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diary on          % begin recording

% FEMA appeal for The Town of Harpswell, Cumberland county, Maine
% TRANSECT ID: CM-129-1
% calculation by SJH, Ransom Consulting, Inc. 20-Feb-2020
% 100-year wave runup using TAW methodology
% including berm and weighted average with foreshore if necessary
%
% chk nld 20200220
%
% This script assumes that the incident wave conditions provided
% as input in the configuration section below are the
% appropriate values located at the end of the foreshore
% or toe of the slope on which the run-up is being calculated
% the script does not attempt to apply a depth limit or any other
% transformation to the incident wave conditions other than
% conversion of the peak wave period to the spectral mean wave
% as recommended in the references below
%
% references:
%
% Van der Meer, J.W., 2002. Technical Report Wave Run-up and
% Wave Overtopping at Dikes. TAW Technical Advisory Committee on
% Flood Defence, The Netherlands.
%
% FEMA. 2007, Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update
%
%
%-----
% CONFIG
%-----
fname='inpfiles/CM-129-1sta_ele_include.csv'; % file with station, elevation, include
% third column is 0 for excluded points
imgname='logfiles/CM-129-1-runup';
SWEL=8.8189; % 100-yr still water level including wave setup.
H0=5.7154; % significant wave height at toe of structure
Tp=12.3322; % peak period, 1/fma,
T0=Tp/1.1;

gamma_berm=0.6; % this may get changed automatically below
gamma_rough=0.6;
gamma_beta=1;
gamma_perm=1;

setupAtToe=-0.018871;
maxSetup=0.45369; % only used in case of berm/shallow foreshore weighted average

plotTitle='Iterative TAW for CM-129-1'

plotTitle =

Iterative TAW for CM-129-1

% END CONFIG
%-----

SWEL=SWEL+setupAtToe

SWEL =

8.800029

SWEL_fore=SWEL+maxSetup

SWEL_fore =

9.253719

% FIND WAVELENGTH USING DEEPWATER DISPERSION RELATION
% using English units
L0=32.15/(2*pi)*T0^2

L0 =

643.12716977951

% Find Hb (Munk, 1949)
%Hb=H0/(3.3*(H0/L0)^(1/3))
%Db=-Hb/.78+SWEL; % depth at breaking

% The toe elevation here is only used to determine the average
% structure slope, it is not used to depth limit the wave height.
% Any depth limiting or other modification of the wave height

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% to make it consistent with TAW guidance should be performed
% prior to the input of the significant wave height given above.
Ztoe=SWEL-1.5*H0

Ztoe =

    0.2269289999999998

% read the transect
[sta,dep,inc] = textread(fname,'%n%n%n%[^\\n]','delimiter',' ','headerlines',0);

% remove unselected points
k=find(inc==0);
sta(k)=[];
dep(k)=[];

sta_org=sta; % used for plotting purposes
dep_org=dep;

% initial guess at maximum run-up elevation to estimate slope
Z2=SWEL+1.5*H0

Z2 =

    17.373129

% determine station at the max runup and -1.5*H0 (i.e. the toe)
top_sta=-999;
toe_sta=-999;
for kk=1:length(sta)-1
    if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1))) % here is the intersection of z2 with profile
        top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
    end
    if ((Ztoe > dep(kk)) & (Ztoe <= dep(kk+1))) % here is the intersection of Ztoe with profile
        toe_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Ztoe)
    end
end
toe_sta =

    6.74104459975011

% check to make sure we got them, if not extend the end slopes outward
S=diff(dep)./diff(sta);
if toe_sta== -999
    dy=dep(1)-Ztoe;
    toe_sta=sta(1)-dy/S(1)
end
if top_sta== -999
    dy=Z2-dep(end);
    top_sta=sta(end)+dy/S(end)
end
top_sta =

    328.799614395887

% just so the reader can tell the values aren't -999 anymore
top_sta

top_sta =

    328.799614395887

toe_sta

toe_sta =

    6.74104459975011

% check for case where the toe of slope is below SWL-1.5*H0
% in this case interpolate setup from the setupAtToe(really setup as first station), and the max setup
% also un-include points seaward of SWL-1.5*H0
if Ztoe > dep(1)
    dd=SWEL_fore-dep;
    k=find(dd<0,1); % k is index of first land point
    staAtSWL=interp1(dep(k-1:k),sta(k-1:k),SWEL_fore);
    dsta=staAtSWL-sta(1);
    dsetup=maxSetup-setupAtToe;
    dsetdsta=dsetup/dsta;
    setup=setupAtToe+dsetdsta*(toe_sta-sta(1));
    sprintf('!!- Location of SWEL-1.5*H0 is %4.1f ft landward of toe of slope',dsta)
    sprintf('!!- Setup is interpolated between setup at toe of slope and max setup')

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    sprintf('!!!-      setup is adjusted to %4.2f feet',setup)
    SWEL=SWEL-setupAtToe+setup;
    sprintf('!!!-      SWEL is adjusted to %4.2f feet',SWEL)
    k=find(dep < SWEL-1.5*H0)
    sta(k)=[];
    dep(k)=[];
else
    sprintf('!!!- The User has selected a starting point that is %4.2f feet above the elevation of SWEL-1.5H0\n',dep(1)
    sprintf('!!!- This may be reasonable for some cases.  However the user may want to consider:\n')
    sprintf('!!!-      1) Selecting a starting point that is at or below %4.2f feet elevation, or\n', Ztoe)
    sprintf('!!!-      2) Reducing the incident wave height to a depth limited condition.\n')
end

ans =

-!!!- Location of SWEL-1.5*H0 is 339.1 ft landward of toe of slope

ans =

-!!!- Setup is interpolated between setup at toe of slope and max setup

ans =

-!!!-      setup is adjusted to 0.02 feet

ans =

-!!!-      SWEL is adjusted to 8.84 feet

k =

    1
    2
    3
    4
    5
    6
    7
    8
    9
   10
   11
   12
   13
   14
   15
   16
   17
   18
   19
   20
   21
   22
   23
   24
   25
   26
   27
   28
   29
   30
   31
   32
   33

% now iterate converge on a runup elevation
tol=0.01; % convergence criteria
R2del=999;
R2_new=3*H0; %initial guess
R2=R2_new;
iter=0;
R2_all=[];
topStaAll=[];
Berm_Segs=[];
TAW_ALWAYS_VALID=1;
while(abs(R2del) > tol && iter <= 25)
    iter=iter+1;
    sprintf('!----- STARTING ITERATION %d -----!',iter)
    % elevation of toe of slope
    Ztoe
    % station of toe slope (relative to 0-NAVD88 shoreline
    toe_sta
    % station of top of slope/extent of 2% run-up

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top_sta
% elevation of top of slope/extent of 2% run-up
Z2
% incident significant wave height
H0
% incident spectral peak wave period
Tp
% incident spectral mean wave period
T0

R2=R2_new
Z2=R2+SWEL
% determine slope for this iteration
top_sta=-999;
for kk=1:length(sta)-1
    if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1))) % here is the intersection of z2 with profile
        top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
        break;
    end
end
if top_sta== -999
    dy=Z2-dep(end);
    top_sta=sta(end)+dy/S(end)
end

% get the length of the slope (not accounting for berm)
Lslope=top_sta-toe_sta

% loop over profile segments to determine berm factor
% re-calculate influence of depth of berm based on this run-up elevation
% check for berm, berm width, berm height
berm_width=0;
rdh_sum=0;
Berm_Segs=[];
Berm_Heights=[];
for kk=1:length(sta)-1
    ddep=dep(kk+1)-dep(kk);
    dsta=sta(kk+1)-sta(kk);
    s=ddep/dsta;
    if (s < 1/15) % count it as a berm if slope is flatter than 1:15 (see TAW manual)
        sprintf('Berm Factor Calculation: Iteration %d, Profile Segment: %d',iter, kk)
        berm_width=berm_width+dsta; % tally the width of all berm segments
        % compute the rdh for this segment and weight it by the segment length
        dh=SWEL-(dep(kk)+dep(kk+1))/2
        if dh < 0
            chi=R2;
        else
            chi=2* H0;
        end
        if (dh <= R2 & dh >=-2*H0)
            rdh=(0.5-0.5*cos(3.14159*dh/chi)) ;
        else
            rdh=1;
        end
        rdh_sum=rdh_sum + rdh * dsta
        Berm_Segs=[Berm_Segs, kk];
        Berm_Heights=[Berm_Heights, (dep(kk)+dep(kk+1))/2];
    end
    if dep(kk) >= Z2 % jump out of loop if we reached limit of run-up for this iteration
        break
    end
end
sprintf('!----- End Berm Factor Calculation, Iter: %d -----!',iter)
berm_width
rB=berm_width/Lslope
if (berm_width > 0)
    rdh_mean=rdh_sum/berm_width
else
    rdh_mean=1
end
gamma_berm=1- rB * (1-rdh_mean)
if gamma_berm > 1
    gamma_berm=1
end
if gamma_berm < 0.6
    gamma_berm =0.6
end
% Iribarren number
slope=(Z2-Ztoe)/(Lslope-berm_width)
Irb=(slope/(sqrt(H0/L0)))
% runup height
gamma_berm
gamma_perm
gamma_beta
gamma_rough
gamma=gamma_berm*gamma_perm*gamma_beta*gamma_rough

% check validity
TAW_VALID=1;
if (Irb*gamma_berm < 0.5 | Irb*gamma_berm > 10 )

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        sprintf('!!! - - Iribaren number: %6.2f is outside the valid range (0.5-10), TAW NOT VALID - - !!!\n', Irb*gamma_
TAW_VALID=0;
else
    sprintf('!!! - - Iribaren number: %6.2f is in the valid range (0.5-10), TAW RECOMMENDED - - !!!\n', Irb*gamma_
end
islope=1/slope;
if (slope < 1/8 | slope > 1)
    sprintf('!!! - - slope: 1:%3.1f V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!\n', islope)
    TAW_VALID=0;
else
    sprintf('!!! - - slope: 1:%3.1f V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!\n', islope)
end
if TAW_VALID == 0
    TAW_ALWAYS_VALID=0;
end

if (Irb*gamma_berm < 1.8)
    R2_new=gamma*H0*1.77*Irb
else
    R2_new=gamma*H0*(4.3-(1.6/sqrt(Irb)))
end

% check to see if we need to evaluate a shallow foreshore
if berm_width > 0.25 * L0;
    disp('!   Berm_width is greater than 1/4 wave length')
    disp('!   Runup will be weighted average with foreshore calculation assuming depth limited wave height on berm
    % do the foreshore calculation
    fore_H0=0.78*(SWEL_fore-min(Berm_Heights))
    % get upper slope
    fore_toe_sta=-999;
    fore_toe_dep=-999;
    for kk=length(dep)-1:-1:1
        ddep=dep(kk+1)-dep(kk);
        dsta=sta(kk+1)-sta(kk);
        s=ddep/dsta;
        if s < 1/15
            break
        end
        fore_toe_sta=sta(kk);
        fore_toe_dep=dep(kk);
        upper_slope=(Z2-fore_toe_dep)/(top_sta-fore_toe_sta)
    end
    fore_Irb=upper_slope/(sqrt(fore_H0/L0));
    fore_gamma=gamma_perm*gamma_beta*gamma_rough;
    if (fore_Irb < 1.8)
        fore_R2=fore_gamma*fore_H0*1.77*fore_Irb;
    else
        fore_R2=fore_gamma*fore_H0*(4.3-(1.6/sqrt(fore_Irb)));
    end
    if berm_width >= L0
        R2_new=fore_R2
        disp('berm is wider than one wavelength, use full shallow foreshore solution');
    else
        w2=(berm_width-0.25*L0)/(0.75*L0)
        w1=1-w2
        R2_new=w2*fore_R2 + w1*R2_new
    end
end % end berm width check
% convergence criterion
R2del=abs(R2-R2_new)
R2_all(iter)=R2_new;
% get the new top station (for plot purposes)
Z2=R2_new+SWEL
top_sta=-999;
for kk=1:length(sta)-1
    if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1))) % here is the intersection of z2 with profile
        top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
        break;
    end
end
if top_sta== -999
    dy=Z2-dep(end);
    top_sta=sta(end)+dy/S(end);
end
topStaAll(iter)=top_sta;
end
ans =
!----- STARTING ITERATION 1 -----!
Ztoe =
    0.2269289999999998
toe_sta =
    6.74104459975011
top_sta =
    328.799614395887
Z2 =
    17.373129
H0 =
    5.7154
Tp =

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```
12.3322
T0 =
R2 = 11.2110909090909
17.1462
Z2 =
top_sta = 25.9890730071834
343.371296183168
Lslope = 336.630251583418
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 1
dh = 8.53413200718341
rdh_sum = 0.849745993595662
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 2
dh = 8.50452200718341
rdh_sum = 1.69657260925671
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 3
dh = 8.4749070071834
rdh_sum = 2.5404563797064
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 4
dh = 8.4452920071834
rdh_sum = 3.3813745236441
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 5
dh = 8.41567750718341
rdh_sum = 4.21930450687379
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 6
dh = 8.3860630071834
rdh_sum = 5.05422394327186
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 7
dh = 8.3564530071834
rdh_sum = 5.88611110865488
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 8
dh = 8.3268380071834
rdh_sum = 6.71494350629483
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 9
dh = 8.29481500718341
rdh_sum = 7.54044824566786
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 10
dh = 8.25927450718341
rdh_sum = 8.36223029887695
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 11
dh = 8.2226940071834
rdh_sum = 9.18014867324218
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 12
dh = 8.18618100718341
rdh_sum = 9.99417845342053
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 13
dh = 8.1496680071834
rdh_sum = 10.804288016054
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 14
dh =
    8.1131550071834
rdh_sum =
    11.6104461325576
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 15
dh =
    8.07663500718341
rdh_sum =
    12.412621205881
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 16
dh =
    8.0401220071834
rdh_sum =
    13.2107835669669
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 17
dh =
    8.00360900718341
rdh_sum =
    14.0049031903346
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 18
dh =
    7.96708900718341
rdh_sum =
    14.7949496740792
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 19
dh =
    7.93057600718341
rdh_sum =
    15.5808945878995
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 20
dh =
    7.89399600718341
rdh_sum =
    16.3627015313542
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 21
dh =
    7.8574160071834
rdh_sum =
    17.1403420217407
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 22
dh =
    7.82090300718341
rdh_sum =
    17.9137957055424
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 23
dh =
    7.78438300718341
rdh_sum =
    18.6830342349309
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 24
dh =
    7.7478700071834
rdh_sum =
    19.4480313024238
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 25
dh =
    7.71135700718341
rdh_sum =
    20.2087602223446
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 26
dh =
    7.67483700718341
rdh_sum =
    20.9651939130463
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 27
dh =
    7.6383240071834
rdh_sum =
    21.717307371988
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 28
dh =
    7.60181100718341
rdh_sum =
    22.4650752108956
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 29
dh =
7.5652980071834
rdh_sum =
23.2084724791065
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 30
dh =
7.52878500718341
rdh_sum =
23.9474746660825
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 31
dh =
7.49219800718341
rdh_sum =
24.6820487235595
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 32
dh =
7.45561800718341
rdh_sum =
25.4121717876562
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 33
dh =
7.41910500718341
rdh_sum =
26.1378288154829
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 34
dh =
7.3825850071834
rdh_sum =
26.8589962202736
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 35
dh =
7.34607200718341
rdh_sum =
27.575652588465
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 36
dh =
7.30955900718341
rdh_sum =
28.2877761023752
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 37
dh =
7.2730460071834
rdh_sum =
28.9953454007886
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 38
dh =
7.23653300718341
rdh_sum =
29.6983395811073
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 39
dh =
7.20001300718341
rdh_sum =
30.3967373184992
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 40
dh =
7.16350000718341
rdh_sum =
31.0905195130409
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 41
dh =
7.1269870071834
rdh_sum =
31.7796666505205
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 42
dh =
7.09039950718341
rdh_sum =
32.4641501682408
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 43
dh =
7.0538190071834
rdh_sum =
33.1439523100719
ans =


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Berm Factor Calculation: Iteration 1, Profile Segment: 44
dh =
    7.01730600718341
rdh_sum =
    33.8190635908787
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 45
dh =
    6.9807930071834
rdh_sum =
    34.4894663766434
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 46
dh =
    6.94428000718341
rdh_sum =
    35.155143507502
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 47
dh =
    6.90776000718341
rdh_sum =
    35.8160773887376
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 48
dh =
    6.8712470071834
rdh_sum =
    36.4722527216039
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 49
dh =
    6.83473400718341
rdh_sum =
    37.1236537789669
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 50
dh =
    6.7982140071834
rdh_sum =
    37.7702643948281
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 51
dh =
    6.7617010071834
rdh_sum =
    38.4120707220032
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 52
dh =
    6.7251210071834
rdh_sum =
    39.049049625619
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 53
dh =
    6.6885410071834
rdh_sum =
    39.6811872609871
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 54
dh =
    6.6520280071834
rdh_sum =
    40.3084791763822
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 55
dh =
    6.61550800718341
rdh_sum =
    40.9309116206413
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 56
dh =
    6.5789950071834
rdh_sum =
    41.5484731948291
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 57
dh =
    6.5424820071834
rdh_sum =
    42.1611520602858
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 58
dh =
    6.50596200718341
rdh_sum =
    42.7689359307408
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 59
dh =
    6.46944900718341
rdh_sum =
    43.3718148893465
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 60
dh =
    6.4329360071834
rdh_sum =
    43.9697785760086
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 61
dh =
    6.3964230071834
rdh_sum =
    44.5628171256095
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 62
dh =
    6.35991000718341
rdh_sum =
    45.1509211690015
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 63
dh =
    6.32332300718341
rdh_sum =
    45.7340718066554
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 64
dh =
    6.28674300718341
rdh_sum =
    46.3122615812694
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 65
dh =
    6.25023000718341
rdh_sum =
    46.885491697791
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 66
dh =
    6.2137170071834
rdh_sum =
    47.453754781817
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 67
dh =
    6.1772040071834
rdh_sum =
    48.0170439591334
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 68
dh =
    6.14068400718341
rdh_sum =
    48.5753519010462
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 69
dh =
    6.10417100718341
rdh_sum =
    49.1286736900291
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 70
dh =
    6.0676580071834
rdh_sum =
    49.6770039564831
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 71
dh =
    6.03113800718341
rdh_sum =
    50.2203368751593
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 72
dh =
    5.99462500718341
rdh_sum =
    50.7586690397757
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 73
dh =
    5.95804500718341
rdh_sum =
    51.291987403695
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 74
dh =
5.92146500718341
rdh_sum =
51.8202885993738
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 75
dh =
5.88495200718341
rdh_sum =
52.343578963363
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 76
dh =
5.8628940071834
rdh_sum =
52.8638410470743
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 77
dh =
5.8552985071834
rdh_sum =
53.3830601881378
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 78
dh =
5.84770300718341
rdh_sum =
53.9012363028023
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 79
dh =
5.84010750718341
rdh_sum =
54.4183693118615
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 80
dh =
5.83251200718341
rdh_sum =
54.9344591406546
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 81
dh =
5.8249165071834
rdh_sum =
55.4495057190669
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 82
dh =
5.81732150718341
rdh_sum =
55.9635090502117
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 83
dh =
5.80972600718341
rdh_sum =
56.4764690043887
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 84
dh =
5.8021305071834
rdh_sum =
56.9883855251222
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 85
dh =
5.7945350071834
rdh_sum =
57.4992585604835
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 86
dh =
5.7869395071834
rdh_sum =
58.0090880630911
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 87
dh =
5.77934400718341
rdh_sum =
58.5178739901108
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 88
dh =
5.77174850718341
rdh_sum =
59.0256163032561
ans =

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Berm Factor Calculation: Iteration 1, Profile Segment: 89
dh =
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rdh_sum =
    59.5323149687883
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 90
dh =
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rdh_sum =
    60.0379699575164
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 91
dh =
    5.74896250718341
rdh_sum =
    60.5425813135037
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 92
dh =
    5.74136700718341
rdh_sum =
    61.0461489479507
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 93
dh =
    5.73377150718341
rdh_sum =
    61.5486728453108
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 94
dh =
    5.7261760071834
rdh_sum =
    62.0501529945854
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 95
dh =
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rdh_sum =
    62.5505893893246
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 96
dh =
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rdh_sum =
    63.0499820276265
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 97
dh =
    5.70338950718341
rdh_sum =
    63.5483309121381
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 98
dh =
    5.6957945071834
rdh_sum =
    64.0456361187622
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 99
dh =
    5.68819900718341
rdh_sum =
    64.5418975905334
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 100
dh =
    5.68060350718341
rdh_sum =
    65.0371153437432
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 101
dh =
    5.67300800718341
rdh_sum =
    65.5312893992312
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 102
dh =
    5.6654125071834
rdh_sum =
    66.0244197823851
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 103
dh =
    5.6578170071834
rdh_sum =
    66.5165065231409
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 104
dh =
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rdh_sum =
67.0075496559821
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 105
dh =
5.6426265071834
rdh_sum =
67.4975492886354
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 106
dh =
5.6350310071834
rdh_sum =
67.9865053959816
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 107
dh =
5.6274355071834
rdh_sum =
68.4744180261467
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 108
dh =
5.6198400071834
rdh_sum =
68.9612872318041
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 109
dh =
5.61224450718341
rdh_sum =
69.4471130701738
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 110
dh =
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rdh_sum =
69.9318956030229
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 111
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 112
dh =
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rdh_sum =
70.8983310906261
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Berm Factor Calculation: Iteration 1, Profile Segment: 113
dh =
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rdh_sum =
71.3799841916398
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 114
dh =
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rdh_sum =
71.8605942796563
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 115
dh =
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rdh_sum =
72.340161439171
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Berm Factor Calculation: Iteration 1, Profile Segment: 116
dh =
5.5590765071834
rdh_sum =
72.8186857592244
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 117
dh =
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rdh_sum =
73.2961673334013
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 118
dh =
5.54388550718341
rdh_sum =
73.7726062598304
ans =

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Berm Factor Calculation: Iteration 1, Profile Segment: 119
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 120
dh =
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rdh_sum =
    74.7223567219221
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 121
dh =
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rdh_sum =
    75.1956684079249
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 122
dh =
    5.51350400718341
rdh_sum =
    75.6679378841182
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 123
dh =
    5.50590850718341
rdh_sum =
    76.1391652713437
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 124
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rdh_sum =
    76.609350694984
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 125
dh =
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rdh_sum =
    77.0784942849624
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 126
dh =
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rdh_sum =
    77.5465962443112
ans =
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dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 128
dh =
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rdh_sum =
    78.4796756259343
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Berm Factor Calculation: Iteration 1, Profile Segment: 129
dh =
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rdh_sum =
    78.9446533398294
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 130
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 131
dh =
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rdh_sum =
    79.8714855768707
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Berm Factor Calculation: Iteration 1, Profile Segment: 132
dh =
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rdh_sum =
    80.3333404188608
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Berm Factor Calculation: Iteration 1, Profile Segment: 133
dh =
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rdh_sum =
    80.7941546984504
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 134
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Berm Factor Calculation: Iteration 1, Profile Segment: 135
dh =
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 81.712662052476
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Berm Factor Calculation: Iteration 1, Profile Segment: 136
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 137
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 138
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 139
dh =
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rdh_sum =
 83.5371970067934
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Berm Factor Calculation: Iteration 1, Profile Segment: 140
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 141
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 144
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rdh_sum =
 85.794482554021
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Berm Factor Calculation: Iteration 1, Profile Segment: 145
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 146
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 147
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 148
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rdh_sum =
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ans =

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rdh_sum = 88.468964841552
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Berm Factor Calculation: Iteration 1, Profile Segment: 151
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rdh_sum = 88.9110814915101
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rdh_sum = 89.7922052121788
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rdh_sum = 90.6691845614713
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rdh_sum = 92.8435159005265
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Berm Factor Calculation: Iteration 1, Profile Segment: 161
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ans = 5.21728200718341
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Berm Factor Calculation: Iteration 1, Profile Segment: 162
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rdh_sum = 93.7060074466115
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Berm Factor Calculation: Iteration 1, Profile Segment: 163
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ans = 5.2020915071834
rdh_sum = 94.1357028274823
ans =

Berm Factor Calculation: Iteration 1, Profile Segment: 164
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 165
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 166
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 167
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 168
dh =
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rdh_sum =
 96.2686875192839
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 169
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 170
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rdh_sum =
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rdh_sum =
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rdh_sum =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 175
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 176
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 177
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rdh_sum =
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ans =
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rdh_sum =
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ans =
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rdh_sum =
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rdh_sum =
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ans =

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dh =
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rdh_sum =
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dh =
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rdh_sum =
107.342292034134
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 196
dh =
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rdh_sum =
107.738079626128
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Berm Factor Calculation: Iteration 1, Profile Segment: 197
dh =
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rdh_sum =
108.132846611859
ans =
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rdh_sum =
108.526593517042
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dh =
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rdh_sum =
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rdh_sum =
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rdh_sum =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 204
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 205
dh =
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rdh_sum =
111.254297170543
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 206
dh =
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rdh_sum =
111.639899935704
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 207
dh =
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rdh_sum =
112.024486946975
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 208
dh =
4.86029700718341
rdh_sum =
112.408058640405
ans =

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Berm Factor Calculation: Iteration 1, Profile Segment: 209
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 210
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 211
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 212
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 213
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 214
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 215
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 216
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rdh_sum =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 219
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 220
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 221
dh =
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Berm Factor Calculation: Iteration 1, Profile Segment: 222
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 223
dh =
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rdh_sum =
    118.040152280739
ans =
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Berm Factor Calculation: Iteration 1, Profile Segment: 224
dh =
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Berm Factor Calculation: Iteration 1, Profile Segment: 225
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 1, Profile Segment: 226
dh =
4.72357900718341
rdh_sum =
119.139330813952
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 227
dh =
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rdh_sum =
119.503713029492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 228
dh =
4.7083885071834
rdh_sum =
119.867090978014
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 229
dh =
4.70079300718341
rdh_sum =
120.229465188747
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 230
dh =
4.69319750718341
rdh_sum =
120.590836261422
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 231
dh =
4.68560200718341
rdh_sum =
120.951204800145
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 232
dh =
4.6780065071834
rdh_sum =
121.310571413389
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 233
dh =
4.67041100718341
rdh_sum =
121.668936713993
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 234
dh =
4.6628155071834
rdh_sum =
122.026301319161
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 235
dh =
4.6552205071834
rdh_sum =
122.382665916269
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 236
dh =
4.64762500718341
rdh_sum =
122.738031065384
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 237
dh =
4.6400295071834
rdh_sum =
123.092397396784
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 238
dh =
4.6324340071834
rdh_sum =
123.445765545097
ans =

Berm Factor Calculation: Iteration 1, Profile Segment: 239
dh =
4.62483850718341
rdh_sum =
123.798136149303
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 240
dh =
4.6172430071834
rdh_sum =
124.149509852729
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 241
dh =
4.60964750718341
rdh_sum =
124.499887303043
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 242
dh =
4.60205250718341
rdh_sum =
124.849269217775
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 243
dh =
4.5944570071834
rdh_sum =
125.197656187716
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 244
dh =
4.58686150718341
rdh_sum =
125.545048873549
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 245
dh =
4.5792660071834
rdh_sum =
125.891447940295
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 246
dh =
4.5716705071834
rdh_sum =
126.236854057301
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 247
dh =
4.5640750071834
rdh_sum =
126.581267898242
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 248
dh =
4.55647950718341
rdh_sum =
126.924690141119
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 249
dh =
4.5488845071834
rdh_sum =
127.267121533458
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 250
dh =
4.5412890071834
rdh_sum =
127.608562696646
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 251
dh =
4.53369350718341
rdh_sum =
127.949014321637
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 252
dh =
4.52609800718341
rdh_sum =
128.288477103695
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 253
dh =
4.5185025071834
rdh_sum =
128.626951742395
ans =

Berm Factor Calculation: Iteration 1, Profile Segment: 254
dh =
4.51090700718341
rdh_sum =
128.964438941618
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 255
dh =
4.5033115071834
rdh_sum =
129.300939409549
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 256
dh =
4.4957165071834
rdh_sum =
129.636453923553
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 257
dh =
4.48812100718341
rdh_sum =
129.970983135482
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 258
dh =
4.4805255071834
rdh_sum =
130.304527766407
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 259
dh =
4.4729300071834
rdh_sum =
130.637088541694
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 260
dh =
4.46533450718341
rdh_sum =
130.968666190993
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 261
dh =
4.45773900718341
rdh_sum =
131.299261448241
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 262
dh =
4.45014350718341
rdh_sum =
131.628875051655
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 263
dh =
4.4425480071834
rdh_sum =
131.957507743728
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 264
dh =
4.43495250718341
rdh_sum =
132.285160271231
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 265
dh =
4.42735750718341
rdh_sum =
132.611833449651
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 266
dh =
4.4197620071834
rdh_sum =
132.937527969799
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 267
dh =
4.41216650718341
rdh_sum =
133.262244591248
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 268
dh =
4.4045710071834
rdh_sum =
133.585984077831
ans =

```

Berm Factor Calculation: Iteration 1, Profile Segment: 269
dh =
    4.3969755071834
rdh_sum =
    133.908747197642
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 270
dh =
    4.38938000718341
rdh_sum =
    134.230534723026
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 271
dh =
    4.38178450718341
rdh_sum =
    134.551347430583
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 272
dh =
    4.3741895071834
rdh_sum =
    134.871186165251
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 273
dh =
    4.36659400718341
rdh_sum =
    135.190051647977
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 274
dh =
    4.35899850718341
rdh_sum =
    135.507944668092
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 275
dh =
    4.32800000718341
rdh_sum =
    135.821877179628
ans =
!----- End Berm Factor Calculation, Iter: 1 -----!
berm_width =
    275
rB =
    0.816920044192328
rdh_mean =
    0.493897735198646
gamma_berm =
    0.586554915472641
gamma_berm =
    0.6
slope =
    0.418011339322766
Irb =
    4.43417854621968
gamma_berm =
    0.6
gamma_perm =
    1
gamma_beta =
    1
gamma_rough =
    0.6
gamma =
    0.36
ans =
!!! - Iribaren number: 2.66 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - slope: 1:2.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
    7.28406649359505
! Berm_width is greater than 1/4 wave length
! Runup will be weighted average with foreshore calculation assuming depth limited wave height on berm
fore_H0 =
    6.97708284
upper_slope =
    0.591280000000001
upper_slope =
    0.591280000000001
upper_slope =
    0.591280035246893
upper_slope =
    0.591280034046847
upper_slope =
    0.58418642721665
upper_slope =
    0.570677599760422
upper_slope =

```



```

0.558003389946922
upper_slope =
0.546088737673167
upper_slope =
0.534867405326031
upper_slope =
0.524280561027568
upper_slope =
0.514275843043501
upper_slope =
0.504806574401893
upper_slope =
0.495830839707974
upper_slope =
0.487311083636256
upper_slope =
0.479213397543815
upper_slope =
0.471507151258171
upper_slope =
0.464164677005949
upper_slope =
0.457160766499722
upper_slope =
0.449138648664121
upper_slope =
0.441470151664179
upper_slope =
0.434132397931349
upper_slope =
0.427104441663401
upper_slope =
0.420367069143356
upper_slope =
0.413902623325299
upper_slope =
0.407694849314715
upper_slope =
0.401728757896232
upper_slope =
0.395990504696518
upper_slope =
0.39046728293168
upper_slope =
0.385147227990241
upper_slope =
0.380019332355453
upper_slope =
0.375073369583025
upper_slope =
0.370299826229417
upper_slope =
0.365689840777235
upper_slope =
0.361235148732762
w2 =
0.236797558185952
w1 =
0.763202441814049
R2_new =
8.97010981212523
R2del =
8.17609018787477
Z2 =
17.8129828193086
ans =
!----- STARTING ITERATION 2 -----!
Ztoe =
0.226928999999998
toe_sta =
6.74104459975011
top_sta =
329.54351545682
Z2 =
17.8129828193086
H0 =
5.7154
Tp =
12.3322
T0 =
11.2110909090909
R2 =
8.97010981212523
Z2 =
17.8129828193086
top_sta =
329.54351545682
Lslope =
322.80247085707
ans =

```

```
Berm Factor Calculation: Iteration 2, Profile Segment: 1
dh =
    8.53413200718341
rdh_sum =
    0.849745993595662
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 2
dh =
    8.50452200718341
rdh_sum =
    1.69657260925671
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 3
dh =
    8.4749070071834
rdh_sum =
    2.5404563797064
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 4
dh =
    8.4452920071834
rdh_sum =
    3.3813745236441
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 5
dh =
    8.41567750718341
rdh_sum =
    4.21930450687379
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 6
dh =
    8.3860630071834
rdh_sum =
    5.05422394327186
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 7
dh =
    8.3564530071834
rdh_sum =
    5.88611110865488
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 8
dh =
    8.3268380071834
rdh_sum =
    6.71494350629483
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 9
dh =
    8.29481500718341
rdh_sum =
    7.54044824566786
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 10
dh =
    8.25927450718341
rdh_sum =
    8.36223029887695
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 11
dh =
    8.2226940071834
rdh_sum =
    9.18014867324218
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 12
dh =
    8.18618100718341
rdh_sum =
    9.99417845342053
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 13
dh =
    8.1496680071834
rdh_sum =
    10.804288016054
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 14
dh =
    8.1131550071834
rdh_sum =
    11.6104461325576
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 15
dh =
    8.07663500718341
rdh_sum =
    12.412621205881
ans =
```

```
Berm Factor Calculation: Iteration 2, Profile Segment: 16
dh =
    8.0401220071834
rdh_sum =
    13.2107835669669
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 17
dh =
    8.00360900718341
rdh_sum =
    14.0049031903346
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 18
dh =
    7.96708900718341
rdh_sum =
    14.7949496740792
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 19
dh =
    7.93057600718341
rdh_sum =
    15.5808945878995
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 20
dh =
    7.89399600718341
rdh_sum =
    16.3627015313542
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 21
dh =
    7.8574160071834
rdh_sum =
    17.1403420217407
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 22
dh =
    7.82090300718341
rdh_sum =
    17.9137957055424
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 23
dh =
    7.78438300718341
rdh_sum =
    18.6830342349309
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 24
dh =
    7.7478700071834
rdh_sum =
    19.4480313024238
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 25
dh =
    7.71135700718341
rdh_sum =
    20.2087602223446
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 26
dh =
    7.67483700718341
rdh_sum =
    20.9651939130463
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 27
dh =
    7.6383240071834
rdh_sum =
    21.717307371988
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 28
dh =
    7.60181100718341
rdh_sum =
    22.4650752108956
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 29
dh =
    7.5652980071834
rdh_sum =
    23.2084724791065
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 30
dh =
    7.52878500718341
rdh_sum =
    23.9474746660825
ans =
```

```
Berm Factor Calculation: Iteration 2, Profile Segment: 31
dh =
    7.49219800718341
rdh_sum =
    24.6820487235595
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 32
dh =
    7.45561800718341
rdh_sum =
    25.4121717876562
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 33
dh =
    7.41910500718341
rdh_sum =
    26.1378288154829
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 34
dh =
    7.3825850071834
rdh_sum =
    26.8589962202736
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 35
dh =
    7.34607200718341
rdh_sum =
    27.575652588465
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 36
dh =
    7.30955900718341
rdh_sum =
    28.2877761023752
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 37
dh =
    7.2730460071834
rdh_sum =
    28.9953454007886
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 38
dh =
    7.23653300718341
rdh_sum =
    29.6983395811073
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 39
dh =
    7.20001300718341
rdh_sum =
    30.3967373184992
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 40
dh =
    7.16350000718341
rdh_sum =
    31.0905195130409
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 41
dh =
    7.1269870071834
rdh_sum =
    31.7796666505205
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 42
dh =
    7.09039950718341
rdh_sum =
    32.4641501682408
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 43
dh =
    7.0538190071834
rdh_sum =
    33.1439523100719
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 44
dh =
    7.01730600718341
rdh_sum =
    33.8190635908787
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 45
dh =
    6.9807930071834
rdh_sum =
    34.4894663766434
ans =
```

Berm Factor Calculation: Iteration 2, Profile Segment: 46
dh =
rdh_sum = 6.94428000718341
35.155143507502
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 47
dh =
rdh_sum = 6.90776000718341
35.8160773887376
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 48
dh =
rdh_sum = 6.8712470071834
36.4722527216039
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 49
dh =
rdh_sum = 6.83473400718341
37.1236537789669
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 50
dh =
rdh_sum = 6.7982140071834
37.7702643948281
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 51
dh =
rdh_sum = 6.7617010071834
38.4120707220032
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 52
dh =
rdh_sum = 6.7251210071834
39.049049625619
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 53
dh =
rdh_sum = 6.6885410071834
39.6811872609871
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 54
dh =
rdh_sum = 6.6520280071834
40.3084791763822
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 55
dh =
rdh_sum = 6.61550800718341
40.9309116206413
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 56
dh =
rdh_sum = 6.5789950071834
41.5484731948291
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 57
dh =
rdh_sum = 6.5424820071834
42.1611520602858
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 58
dh =
rdh_sum = 6.50596200718341
42.7689359307408
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 59
dh =
rdh_sum = 6.46944900718341
43.3718148893465
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 60
dh =
rdh_sum = 6.4329360071834
43.9697785760086
ans =

```
Berm Factor Calculation: Iteration 2, Profile Segment: 61
dh =
    6.3964230071834
rdh_sum =
    44.5628171256095
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 62
dh =
    6.35991000718341
rdh_sum =
    45.1509211690015
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 63
dh =
    6.32332300718341
rdh_sum =
    45.7340718066554
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 64
dh =
    6.28674300718341
rdh_sum =
    46.3122615812694
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 65
dh =
    6.25023000718341
rdh_sum =
    46.885491697791
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 66
dh =
    6.2137170071834
rdh_sum =
    47.453754781817
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 67
dh =
    6.1772040071834
rdh_sum =
    48.0170439591334
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 68
dh =
    6.14068400718341
rdh_sum =
    48.5753519010462
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 69
dh =
    6.10417100718341
rdh_sum =
    49.1286736900291
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 70
dh =
    6.0676580071834
rdh_sum =
    49.6770039564831
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 71
dh =
    6.03113800718341
rdh_sum =
    50.2203368751593
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 72
dh =
    5.99462500718341
rdh_sum =
    50.7586690397757
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 73
dh =
    5.95804500718341
rdh_sum =
    51.291987403695
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 74
dh =
    5.92146500718341
rdh_sum =
    51.8202885993738
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 75
dh =
    5.88495200718341
rdh_sum =
    52.343578963363
ans =
```

Berm Factor Calculation: Iteration 2, Profile Segment: 76
dh =
 5.8628940071834
rdh_sum =
 52.8638410470743
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 77
dh =
 5.8552985071834
rdh_sum =
 53.3830601881378
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 78
dh =
 5.84770300718341
rdh_sum =
 53.9012363028023
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 79
dh =
 5.84010750718341
rdh_sum =
 54.4183693118615
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 80
dh =
 5.83251200718341
rdh_sum =
 54.9344591406546
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 81
dh =
 5.8249165071834
rdh_sum =
 55.4495057190669
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 82
dh =
 5.81732150718341
rdh_sum =
 55.9635090502117
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 83
dh =
 5.80972600718341
rdh_sum =
 56.4764690043887
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 84
dh =
 5.8021305071834
rdh_sum =
 56.9883855251222
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 85
dh =
 5.7945350071834
rdh_sum =
 57.4992585604835
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 86
dh =
 5.7869395071834
rdh_sum =
 58.0090880630911
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 87
dh =
 5.77934400718341
rdh_sum =
 58.5178739901108
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 88
dh =
 5.77174850718341
rdh_sum =
 59.0256163032561
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 89
dh =
 5.76415300718341
rdh_sum =
 59.5323149687883
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 90
dh =
 5.75655750718341
rdh_sum =
 60.0379699575164
ans =

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Berm Factor Calculation: Iteration 2, Profile Segment: 91
dh =
    5.74896250718341
rdh_sum =
    60.5425813135037
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 92
dh =
    5.74136700718341
rdh_sum =
    61.0461489479507
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 93
dh =
    5.73377150718341
rdh_sum =
    61.5486728453108
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 94
dh =
    5.7261760071834
rdh_sum =
    62.0501529945854
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 95
dh =
    5.7185805071834
rdh_sum =
    62.5505893893246
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 96
dh =
    5.71098500718341
rdh_sum =
    63.0499820276265
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 97
dh =
    5.70338950718341
rdh_sum =
    63.5483309121381
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 98
dh =
    5.6957945071834
rdh_sum =
    64.0456361187622
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 99
dh =
    5.68819900718341
rdh_sum =
    64.5418975905334
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 100
dh =
    5.68060350718341
rdh_sum =
    65.0371153437432
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 101
dh =
    5.67300800718341
rdh_sum =
    65.5312893992312
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 102
dh =
    5.6654125071834
rdh_sum =
    66.0244197823851
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 103
dh =
    5.6578170071834
rdh_sum =
    66.5165065231409
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 104
dh =
    5.6502215071834
rdh_sum =
    67.0075496559821
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 105
dh =
    5.6426265071834
rdh_sum =
    67.4975492886354
ans =
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Berm Factor Calculation: Iteration 2, Profile Segment: 106
dh =
    5.6350310071834
rdh_sum =
    67.9865053959816
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 107
dh =
    5.6274355071834
rdh_sum =
    68.4744180261467
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 108
dh =
    5.6198400071834
rdh_sum =
    68.9612872318041
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 109
dh =
    5.61224450718341
rdh_sum =
    69.4471130701738
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 110
dh =
    5.60464900718341
rdh_sum =
    69.9318956030229
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 111
dh =
    5.59705350718341
rdh_sum =
    70.4156348966646
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 112
dh =
    5.58945850718341
rdh_sum =
    70.8983310906261
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 113
dh =
    5.58186300718341
rdh_sum =
    71.3799841916398
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 114
dh =
    5.57426750718341
rdh_sum =
    71.8605942796563
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 115
dh =
    5.5666720071834
rdh_sum =
    72.340161439171
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 116
dh =
    5.5590765071834
rdh_sum =
    72.8186857592244
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 117
dh =
    5.5514810071834
rdh_sum =
    73.2961673334013
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 118
dh =
    5.54388550718341
rdh_sum =
    73.7726062598304
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 119
dh =
    5.5362905071834
rdh_sum =
    74.2480027098098
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 120
dh =
    5.5286950071834
rdh_sum =
    74.7223567219221
ans =
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Berm Factor Calculation: Iteration 2, Profile Segment: 121
dh =
ans = 5.52109950718341
rdh_sum = 75.1956684079249
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 122
dh =
ans = 5.51350400718341
rdh_sum = 75.6679378841182
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 123
dh =
ans = 5.50590850718341
rdh_sum = 76.1391652713437
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 124
dh =
ans = 5.49831300718341
rdh_sum = 76.609350694984
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 125
dh =
ans = 5.4907175071834
rdh_sum = 77.0784942849624
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 126
dh =
ans = 5.4831225071834
rdh_sum = 77.5465962443112
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 127
dh =
ans = 5.4755270071834
rdh_sum = 78.0136566434547
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 128
dh =
ans = 5.4679315071834
rdh_sum = 78.4796756259343
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 129
dh =
ans = 5.4603360071834
rdh_sum = 78.9446533398294
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 130
dh =
ans = 5.45274050718341
rdh_sum = 79.4085899377569
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 131
dh =
ans = 5.44514500718341
rdh_sum = 79.8714855768707
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 132
dh =
ans = 5.43754950718341
rdh_sum = 80.3333404188608
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 133
dh =
ans = 5.42995450718341
rdh_sum = 80.7941546984504
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 134
dh =
ans = 5.42235900718341
rdh_sum = 81.2539285178908
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 135
dh =
ans = 5.41476350718341
rdh_sum = 81.712662052476
ans =

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Berm Factor Calculation: Iteration 2, Profile Segment: 136
dh =
    5.4071680071834
rdh_sum =
    82.1703554820333
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 137
dh =
    5.3995725071834
rdh_sum =
    82.6270089909226
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 138
dh =
    5.3919770071834
rdh_sum =
    83.0826227680352
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 139
dh =
    5.3843815071834
rdh_sum =
    83.5371970067934
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 140
dh =
    5.3767865071834
rdh_sum =
    83.9907319735611
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 141
dh =
    5.3691910071834
rdh_sum =
    84.4432278023948
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 142
dh =
    5.3615955071834
rdh_sum =
    84.8946847003037
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 143
dh =
    5.35400000718341
rdh_sum =
    85.3451028788247
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 144
dh =
    5.34640450718341
rdh_sum =
    85.794482554021
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 145
dh =
    5.33880900718341
rdh_sum =
    86.2428239464813
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 146
dh =
    5.3312135071834
rdh_sum =
    86.6901272813188
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 147
dh =
    5.3236180071834
rdh_sum =
    87.1363927881704
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 148
dh =
    5.3160225071834
rdh_sum =
    87.5816207011953
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 149
dh =
    5.3084275071834
rdh_sum =
    88.0258113273539
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 150
dh =
    5.3008320071834
rdh_sum =
    88.468964841552
ans =
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Berm Factor Calculation: Iteration 2, Profile Segment: 151
dh =
    5.2932365071834
rdh_sum =
    88.9110814915101
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 152
dh =
    5.28564100718341
rdh_sum =
    89.352161529467
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 153
dh =
    5.27804550718341
rdh_sum =
    89.7922052121788
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 154
dh =
    5.27045000718341
rdh_sum =
    90.2312128009179
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 155
dh =
    5.26285450718341
rdh_sum =
    90.6691845614713
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 156
dh =
    5.25525950718341
rdh_sum =
    91.1061208323005
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 157
dh =
    5.24766400718341
rdh_sum =
    91.5420218200406
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 158
dh =
    5.24006850718341
rdh_sum =
    91.9768878040168
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 159
dh =
    5.2324730071834
rdh_sum =
    92.410719068064
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 160
dh =
    5.2248775071834
rdh_sum =
    92.8435159005265
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 161
dh =
    5.21728200718341
rdh_sum =
    93.2752785942562
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 162
dh =
    5.20968650718341
rdh_sum =
    93.7060074466115
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 163
dh =
    5.2020915071834
rdh_sum =
    94.1357028274823
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 164
dh =
    5.19449600718341
rdh_sum =
    94.5643649751894
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 165
dh =
    5.18690050718341
rdh_sum =
    94.9919942006025
ans =
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Berm Factor Calculation: Iteration 2, Profile Segment: 166
dh =
 5.17930500718341
rdh_sum =
 95.4185908190924
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 167
dh =
 5.1717095071834
rdh_sum =
 95.8441551505299
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 168
dh =
 5.1641140071834
rdh_sum =
 96.2686875192839
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 169
dh =
 5.1565185071834
rdh_sum =
 96.6921882542206
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 170
dh =
 5.1489235071834
rdh_sum =
 97.1146577565793
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 171
dh =
 5.1413280071834
rdh_sum =
 97.5360962963157
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 172
dh =
 5.1337325071834
rdh_sum =
 97.9565042157778
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 173
dh =
 5.1261370071834
rdh_sum =
 98.3758818618047
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 174
dh =
 5.11854150718341
rdh_sum =
 98.7942295857254
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 175
dh =
 5.11094600718341
rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 176
dh =
 5.10335050718341
rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 177
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 178
dh =
 5.08816000718341
rdh_sum =
 100.457328579379
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 179
dh =
 5.08056450718341
rdh_sum =
 100.870532187396
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 180
dh =
 5.0729690071834
rdh_sum =
 101.282708075449
ans =

Berm Factor Calculation: Iteration 2, Profile Segment: 181
dh =
5.0653735071834
rdh_sum =
101.693856626252
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 182
dh =
5.0577780071834
rdh_sum =
102.103978226992
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 183
dh =
5.05018250718341
rdh_sum =
102.513073269335
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 184
dh =
5.0425875071834
rdh_sum =
102.921142216954
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 185
dh =
5.0349920071834
rdh_sum =
103.328185402895
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 186
dh =
5.02739650718341
rdh_sum =
103.734203232237
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 187
dh =
5.01980100718341
rdh_sum =
104.139196114527
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 188
dh =
5.01220550718341
rdh_sum =
104.543164463779
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 189
dh =
5.00461000718341
rdh_sum =
104.946108698469
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 190
dh =
4.9970145071834
rdh_sum =
105.348029241541
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 191
dh =
4.9894195071834
rdh_sum =
105.74892658774
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 192
dh =
4.9818240071834
rdh_sum =
106.148801101553
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 193
dh =
4.9742285071834
rdh_sum =
106.547653219299
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 194
dh =
4.9666330071834
rdh_sum =
106.945483381751
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 195
dh =
4.95903750718341
rdh_sum =
107.342292034134
ans =

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Berm Factor Calculation: Iteration 2, Profile Segment: 196
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 197
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 198
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 199
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 200
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 201
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 202
dh =
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rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 203
dh =
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rdh_sum =
    110.480042188377
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 204
dh =
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rdh_sum =
    110.867678086127
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 205
dh =
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rdh_sum =
    111.254297170543
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 206
dh =
    4.87548750718341
rdh_sum =
    111.639899935704
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 207
dh =
    4.8678925071834
rdh_sum =
    112.024486946975
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 208
dh =
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rdh_sum =
    112.408058640405
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 209
dh =
    4.85270150718341
rdh_sum =
    112.790615523355
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 210
dh =
    4.84510600718341
rdh_sum =
    113.172158107609
ans =
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Berm Factor Calculation: Iteration 2, Profile Segment: 211
dh =
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rdh_sum =
113.552686909369
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 212
dh =
4.82991500718341
rdh_sum =
113.932202449255
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 213
dh =
4.8223195071834
rdh_sum =
114.310705252306
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 214
dh =
4.8147245071834
rdh_sum =
114.688195914584
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 215
dh =
4.80712900718341
rdh_sum =
115.0646749033
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 216
dh =
4.7995335071834
rdh_sum =
115.440142756723
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 217
dh =
4.79193800718341
rdh_sum =
115.814600017528
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 218
dh =
4.78434250718341
rdh_sum =
116.188047232794
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 219
dh =
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rdh_sum =
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Berm Factor Calculation: Iteration 2, Profile Segment: 220
dh =
4.76915150718341
rdh_sum =
116.93191373703
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 221
dh =
4.76155650718341
rdh_sum =
117.302334208516
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 222
dh =
4.7539610071834
rdh_sum =
117.671746866732
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 223
dh =
4.74636550718341
rdh_sum =
118.040152280739
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 224
dh =
4.7387700071834
rdh_sum =
118.407551023989
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 225
dh =
4.7311745071834
rdh_sum =
118.773943674319
ans =

Berm Factor Calculation: Iteration 2, Profile Segment: 226
dh =
rdh_sum = 4.72357900718341
119.139330813952
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 227
dh =
rdh_sum = 4.71598350718341
119.503713029492
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 228
dh =
rdh_sum = 4.7083885071834
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 229
dh =
rdh_sum = 4.70079300718341
120.229465188747
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 230
dh =
rdh_sum = 4.69319750718341
120.590836261422
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 231
dh =
rdh_sum = 4.68560200718341
120.951204800145
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 232
dh =
rdh_sum = 4.6780065071834
121.310571413389
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 233
dh =
rdh_sum = 4.67041100718341
121.668936713993
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 234
dh =
rdh_sum = 4.6628155071834
122.026301319161
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 235
dh =
rdh_sum = 4.6552205071834
122.382665916269
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 236
dh =
rdh_sum = 4.64762500718341
122.738031065384
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 237
dh =
rdh_sum = 4.6400295071834
123.092397396784
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 238
dh =
rdh_sum = 4.6324340071834
123.445765545097
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 239
dh =
rdh_sum = 4.62483850718341
123.798136149303
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 240
dh =
rdh_sum = 4.6172430071834
124.149509852729
ans =

Berm Factor Calculation: Iteration 2, Profile Segment: 241
dh =
 4.60964750718341
rdh_sum =
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ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 242
dh =
 4.60205250718341
rdh_sum =
 124.849269217775
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 243
dh =
 4.5944570071834
rdh_sum =
 125.197656187716
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 244
dh =
 4.58686150718341
rdh_sum =
 125.545048873549
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 245
dh =
 4.5792660071834
rdh_sum =
 125.891447940295
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 246
dh =
 4.5716705071834
rdh_sum =
 126.236854057301
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 247
dh =
 4.5640750071834
rdh_sum =
 126.581267898242
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 248
dh =
 4.55647950718341
rdh_sum =
 126.924690141119
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 249
dh =
 4.5488845071834
rdh_sum =
 127.267121533458
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 250
dh =
 4.5412890071834
rdh_sum =
 127.608562696646
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 251
dh =
 4.53369350718341
rdh_sum =
 127.949014321637
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 252
dh =
 4.52609800718341
rdh_sum =
 128.288477103695
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 253
dh =
 4.5185025071834
rdh_sum =
 128.626951742395
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 254
dh =
 4.51090700718341
rdh_sum =
 128.964438941618
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 255
dh =
 4.5033115071834
rdh_sum =
 129.300939409549
ans =

Berm Factor Calculation: Iteration 2, Profile Segment: 256
dh =
4.4957165071834
rdh_sum =
129.636453923553
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 257
dh =
4.48812100718341
rdh_sum =
129.970983135482
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 258
dh =
4.4805255071834
rdh_sum =
130.304527766407
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 259
dh =
4.4729300071834
rdh_sum =
130.637088541694
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 260
dh =
4.46533450718341
rdh_sum =
130.968666190993
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 261
dh =
4.45773900718341
rdh_sum =
131.299261448241
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 262
dh =
4.45014350718341
rdh_sum =
131.628875051655
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 263
dh =
4.4425480071834
rdh_sum =
131.957507743728
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 264
dh =
4.43495250718341
rdh_sum =
132.285160271231
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 265
dh =
4.42735750718341
rdh_sum =
132.611833449651
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 266
dh =
4.4197620071834
rdh_sum =
132.937527969799
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 267
dh =
4.41216650718341
rdh_sum =
133.262244591248
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 268
dh =
4.4045710071834
rdh_sum =
133.585984077831
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 269
dh =
4.3969755071834
rdh_sum =
133.908747197642
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 270
dh =
4.38938000718341
rdh_sum =
134.230534723026
ans =

```

Berm Factor Calculation: Iteration 2, Profile Segment: 271
dh =
    4.38178450718341
rdh_sum =
    134.551347430583
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 272
dh =
    4.3741895071834
rdh_sum =
    134.871186165251
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 273
dh =
    4.36659400718341
rdh_sum =
    135.190051647977
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 274
dh =
    4.35899850718341
rdh_sum =
    135.507944668092
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 275
dh =
    4.32800000718341
rdh_sum =
    135.821877179628
ans =
!----- End Berm Factor Calculation, Iter: 2 -----!
berm_width =
    275
rB =
    0.851914172992078
rdh_mean =
    0.493897735198646
gamma_berm =
    0.568844307632337
gamma_berm =
    0.6
slope =
    0.367890058902837
Irb =
    3.90250228426186
gamma_berm =
    0.6
gamma_perm =
    1
gamma_beta =
    1
gamma_rough =
    0.6
gamma =
    0.36
ans =
!!! - - Iribaren number: 2.34 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:2.7 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
    7.18096908069943
! Berm_width is greater than 1/4 wave length
! Runup will be weighted average with foreshore calculation assuming depth limited wave height on berm
fore_H0 =
    6.97708284
upper_slope =
    0.591280000000001
upper_slope =
    0.591280000000001
upper_slope =
    0.591280068759167
upper_slope =
    0.591280064335511
upper_slope =
    0.578257314431004
upper_slope =
    0.554438809214106
upper_slope =
    0.533189234928601
upper_slope =
    0.514114200257779
upper_slope =
    0.496896251314169
upper_slope =
    0.481276736848733
upper_slope =
    0.467042899297382
upper_slope =
    0.454018255638716
upper_slope =

```

```

0.442054922343806
upper_slope =
0.431028330376857
upper_slope =
0.420832569728005
upper_slope =
0.411377111141526
upper_slope =
0.402584216954361
upper_slope =
0.394386539284337
upper_slope =
0.384787855737291
upper_slope =
0.375797771669918
upper_slope =
0.367360183787495
upper_slope =
0.359425679005785
upper_slope =
0.351950566076745
upper_slope =
0.344896070682744
upper_slope =
0.33822766268651
upper_slope =
0.331914490896321
upper_slope =
0.325928905820285
upper_slope =
0.320246054833865
upper_slope =
0.314843537258222
upper_slope =
0.309701109254499
upper_slope =
0.304800430337495
upper_slope =
0.300124844818007
upper_slope =
0.295659192684851
upper_slope =
0.291389645401677
w2 =
0.236797558185952
w1 =
0.763202441814049
R2_new =
8.79483149783466
R2del =
0.175278314290576
Z2 =
17.6377045050181
ans =
!----- STARTING ITERATION 3 -----!
Ztoe =
0.226928999999999
toe_sta =
6.74104459975011
top_sta =
329.247076689585
Z2 =
17.6377045050181
H0 =
5.7154
Tp =
12.3322
T0 =
11.2110909090909
R2 =
8.79483149783466
Z2 =
17.6377045050181
top_sta =
329.247076689585
Lslope =
322.506032089835
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 1
dh =
8.53413200718341
rdh_sum =
0.849745993595662
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 2
dh =
8.50452200718341
rdh_sum =
1.69657260925671
ans =

```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 3
dh =
    8.4749070071834
rdh_sum =
    2.5404563797064
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 4
dh =
    8.4452920071834
rdh_sum =
    3.3813745236441
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 5
dh =
    8.41567750718341
rdh_sum =
    4.21930450687379
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 6
dh =
    8.3860630071834
rdh_sum =
    5.05422394327186
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 7
dh =
    8.3564530071834
rdh_sum =
    5.88611110865488
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 8
dh =
    8.3268380071834
rdh_sum =
    6.71494350629483
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 9
dh =
    8.29481500718341
rdh_sum =
    7.54044824566786
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 10
dh =
    8.25927450718341
rdh_sum =
    8.36223029887695
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 11
dh =
    8.2226940071834
rdh_sum =
    9.18014867324218
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 12
dh =
    8.18618100718341
rdh_sum =
    9.99417845342053
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 13
dh =
    8.1496680071834
rdh_sum =
    10.804288016054
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 14
dh =
    8.1131550071834
rdh_sum =
    11.6104461325576
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 15
dh =
    8.07663500718341
rdh_sum =
    12.412621205881
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 16
dh =
    8.0401220071834
rdh_sum =
    13.2107835669669
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 17
dh =
    8.00360900718341
rdh_sum =
    14.0049031903346
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 18
dh =
    7.96708900718341
rdh_sum =
    14.7949496740792
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 19
dh =
    7.93057600718341
rdh_sum =
    15.5808945878995
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 20
dh =
    7.89399600718341
rdh_sum =
    16.3627015313542
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 21
dh =
    7.8574160071834
rdh_sum =
    17.1403420217407
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 22
dh =
    7.82090300718341
rdh_sum =
    17.9137957055424
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 23
dh =
    7.78438300718341
rdh_sum =
    18.6830342349309
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 24
dh =
    7.7478700071834
rdh_sum =
    19.4480313024238
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 25
dh =
    7.71135700718341
rdh_sum =
    20.2087602223446
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 26
dh =
    7.67483700718341
rdh_sum =
    20.9651939130463
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 27
dh =
    7.6383240071834
rdh_sum =
    21.717307371988
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 28
dh =
    7.60181100718341
rdh_sum =
    22.4650752108956
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 29
dh =
    7.5652980071834
rdh_sum =
    23.2084724791065
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 30
dh =
    7.52878500718341
rdh_sum =
    23.9474746660825
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 31
dh =
    7.49219800718341
rdh_sum =
    24.6820487235595
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 32
dh =
    7.45561800718341
rdh_sum =
    25.4121717876562
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 33
dh =
    7.41910500718341
rdh_sum =
    26.1378288154829
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 34
dh =
    7.3825850071834
rdh_sum =
    26.8589962202736
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 35
dh =
    7.34607200718341
rdh_sum =
    27.575652588465
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 36
dh =
    7.30955900718341
rdh_sum =
    28.2877761023752
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 37
dh =
    7.2730460071834
rdh_sum =
    28.9953454007886
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 38
dh =
    7.23653300718341
rdh_sum =
    29.6983395811073
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 39
dh =
    7.20001300718341
rdh_sum =
    30.3967373184992
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 40
dh =
    7.16350000718341
rdh_sum =
    31.0905195130409
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 41
dh =
    7.1269870071834
rdh_sum =
    31.7796666505205
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 42
dh =
    7.09039950718341
rdh_sum =
    32.4641501682408
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 43
dh =
    7.0538190071834
rdh_sum =
    33.1439523100719
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 44
dh =
    7.01730600718341
rdh_sum =
    33.8190635908787
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 45
dh =
    6.9807930071834
rdh_sum =
    34.4894663766434
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 46
dh =
    6.94428000718341
rdh_sum =
    35.155143507502
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 47
dh =
    6.90776000718341
rdh_sum =
    35.8160773887376
ans =
```


Berm Factor Calculation: Iteration 3, Profile Segment: 48
dh =
 6.8712470071834
rdh_sum =
 36.4722527216039
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 49
dh =
 6.83473400718341
rdh_sum =
 37.1236537789669
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 50
dh =
 6.7982140071834
rdh_sum =
 37.7702643948281
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 51
dh =
 6.7617010071834
rdh_sum =
 38.4120707220032
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 52
dh =
 6.7251210071834
rdh_sum =
 39.049049625619
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 53
dh =
 6.6885410071834
rdh_sum =
 39.6811872609871
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 54
dh =
 6.6520280071834
rdh_sum =
 40.3084791763822
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 55
dh =
 6.61550800718341
rdh_sum =
 40.9309116206413
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 56
dh =
 6.5789950071834
rdh_sum =
 41.5484731948291
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 57
dh =
 6.5424820071834
rdh_sum =
 42.1611520602858
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 58
dh =
 6.50596200718341
rdh_sum =
 42.7689359307408
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 59
dh =
 6.46944900718341
rdh_sum =
 43.3718148893465
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 60
dh =
 6.4329360071834
rdh_sum =
 43.9697785760086
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 61
dh =
 6.3964230071834
rdh_sum =
 44.5628171256095
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 62
dh =
 6.35991000718341
rdh_sum =
 45.1509211690015
ans =

```
Berm Factor Calculation: Iteration 3, Profile Segment: 63
dh =
rdh_sum = 6.32332300718341
ans = 45.7340718066554
Berm Factor Calculation: Iteration 3, Profile Segment: 64
dh =
rdh_sum = 6.28674300718341
ans = 46.3122615812694
Berm Factor Calculation: Iteration 3, Profile Segment: 65
dh =
rdh_sum = 6.25023000718341
ans = 46.885491697791
Berm Factor Calculation: Iteration 3, Profile Segment: 66
dh =
rdh_sum = 6.2137170071834
ans = 47.453754781817
Berm Factor Calculation: Iteration 3, Profile Segment: 67
dh =
rdh_sum = 6.1772040071834
ans = 48.0170439591334
Berm Factor Calculation: Iteration 3, Profile Segment: 68
dh =
rdh_sum = 6.14068400718341
ans = 48.5753519010462
Berm Factor Calculation: Iteration 3, Profile Segment: 69
dh =
rdh_sum = 6.10417100718341
ans = 49.1286736900291
Berm Factor Calculation: Iteration 3, Profile Segment: 70
dh =
rdh_sum = 6.0676580071834
ans = 49.6770039564831
Berm Factor Calculation: Iteration 3, Profile Segment: 71
dh =
rdh_sum = 6.03113800718341
ans = 50.2203368751593
Berm Factor Calculation: Iteration 3, Profile Segment: 72
dh =
rdh_sum = 5.99462500718341
ans = 50.7586690397757
Berm Factor Calculation: Iteration 3, Profile Segment: 73
dh =
rdh_sum = 5.95804500718341
ans = 51.291987403695
Berm Factor Calculation: Iteration 3, Profile Segment: 74
dh =
rdh_sum = 5.92146500718341
ans = 51.8202885993738
Berm Factor Calculation: Iteration 3, Profile Segment: 75
dh =
rdh_sum = 5.88495200718341
ans = 52.343578963363
Berm Factor Calculation: Iteration 3, Profile Segment: 76
dh =
rdh_sum = 5.8628940071834
ans = 52.8638410470743
Berm Factor Calculation: Iteration 3, Profile Segment: 77
dh =
rdh_sum = 5.8552985071834
ans = 53.3830601881378
```

Berm Factor Calculation: Iteration 3, Profile Segment: 78
dh =
rdh_sum = 5.84770300718341
53.9012363028023
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 79
dh =
rdh_sum = 5.84010750718341
54.4183693118615
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 80
dh =
rdh_sum = 5.83251200718341
54.9344591406546
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 81
dh =
rdh_sum = 5.8249165071834
55.4495057190669
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 82
dh =
rdh_sum = 5.81732150718341
55.9635090502117
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 83
dh =
rdh_sum = 5.80972600718341
56.4764690043887
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 84
dh =
rdh_sum = 5.8021305071834
56.9883855251222
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 85
dh =
rdh_sum = 5.7945350071834
57.4992585604835
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 86
dh =
rdh_sum = 5.7869395071834
58.0090880630911
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 87
dh =
rdh_sum = 5.77934400718341
58.5178739901108
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 88
dh =
rdh_sum = 5.77174850718341
59.0256163032561
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 89
dh =
rdh_sum = 5.76415300718341
59.5323149687883
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 90
dh =
rdh_sum = 5.75655750718341
60.0379699575164
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 91
dh =
rdh_sum = 5.74896250718341
60.5425813135037
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 92
dh =
rdh_sum = 5.74136700718341
61.0461489479507
ans =

Berm Factor Calculation: Iteration 3, Profile Segment: 93
dh =
5.73377150718341
rdh_sum =
61.5486728453108
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 94
dh =
5.7261760071834
rdh_sum =
62.0501529945854
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 95
dh =
5.7185805071834
rdh_sum =
62.5505893893246
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 96
dh =
5.71098500718341
rdh_sum =
63.0499820276265
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 97
dh =
5.70338950718341
rdh_sum =
63.5483309121381
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 98
dh =
5.6957945071834
rdh_sum =
64.0456361187622
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 99
dh =
5.68819900718341
rdh_sum =
64.5418975905334
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 100
dh =
5.68060350718341
rdh_sum =
65.0371153437432
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 101
dh =
5.67300800718341
rdh_sum =
65.5312893992312
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 102
dh =
5.6654125071834
rdh_sum =
66.0244197823851
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 103
dh =
5.6578170071834
rdh_sum =
66.5165065231409
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 104
dh =
5.6502215071834
rdh_sum =
67.0075496559821
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 105
dh =
5.6426265071834
rdh_sum =
67.4975492886354
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 106
dh =
5.6350310071834
rdh_sum =
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ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 267
dh =
 4.41216650718341
rdh_sum =
 133.262244591248
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 268
dh =
 4.4045710071834
rdh_sum =
 133.585984077831
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 269
dh =
 4.3969755071834
rdh_sum =
 133.908747197642
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 270
dh =
 4.38938000718341
rdh_sum =
 134.230534723026
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 271
dh =
 4.38178450718341
rdh_sum =
 134.551347430583
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 272
dh =
 4.3741895071834
rdh_sum =
 134.871186165251
ans =

Berm Factor Calculation: Iteration 3, Profile Segment: 273

dh =

4.36659400718341

rdh_sum =

135.190051647977

ans =

Berm Factor Calculation: Iteration 3, Profile Segment: 274

dh =

4.35899850718341

rdh_sum =

135.507944668092

ans =

Berm Factor Calculation: Iteration 3, Profile Segment: 275

dh =

4.32800000718341

rdh_sum =

135.821877179628

ans =

!----- End Berm Factor Calculation, Iter: 3 -----!

berm_width =

275

rB =

0.852697229313831

rdh_mean =

0.493897735198646

gamma_berm =

0.568448001054431

gamma_berm =

0.6

slope =

0.36649610037087

Irb =

3.88771545807963

gamma_berm =

0.6

gamma_perm =

1

gamma_beta =

1

gamma_rough =

0.6

gamma =

0.36

ans =

!!! - - Iribaren number: 2.33 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!

ans =

!!! - - slope: 1:2.7 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!

R2_new =

7.1778029002531

! Berm_width is greater than 1/4 wave length

! Runup will be weighted average with foreshore calculation assuming depth limited wave height on berm

fore_H0 =

6.97708284

upper_slope =

0.59128

upper_slope =

0.59128

upper_slope =

0.591280070189838

upper_slope =

0.591280065586343

upper_slope =

0.578019706833655

upper_slope =

0.55380559134324

upper_slope =

0.532245502676118

upper_slope =

0.512925711485317

upper_slope =

0.495514372708364

upper_slope =

0.47974197363416

upper_slope =

0.465387459641602

upper_slope =

0.452267940842998

upper_slope =

0.440230533423556

upper_slope =

0.42914673402515

upper_slope =

0.418907508636221

upper_slope =

0.409419829954896

upper_slope =

0.400603950255503

upper_slope =

0.392390891808502

upper_slope =


```

0.382764113829367
upper_slope =
0.373753507281228
upper_slope =
0.365301748695333
upper_slope =
0.357358411265668
upper_slope =
0.34987895795094
upper_slope =
0.342823905977667
upper_slope =
0.33615812964357
upper_slope =
0.329850275429892
upper_slope =
0.323872268867834
upper_slope =
0.318198896794063
upper_slope =
0.312807451883228
upper_slope =
0.307677428888491
upper_slope =
0.302790264022493
upper_slope =
0.298129110495992
upper_slope =
0.293678644493967
upper_slope =
0.289424896880295
w2 =
0.236797558185952
w1 =
0.763202441814049
R2_new =
8.78920187834023
R2del =
0.00562961949442276
Z2 =
17.6320748855236
% final 2% runup elevation
Z2=R2_new+SWEL
Z2 =
17.6320748855236
diary off
-1.000000e+00
-1.000000e+00
-1.000000e+00

```