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PART 5: RUNUP2

for transect: YK-92

Station locations shifted by: -3.93 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-92

Incident significant wave height: 18.93 feet

Peak wave period: 14.35 seconds

Mean wave height: 11.85 feet

Local Depth below SWEL: 37.42 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,  $D = 37.42$

Period,  $T = 12.20$

Waveheight,  $H = 11.85$

Deep water wavelength,  $L_0$  (ft)

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

$L_0 = 32.17 \cdot 12.20^2 / 6.28 = 761.71$

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

$C_0 = L_0 / T$

$C_0 = 761.71 / 12.20 = 62.45$

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

$\sigma = 2\pi / T$

$\sigma = 6.28 / 12.20 = 0.52$

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

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

$y = 0.52 \cdot 0.52 \cdot 37.42 / 32.17 = 0.31$

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

$C_{1H} = 32.92$

Shoaling Coefficient  $K_{sH}$

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

$K_{sH} = \sqrt{62.45 / 32.92} = 1.38$

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

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

$H_{0\_H} = 11.85 / 1.38 = 8.60$

Deepwater mean wave height: 8.60 feet

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END RUNUP2 CONVERSIONS

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RUNUP2 RESULTS

for transect: YK-92

RUNUP2 SWEL:

8.80

8.80

8.80

8.80

8.80  
8.80  
8.80  
8.80  
8.80

RUNUP2 deepwater mean wave heights:

8.17  
8.17  
8.17  
8.60  
8.60  
8.60  
9.03  
9.03  
9.03

RUNUP2 mean wave periods:

11.59  
12.20  
12.81  
11.59  
12.20  
12.81  
11.59  
12.20  
12.81

RUNUP2 runup above SWEL:

2.29  
2.25  
2.29  
2.19  
2.24  
2.19  
2.12  
2.26  
2.21

RUNUP2 Mean runup height above SWEL: 2.23 feet

RUNUP2 2-percent runup height above SWEL: 4.90 feet

RUNUP2 2-percent runup elevation: 13.70 feet-NAVD88

RUNUP2 Messages:

No Messages

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

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

Incident significant wave height: 18.93 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: 13.74 feet

Peak wave period: 14.35 seconds

Average beach Slope: 1:50.79 (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 =    13.74  
Wave Period,                        T =    14.35  
Beach Slope,                         S =    0.020

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 = [ 8.2, 7.3, 6.7, 5.5, 3.6]

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

ACES Beach 2-percent runup height above SWEL: 7.34 feet

ACES Beach 2-percent runup elevation: 16.14 feet-NAVD88

ACES BEACH RUNUP is valid

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

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