveheight,  $H = 8.98$

Deep water wavelength,  $L_0$  (ft)

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

$L_0 = 32.17 \cdot 11.21^2 / 6.28 = 643.57$

Deep water wave celerity,  $C_0$  (ft/s)

$C_0 = L_0 / T$

$C_0 = 643.57 / 11.21 = 57.41$

Angular frequency,  $\sigma$  (rad/s)

$\sigma = 2\pi / T$

$\sigma = 6.28 / 11.21 = 0.56$

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

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

$y = 0.56 \cdot 0.56 \cdot 36.55 / 32.17 = 0.36$

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

$C_{1H} = 32.26$

Shoaling Coefficient  $K_{sH}$

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

$K_{sH} = \sqrt{57.41 / 32.26} = 1.33$

Deepwater Wave Height  $H_{0_H}$  (ft)

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

$H_{0_H} = 8.98 / 1.33 = 6.74$

Deepwater mean wave height: 6.74 feet

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END RUNUP2 CONVERSIONS

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RUNUP2 RESULTS

for transect: YK-99

RUNUP2 SWEL:

9.10

9.10

9.10

9.10

9.10  
9.10  
9.10  
9.10  
9.10

RUNUP2 deepwater mean wave heights:

6.40  
6.40  
6.40  
6.74  
6.74  
6.74  
7.07  
7.07  
7.07

RUNUP2 mean wave periods:

10.65  
11.21  
11.77  
10.65  
11.21  
11.77  
10.65  
11.21  
11.77

RUNUP2 runup above SWEL:

0.05  
0.05  
0.05  
0.05  
0.05  
0.08  
0.06  
0.08  
0.11

RUNUP2 Mean runup height above SWEL: 0.06 feet

RUNUP2 2-percent runup height above SWEL: 0.14 feet

RUNUP2 2-percent runup elevation: 9.24 feet-NAVD88

RUNUP2 Messages:

No Messages

\_\_\_\_\_END RUNUP2 RESULTS\_\_\_\_\_

\_\_\_\_\_ACES BEACH RUNUP\_\_\_\_\_

Incident significant wave height: 14.35 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: 10.76 feet

Peak wave period: 13.19 seconds

Average beach Slope: 1:96.45 (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 =    10.76  
Wave Period,                      T =    13.19  
Beach Slope,                      S =    0.010

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 = [ 4.1, 3.7, 3.4, 2.8, 1.9]

ACES RUNUP CALCULATED USING 'Aces\_Beach\_Runup.m'

ACES Beach 2-percent runup height above SWEL: 3.74 feet

ACES Beach 2-percent runup elevation: 12.84 feet-NAVD88

ACES BEACH RUNUP is valid

\_\_\_\_\_END ACES BEACH RESULTS\_\_\_\_\_

PART 5 COMPLETE\_\_\_\_\_