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diary on          % begin recording

% FEMA appeal for The Town of Harpswell, Cumberland county, Maine
% TRANSECT ID: CM-131-1
% 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-131-1sta_ele_include.csv'; % file with station, elevation, include
% third column is 0 for excluded points
imgname='logfiles/CM-131-1-runup';
SWEL=8.8473; % 100-yr still water level including wave setup.
H0=1.4239; % significant wave height at toe of structure
Tp=3.7042; % peak period, 1/fma,
T0=Tp/1.1;

gamma_berm=0.99896; % this may get changed automatically below
gamma_rough=1;
gamma_beta=1;
gamma_perm=1;

setupAtToe=0.1644;
maxSetup=0.2308; % only used in case of berm/shallow foreshore weighted average

plotTitle='Iterative TAW for CM-131-1'

plotTitle =

Iterative TAW for CM-131-1

% END CONFIG
%-----

SWEL=SWEL+setupAtToe

SWEL =

          9.0117

SWEL_fore=SWEL+maxSetup

SWEL_fore =

          9.2425

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

L0 =

          58.0235896915613

% 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 =

        6.87585

% 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 =

        11.14755

% 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 =

        585.748676625019

toe_sta =

        689.365955814508

top_sta =

        902.872140769547

% 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

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

top_sta =

        902.872140769547

toe_sta

toe_sta =

        689.365955814508

% 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);

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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')
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 366.8 ft landward of toe of slope

ans =

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

ans =

-!!-          setup is adjusted to 0.22 feet

ans =

-!!-          SWEL is adjusted to 9.06 feet

k =

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% 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
    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)

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        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 )
    sprintf('!!! - - Iribarren number: %6.2f is outside the valid range (0.5-10), TAW NOT VALID - - !!!\n', Irb*gamma_berm)
    TAW_VALID=0;
else
    sprintf('!!! - - Iribarren number: %6.2f is in the valid range (0.5-10), TAW RECOMMENDED - - !!!\n', Irb*gamma_berm)
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

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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 =
    6.87585
toe_sta =
    689.365955814508
top_sta =
    902.872140769547
Z2 =
    11.14755
H0 =
    1.4239
Tp =
    3.7042
T0 =
    3.36745454545455
R2 =
    4.2717
Z2 =
    13.3356008553769
top_sta =
    962.616013781494
Lslope =
    273.250057966986
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 1
dh =
    2.10633285537685
rdh_sum =
    0.841854786251598
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 2
dh =
    2.05967235537685

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rdh_sum =
    1.66448332893937
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 3
dh =
    2.01301135537685
rdh_sum =
    2.46703076358375
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 4
dh =
    1.96635035537685
rdh_sum =
    3.24869562307788
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 5
dh =
    1.91968935537685
rdh_sum =
    4.00873175956462
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 6
dh =
    1.87302835537685
rdh_sum =
    4.74645032102899
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 7
dh =
    1.83625585537685
rdh_sum =
    5.46613420323588
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 8
dh =
    1.81925935537685
rdh_sum =
    6.17735836727645
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 9
dh =
    1.81215085537685
rdh_sum =
    6.88502220217542
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 10
dh =
    1.80504235537685
rdh_sum =
    7.58911293782331
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 11
dh =
    1.79793385537685
rdh_sum =
    8.28961802383533
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 12
dh =
    1.79082535537685
rdh_sum =
    8.98652513032316
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 13
dh =
    1.78371685537685
rdh_sum =
    9.67982214865309
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 14
dh =
    1.77660835537685
rdh_sum =
    10.3694971921907
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 15
dh =
    1.76949985537685
rdh_sum =
    11.0555385970319
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 16
dh =
    1.76239135537685
rdh_sum =
    11.73793492272
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 17
dh =
    1.75528285537685
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rdh_sum =
    12.4166749529493
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 18
dh =
    1.74817435537685
rdh_sum =
    13.091747696255
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 19
dh =
    1.74106585537685
rdh_sum =
    13.7631423866887
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 20
dh =
    1.73395735537685
rdh_sum =
    14.430848484481
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 21
dh =
    1.72684885537685
rdh_sum =
    15.0948556766891
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 22
dh =
    1.71974035537685
rdh_sum =
    15.7551538778315
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 23
dh =
    1.71263185537685
rdh_sum =
    16.4117332305077
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 24
dh =
    1.70552335537685
rdh_sum =
    17.0645841060046
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 25
dh =
    1.70275535537685
rdh_sum =
    17.7159805833779
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 26
dh =
    1.70866785537685
rdh_sum =
    18.3704819525397
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 27
dh =
    1.71892035537685
rdh_sum =
    19.0303516650813
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 28
dh =
    1.72917285537685
rdh_sum =
    19.6955692706332
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 29
dh =
    1.73942535537685
rdh_sum =
    20.3661136347288
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 30
dh =
    1.74967835537685
rdh_sum =
    21.0419631996797
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 31
dh =
    1.75993085537685
rdh_sum =
    21.7230952117379
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 32
dh =
    1.77018335537685
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rdh_sum =
    22.4094865006823
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 33
dh =
    1.78043635537685
rdh_sum =
    23.1011134782629
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 34
dh =
    1.79068885537685
rdh_sum =
    23.7979513758418
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 35
dh =
    1.80094135537685
rdh_sum =
    24.4999750141172
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 36
dh =
    1.81119385537685
rdh_sum =
    25.2071585504327
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 37
dh =
    1.82144635537685
rdh_sum =
    25.9194754820827
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 38
dh =
    1.83169935537685
rdh_sum =
    26.6368988980544
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 39
dh =
    1.84195185537685
rdh_sum =
    27.359400736076
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 40
dh =
    1.85220435537685
rdh_sum =
    28.0869525339406
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 41
dh =
    1.86416785537685
rdh_sum =
    28.8203602144864
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 42
dh =
    1.87955235537685
rdh_sum =
    29.5612383893607
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 43
dh =
    1.89664685537685
rdh_sum =
    30.3103359414417
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 44
dh =
    1.91374135537685
rdh_sum =
    31.0675642879231
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 45
dh =
    1.93083635537685
rdh_sum =
    31.8328321883445
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 46
dh =
    1.94793135537685
rdh_sum =
    32.6060453039643
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 47
dh =
    1.96502635537685
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rdh_sum =
    33.3871064704382
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 48
dh =
    1.98212135537685
rdh_sum =
    34.1759157323751
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 49
dh =
    1.99921635537685
rdh_sum =
    34.9723703788842
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 50
dh =
    2.01631135537685
rdh_sum =
    35.7763649801026
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 51
dh =
    2.03340635537685
rdh_sum =
    36.5877914246904
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 52
dh =
    2.05050135537685
rdh_sum =
    37.4065389582787
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 53
dh =
    2.06759585537685
rdh_sum =
    38.2324940137266
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 54
dh =
    2.08469035537685
rdh_sum =
    39.0655406765526
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 55
dh =
    2.10178535537685
rdh_sum =
    39.9055607125973
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 56
dh =
    2.11888035537685
rdh_sum =
    40.7524331985891
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 57
dh =
    2.12914935537685
rdh_sum =
    48.4107997068484
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 58
dh =
    2.12574435537685
rdh_sum =
    49.2603890202476
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 59
dh =
    2.11549185537685
rdh_sum =
    50.1059129679034
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 60
dh =
    2.10523935537685
rdh_sum =
    50.9473273507472
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 61
dh =
    2.09498635537685
rdh_sum =
    51.7845882917974
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 62
dh =
    2.08473385537685
```

```
rdh_sum =
    52.6176528504675
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 63
dh =
    2.07448135537685
rdh_sum =
    53.4464784214811
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 64
dh =
    2.06422885537685
rdh_sum =
    54.2710229418085
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 65
dh =
    2.05397635537685
rdh_sum =
    55.0912448960478
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 66
dh =
    2.04372335537685
rdh_sum =
    55.9071031079421
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 67
dh =
    2.03347085537685
rdh_sum =
    56.718557385042
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 68
dh =
    2.00654885537685
rdh_sum =
    57.518259188331
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 83
dh =
    0.962549855376849
rdh_sum =
    57.7746305814695
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 84
dh =
    1.07218435537685
rdh_sum =
    58.0854610562565
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 85
dh =
    1.18181935537685
rdh_sum =
    58.4535146126854
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 86
dh =
    1.29145435537685
rdh_sum =
    58.8807189829909
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 87
dh =
    1.40108885537685
rdh_sum =
    59.3681374326918
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 88
dh =
    1.51072335537685
rdh_sum =
    59.9159537760576
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 89
dh =
    1.62035835537685
rdh_sum =
    60.5234696939381
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 90
dh =
    1.72999335537685
rdh_sum =
    61.1891143830965
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 91
dh =
    1.83962785537685
```

```
rdh_sum =
    61.9104675339925
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 92
dh =
    1.94926235537685
rdh_sum =
    62.6842952154543
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 93
dh =
    2.05889735537685
rdh_sum =
    63.5065970633593
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 94
dh =
    2.12030385537685
rdh_sum =
    65.2014721808151
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 109
dh =
    0.781146855376848
rdh_sum =
    65.3759105951208
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 110
dh =
    0.790442855376849
rdh_sum =
    65.5542576934972
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 111
dh =
    0.799738355376848
rdh_sum =
    65.7365470894001
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 112
dh =
    0.809033855376848
rdh_sum =
    65.9228121910588
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 113
dh =
    0.818329855376849
rdh_sum =
    66.1130862051501
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 114
dh =
    0.827625355376847
rdh_sum =
    66.3074014855544
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 115
dh =
    0.836920855376848
rdh_sum =
    66.5057901759427
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 116
dh =
    0.846216855376849
rdh_sum =
    66.7082842133126
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 117
dh =
    0.855512855376849
rdh_sum =
    66.9149148846796
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 118
dh =
    0.86480835537685
rdh_sum =
    67.1257128170563
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 119
dh =
    0.87410385537685
rdh_sum =
    67.3407084209133
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 120
dh =
    0.883399855376849
```

```
rdh_sum =
    67.5599318935237
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 121
dh =
    0.89269535537685
rdh_sum =
    67.7834125327865
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 122
dh =
    0.90199085537685
rdh_sum =
    68.0111794155471
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 123
dh =
    0.911286855376849
rdh_sum =
    68.2432614007962
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 124
dh =
    0.920582855376848
rdh_sum =
    68.4796866639524
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 125
dh =
    0.929878355376848
rdh_sum =
    68.7204826878386
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 126
dh =
    0.939173855376849
rdh_sum =
    68.9656767285354
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 127
dh =
    0.955090855376849
rdh_sum =
    69.2184636065964
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 128
dh =
    0.977628855376848
rdh_sum =
    69.4821315275072
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 129
dh =
    1.00016685537685
rdh_sum =
    69.7568265781069
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 130
dh =
    1.02270485537685
rdh_sum =
    70.0426880289001
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 131
dh =
    1.04524285537685
rdh_sum =
    70.339848247968
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 132
dh =
    1.06778085537685
rdh_sum =
    70.6484326191456
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 133
dh =
    1.09031885537685
rdh_sum =
    70.9685594645173
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 134
dh =
    1.11285685537685
rdh_sum =
    71.3003399712766
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 135
dh =
    1.13539435537685
```

```
rdh_sum =
    71.6438778610564
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 136
dh =
    1.15793185537685
rdh_sum =
    71.9992698454041
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 137
dh =
    1.18046985537685
rdh_sum =
    72.3666055745815
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 138
dh =
    1.19257385537685
rdh_sum =
    72.7403899933018
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 139
dh =
    1.18380935537685
rdh_sum =
    73.1095026054164
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 140
dh =
    1.16461035537685
rdh_sum =
    73.4684247935182
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 141
dh =
    1.14541135537685
rdh_sum =
    73.8172198395406
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 142
dh =
    1.12621235537685
rdh_sum =
    74.1559555680525
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 143
dh =
    1.10701335537685
rdh_sum =
    74.4847043158355
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 144
dh =
    1.08781435537685
rdh_sum =
    74.8035428994363
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 145
dh =
    1.06861535537685
rdh_sum =
    75.1125525807094
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 146
dh =
    1.04941635537685
rdh_sum =
    75.411819030367
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 147
dh =
    1.03021735537685
rdh_sum =
    75.7014322895499
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 148
dh =
    1.01101835537685
rdh_sum =
    75.9814867294388
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 149
dh =
    0.991819355376849
rdh_sum =
    76.2520810089232
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 150
dh =
    0.972620355376849
```

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rdh_sum =
    76.5133180303467
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 151
dh =
    0.953421355376848
rdh_sum =
    76.7653048933494
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 152
dh =
    0.928784855376849
rdh_sum =
    77.0055853280902
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 153
dh =
    0.898710355376849
rdh_sum =
    77.2318362492055
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 154
dh =
    0.86863585537685
rdh_sum =
    77.444358950153
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 155
dh =
    0.838561855376849
rdh_sum =
    77.6434700541958
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 156
dh =
    0.808487355376849
rdh_sum =
    77.8295004997437
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 157
dh =
    0.778412855376848
rdh_sum =
    78.0027958476773
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 158
dh =
    0.748338355376848
rdh_sum =
    78.1637156753682
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 159
dh =
    0.718263855376849
rdh_sum =
    78.3126331809219
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 160
dh =
    0.68818985537685
rdh_sum =
    78.449934962264
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 161
dh =
    0.658115355376848
rdh_sum =
    78.5760200156049
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 162
dh =
    0.628040855376849
rdh_sum =
    78.6912998788671
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 163
dh =
    0.597966855376848
rdh_sum =
    78.7961981513885
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 175
dh =
    -0.339221144623151
rdh_sum =
    78.8116773931597
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 176
dh =
    -0.28063464462315
```



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rdh_sum =
    78.8222889208286
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 177
dh =
    -0.22204814462315
rdh_sum =
    78.8289411386826
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 178
dh =
    -0.163461644623151
rdh_sum =
    78.8325498002911
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 179
dh =
    -0.104875144623152
rdh_sum =
    78.8340363086814
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 180
dh =
    -0.0462886446231519
rdh_sum =
    78.8343260060279
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 181
dh =
    0.0122978553768487
rdh_sum =
    78.8343720181381
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 182
dh =
    0.0708838553768505
rdh_sum =
    78.8358999127566
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 183
dh =
    0.129470355376849
rdh_sum =
    78.8409911380911
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 184
dh =
    0.188056855376848
rdh_sum =
    78.8517122593901
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 185
dh =
    0.246643355376849
rdh_sum =
    78.8701063334337
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 186
dh =
    0.305229855376849
rdh_sum =
    78.8981843774455
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 187
dh =
    0.36381635537685
rdh_sum =
    78.9379169717915
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 188
dh =
    0.42240285537685
rdh_sum =
    78.9912260315281
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 189
dh =
    0.438199855376849
rdh_sum =
    79.0485176062577
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 190
dh =
    0.411207355376849
rdh_sum =
    79.0990862821363
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 191
dh =
    0.384214855376849
```

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rdh_sum =
    79.1433305308877
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 192
dh =
    0.357222855376849
rdh_sum =
    79.181654537447
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 193
dh =
    0.33023035537685
rdh_sum =
    79.2144675163969
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 194
dh =
    0.30323785537685
rdh_sum =
    79.2421836818956
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 195
dh =
    0.276245355376849
rdh_sum =
    79.2652217670031
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 196
dh =
    0.249252855376849
rdh_sum =
    79.2840046524271
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 197
dh =
    0.222260855376849
rdh_sum =
    79.2989590585367
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 198
dh =
    0.195268355376848
rdh_sum =
    79.3105149582544
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 199
dh =
    0.168275855376848
rdh_sum =
    79.3191054125444
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 200
dh =
    0.141283855376848
rdh_sum =
    79.3251661543845
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 201
dh =
    0.114291355376848
rdh_sum =
    79.3291350659149
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 202
dh =
    0.087298855376849
rdh_sum =
    79.3314519348235
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 203
dh =
    0.0603068553768491
rdh_sum =
    79.3325580318549
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 204
dh =
    0.0333143553768487
rdh_sum =
    79.332895656387
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 205
dh =
    0.00632185537684826
rdh_sum =
    79.3329078156542
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 206
dh =
    -0.0206706446231504
```

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rdh_sum =
    79.3329655902888
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 207
dh =
    -0.0476631446231508
rdh_sum =
    79.3332727458936
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 208
dh =
    -0.0746551446231507
rdh_sum =
    79.3340261845725
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 209
dh =
    -0.101647644623151
rdh_sum =
    79.3354226490976
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 210
dh =
    -0.128640144623152
rdh_sum =
    79.3376586224025
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 211
dh =
    -0.165996644623151
rdh_sum =
    79.3413799396644
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 212
dh =
    -0.213718144623151
rdh_sum =
    79.347543420399
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 213
dh =
    -0.261439644623151
rdh_sum =
    79.3567572896778
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 214
dh =
    -0.309160644623152
rdh_sum =
    79.3696259741695
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 215
dh =
    -0.356882144623151
rdh_sum =
    79.3867494757335
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 216
dh =
    -0.404603644623151
rdh_sum =
    79.408722520724
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 217
dh =
    -0.452324644623152
rdh_sum =
    79.4361338025994
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 218
dh =
    -0.500046144623152
rdh_sum =
    79.4695654308566
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 219
dh =
    -0.547767644623152
rdh_sum =
    79.5095920462322
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 220
dh =
    -0.595488644623151
rdh_sum =
    79.556780088891
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 221
dh =
    -0.64320964462315
```

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rdh_sum =  
    79.6116872450383  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 222  
dh =  
    -0.690931144623152  
rdh_sum =  
    79.6748617834261  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 223  
dh =  
    -0.738652644623151  
rdh_sum =  
    79.7468417124585  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 224  
dh =  
    -0.786373644623152  
rdh_sum =  
    79.8281540950315  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 225  
dh =  
    -0.83409514462315  
rdh_sum =  
    79.9193146954313  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 226  
dh =  
    -0.881816644623152  
rdh_sum =  
    80.0208270535204  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 227  
dh =  
    -0.901140144623151  
rdh_sum =  
    80.126671410744  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 228  
dh =  
    -0.863668644623152  
rdh_sum =  
    80.2241885640998  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 229  
dh =  
    -0.797799644623151  
rdh_sum =  
    80.3078124072049  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 230  
dh =  
    -0.731930644623151  
rdh_sum =  
    80.3785198636183  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 231  
dh =  
    -0.666061144623152  
rdh_sum =  
    80.4373180754972  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 232  
dh =  
    -0.60019164462315  
rdh_sum =  
    80.4852422293104  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 233  
dh =  
    -0.534322644623151  
rdh_sum =  
    80.523353095604  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 234  
dh =  
    -0.468453644623152  
rdh_sum =  
    80.5527343828683  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 235  
dh =  
    -0.402584644623152  
rdh_sum =  
    80.5744902813895  
ans =  
Berm Factor Calculation: Iteration 1, Profile Segment: 236  
dh =  
    -0.336715644623151
```

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rdh_sum =
    80.5897428725406
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 237
dh =
    -0.270846144623151
rdh_sum =
    80.5996294597129
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 238
dh =
    -0.204976644623152
rdh_sum =
    80.6052999901343
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 239
dh =
    -0.139107644623151
rdh_sum =
    80.6079143218928
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 240
dh =
    -0.0948221446231514
rdh_sum =
    80.6091296150934
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 241
dh =
    -0.093704644623152
rdh_sum =
    80.610316443359
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 242
dh =
    -0.114171144623151
rdh_sum =
    80.6120779937279
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 243
dh =
    -0.13463714462315
rdh_sum =
    80.6145271271721
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 244
dh =
    -0.155103144623151
rdh_sum =
    80.6177765615553
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 245
dh =
    -0.175569144623152
rdh_sum =
    80.6219388334369
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 246
dh =
    -0.196035644623151
rdh_sum =
    80.6271262989931
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 247
dh =
    -0.216502144623151
rdh_sum =
    80.6334510612083
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 248
dh =
    -0.23696814462315
rdh_sum =
    80.6410249335245
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 249
dh =
    -0.257434144623153
rdh_sum =
    80.6499594728193
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 250
dh =
    -0.277900144623151
rdh_sum =
    80.6603659277178
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 251
dh =
    -0.298366644623151
```

```
rdh_sum =
    80.6723552534109
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 252
dh =
    -0.31883314462315
rdh_sum =
    80.6860380118777
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 253
dh =
    -0.339299144623151
rdh_sum =
    80.7015243360339
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 254
dh =
    -0.359765144623152
rdh_sum =
    80.7189239902277
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 255
dh =
    -0.380231144623151
rdh_sum =
    80.7383463053512
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 256
dh =
    -0.400697644623151
rdh_sum =
    80.7599002074728
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 257
dh =
    -0.42116414462315
rdh_sum =
    80.7836940916548
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 258
dh =
    -0.441630144623153
rdh_sum =
    80.8098357868047
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 259
dh =
    -0.462096144623152
rdh_sum =
    80.8384326433452
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 260
dh =
    -0.482562144623151
rdh_sum =
    80.8695914554937
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 261
dh =
    -0.503802644623152
rdh_sum =
    80.9035214870835
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 262
dh =
    -0.526591144623152
rdh_sum =
    80.9405511480081
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 263
dh =
    -0.550153144623151
rdh_sum =
    80.9809223711149
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 264
dh =
    -0.573715644623151
rdh_sum =
    81.0247732441194
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 265
dh =
    -0.597278144623152
rdh_sum =
    81.072240740422
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 266
dh =
    -0.620840644623151
```

```
rdh_sum =
    81.1234607474159
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 267
dh =
    -0.64440314462315
rdh_sum =
    81.1785680256829
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 268
dh =
    -0.667965144623151
rdh_sum =
    81.2376960817945
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 269
dh =
    -0.691527644623152
rdh_sum =
    81.3009773855973
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 270
dh =
    -0.715090144623153
rdh_sum =
    81.3685430758818
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 271
dh =
    -0.738652644623151
rdh_sum =
    81.4405230049143
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 278
dh =
    -1.42260614462315
rdh_sum =
    81.6901106993856
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 279
dh =
    -1.44238464462315
rdh_sum =
    81.9460197781445
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 280
dh =
    -1.43029764462315
rdh_sum =
    82.1980595219542
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 281
dh =
    -1.41821014462315
rdh_sum =
    82.4462493655522
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 282
dh =
    -1.40612264462315
rdh_sum =
    82.6906092083798
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 283
dh =
    -1.39403564462315
rdh_sum =
    82.9311594097166
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 284
dh =
    -1.38194864462315
rdh_sum =
    83.1679204710346
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 285
dh =
    -1.36986114462315
rdh_sum =
    83.4009130377703
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 286
dh =
    -1.35777364462315
rdh_sum =
    83.6301582103384
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 287
dh =
    -1.34568664462315
```

```
rdh_sum =
    83.8556775389728
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 288
dh =
    -1.33359914462315
rdh_sum =
    84.0774925600944
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 289
dh =
    -1.32151164462315
rdh_sum =
    84.2956252574297
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 290
dh =
    -1.30942464462315
rdh_sum =
    84.5100980566363
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 291
dh =
    -1.29733714462315
rdh_sum =
    84.7209333698031
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 292
dh =
    -1.28524964462315
rdh_sum =
    84.9281540483344
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 293
dh =
    -1.27316264462315
rdh_sum =
    85.1317833773629
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 294
dh =
    -1.26107564462315
rdh_sum =
    85.3318447758121
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 295
dh =
    -1.24898814462315
rdh_sum =
    85.5283617984211
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 296
dh =
    -1.23690064462315
rdh_sum =
    85.7213584281049
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 297
dh =
    -1.24853564462315
rdh_sum =
    85.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 318
dh =
    -2.93682164462315
rdh_sum =
    86.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 319
dh =
    -2.93911314462315
rdh_sum =
    87.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 320
dh =
    -2.91456764462315
rdh_sum =
    88.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 321
dh =
    -2.89002214462315
rdh_sum =
    89.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 322
dh =
    -2.86547614462315
```



```
rdh_sum =
    90.9177432296734
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 323
dh =
    -2.84093064462315
rdh_sum =
    91.6655516931356
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 324
dh =
    -2.81638514462315
rdh_sum =
    92.4054808384474
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 325
dh =
    -2.79183964462315
rdh_sum =
    93.1374524825781
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 326
dh =
    -2.76729414462315
rdh_sum =
    93.8613910355187
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 327
dh =
    -2.74274864462315
rdh_sum =
    94.5772235249143
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 328
dh =
    -2.71820314462315
rdh_sum =
    95.2848796198422
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 329
dh =
    -2.69365764462315
rdh_sum =
    95.9842916537301
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 330
dh =
    -2.66911214462315
rdh_sum =
    96.6753946464056
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 331
dh =
    -2.64456664462315
rdh_sum =
    97.358126325271
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 332
dh =
    -2.64509964462315
rdh_sum =
    98.0410404276937
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 333
dh =
    -2.67071114462315
rdh_sum =
    98.7326866328384
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 334
dh =
    -2.69632314462315
rdh_sum =
    99.4329971176172
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 335
dh =
    -2.72193464462315
rdh_sum =
    100.141900646781
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 336
dh =
    -2.74754614462315
rdh_sum =
    100.859323106289
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 337
dh =
    -2.77315814462315
```

```
rdh_sum =
    101.585187523818
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 338
dh =
    -2.79877014462315
rdh_sum =
    102.319413764877
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 339
dh =
    -2.82438164462315
rdh_sum =
    103.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 340
dh =
    -2.84999314462315
rdh_sum =
    104.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 341
dh =
    -2.87560514462315
rdh_sum =
    105.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 342
dh =
    -2.90121714462315
rdh_sum =
    106.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 343
dh =
    -2.92682864462315
rdh_sum =
    107.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 344
dh =
    -2.95244014462315
rdh_sum =
    108.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 345
dh =
    -2.97805214462315
rdh_sum =
    109.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 346
dh =
    -3.00366364462315
rdh_sum =
    110.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 347
dh =
    -3.02615314462315
rdh_sum =
    111.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 348
dh =
    -3.04239864462315
rdh_sum =
    112.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 349
dh =
    -3.05552214462315
rdh_sum =
    113.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 350
dh =
    -3.06864564462315
rdh_sum =
    114.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 351
dh =
    -3.08176864462315
rdh_sum =
    115.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 352
dh =
    -3.09489214462315
```

```

rdh_sum =
    116.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 353
dh =
    -3.10801564462315
rdh_sum =
    117.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 354
dh =
    -3.12113864462315
rdh_sum =
    118.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 355
dh =
    -3.13426214462315
rdh_sum =
    119.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 356
dh =
    -3.14738564462315
rdh_sum =
    120.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 357
dh =
    -3.16050914462315
rdh_sum =
    121.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 358
dh =
    -3.17363264462315
rdh_sum =
    122.061918567492
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 359
dh =
    -3.18675564462315
rdh_sum =
    123.061918567492
ans =
!----- End Berm Factor Calculation, Iter: 1 -----!
berm_width =
    303
rB =
    1.10887442167207
rdh_mean =
    0.406144945767302
gamma_berm =
    0.341489320180684
gamma_berm =
    0.6
slope =
    -0.217134905614551
Irb =
    -1.38609244362968
gamma_berm =
    0.6
gamma_perm =
    1
gamma_beta =
    1
gamma_rough =
    1
gamma =
    0.6
ans =
!!! - - Iribaren number: -0.83 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:-4.6 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
    -2.09602376637433
!   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 =
    1.80004383
upper_slope =
    0.0983111386978463
upper_slope =
    0.0992755606253062
upper_slope =
    0.100310419480375
upper_slope =
    0.101423724317526
upper_slope =
    0.102624746255337

```

```

upper_slope =
    0.103924277266033
upper_slope =
    0.105334955366755
upper_slope =
    0.106871676977954
upper_slope =
    0.108552124982866
upper_slope =
    0.110397452220613
upper_slope =
    0.112433176543556
upper_slope =
    0.114690367995418
upper_slope =
    0.117207245738271
upper_slope =
    0.120031298756944
upper_slope =
    0.123222558685264
upper_slope =
    0.126857542610512
upper_slope =
    0.131035710586596
upper_slope =
    0.135888648043583
upper_slope =
    0.141594175685385
upper_slope =
    0.141594192604262
upper_slope =
    0.141594213129044
upper_slope =
    0.141594238550011
upper_slope =
    0.141594135428206
upper_slope =
    0.141594156641943
upper_slope =
    0.141594185735989
upper_slope =
    0.141594228102908
upper_slope =
    0.14159429550948
upper_slope =
    0.141594419465514
upper_slope =
    0.141594722550552
upper_slope =
    0.141594000000014
upper_slope =
    0.141593999999999
upper_slope =
    0.141593999999996
upper_slope =
    0.141593999999997
upper_slope =
    0.141593999999998
upper_slope =
    0.141593999999999
upper_slope =
    0.141593999999999
upper_slope =
    0.141594151148415
upper_slope =
    0.141594131302283
R2_new =
    2.56131124654662
berm is wider than one wavelength, use full shallow foreshore solution
R2del =
    1.71038875345338
Z2 =
    11.6252121019235
top_sta =
    908.64085531658
ans =
!----- STARTING ITERATION 2 -----!
Ztoe =
    6.87585
toe_sta =
    689.365955814508
top_sta =
    908.64085531658
Z2 =
    11.6252121019235
H0 =
    1.4239
Tp =
    3.7042
T0 =

```

```
R2 = 3.36745454545455
Z2 = 2.56131124654662
top_sta = 11.6252121019235
Lslope = 908.64085531658
ans = 219.274899502072
Berm Factor Calculation: Iteration 2, Profile Segment: 1
dh = 2.10633285537685
rdh_sum = 0.841854786251598
ans = 2.05967235537685
Berm Factor Calculation: Iteration 2, Profile Segment: 2
dh = 2.05967235537685
rdh_sum = 1.66448332893937
ans = 1.66448332893937
Berm Factor Calculation: Iteration 2, Profile Segment: 3
dh = 2.01301135537685
rdh_sum = 2.46703076358375
ans = 2.46703076358375
Berm Factor Calculation: Iteration 2, Profile Segment: 4
dh = 1.96635035537685
rdh_sum = 3.24869562307788
ans = 3.24869562307788
Berm Factor Calculation: Iteration 2, Profile Segment: 5
dh = 1.91968935537685
rdh_sum = 4.00873175956462
ans = 4.00873175956462
Berm Factor Calculation: Iteration 2, Profile Segment: 6
dh = 1.87302835537685
rdh_sum = 4.74645032102899
ans = 4.74645032102899
Berm Factor Calculation: Iteration 2, Profile Segment: 7
dh = 1.83625585537685
rdh_sum = 5.46613420323588
ans = 5.46613420323588
Berm Factor Calculation: Iteration 2, Profile Segment: 8
dh = 1.81925935537685
rdh_sum = 6.17735836727645
ans = 6.17735836727645
Berm Factor Calculation: Iteration 2, Profile Segment: 9
dh = 1.81215085537685
rdh_sum = 6.88502220217542
ans = 6.88502220217542
Berm Factor Calculation: Iteration 2, Profile Segment: 10
dh = 1.80504235537685
rdh_sum = 7.58911293782331
ans = 7.58911293782331
Berm Factor Calculation: Iteration 2, Profile Segment: 11
dh = 1.79793385537685
rdh_sum = 8.28961802383533
ans = 8.28961802383533
Berm Factor Calculation: Iteration 2, Profile Segment: 12
dh = 1.79082535537685
rdh_sum = 8.98652513032316
ans = 8.98652513032316
Berm Factor Calculation: Iteration 2, Profile Segment: 13
dh = 1.78371685537685
rdh_sum = 9.67982214865309
ans = 9.67982214865309
Berm Factor Calculation: Iteration 2, Profile Segment: 14
dh =
```

```
1.77660835537685
rdh_sum = 10.3694971921907
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 15
dh = 1.76949985537685
rdh_sum = 11.0555385970319
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 16
dh = 1.76239135537685
rdh_sum = 11.73793492272
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 17
dh = 1.75528285537685
rdh_sum = 12.4166749529493
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 18
dh = 1.74817435537685
rdh_sum = 13.091747696255
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 19
dh = 1.74106585537685
rdh_sum = 13.7631423866887
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 20
dh = 1.73395735537685
rdh_sum = 14.430848484481
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 21
dh = 1.72684885537685
rdh_sum = 15.0948556766891
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 22
dh = 1.71974035537685
rdh_sum = 15.7551538778315
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 23
dh = 1.71263185537685
rdh_sum = 16.4117332305077
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 24
dh = 1.70552335537685
rdh_sum = 17.0645841060046
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 25
dh = 1.70275535537685
rdh_sum = 17.7159805833779
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 26
dh = 1.70866785537685
rdh_sum = 18.3704819525397
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 27
dh = 1.71892035537685
rdh_sum = 19.0303516650813
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 28
dh = 1.72917285537685
rdh_sum = 19.6955692706332
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 29
dh =
```

```
1.73942535537685
rdh_sum =
20.3661136347288
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 30
dh =
1.74967835537685
rdh_sum =
21.0419631996797
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 31
dh =
1.75993085537685
rdh_sum =
21.7230952117379
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 32
dh =
1.77018335537685
rdh_sum =
22.4094865006823
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 33
dh =
1.78043635537685
rdh_sum =
23.1011134782629
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 34
dh =
1.79068885537685
rdh_sum =
23.7979513758418
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 35
dh =
1.80094135537685
rdh_sum =
24.4999750141172
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 36
dh =
1.81119385537685
rdh_sum =
25.2071585504327
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 37
dh =
1.82144635537685
rdh_sum =
25.9194754820827
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 38
dh =
1.83169935537685
rdh_sum =
26.6368988980544
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 39
dh =
1.84195185537685
rdh_sum =
27.359400736076
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 40
dh =
1.85220435537685
rdh_sum =
28.0869525339406
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 41
dh =
1.86416785537685
rdh_sum =
28.8203602144864
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 42
dh =
1.87955235537685
rdh_sum =
29.5612383893607
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 43
dh =
1.89664685537685
rdh_sum =
30.3103359414417
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 44
dh =
```

```
1.91374135537685
rdh_sum = 31.0675642879231
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 45
dh = 1.93083635537685
rdh_sum = 31.8328321883445
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 46
dh = 1.94793135537685
rdh_sum = 32.6060453039643
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 47
dh = 1.96502635537685
rdh_sum = 33.3871064704382
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 48
dh = 1.98212135537685
rdh_sum = 34.1759157323751
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 49
dh = 1.99921635537685
rdh_sum = 34.9723703788842
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 50
dh = 2.01631135537685
rdh_sum = 35.7763649801026
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 51
dh = 2.03340635537685
rdh_sum = 36.5877914246904
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 52
dh = 2.05050135537685
rdh_sum = 37.4065389582787
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 53
dh = 2.06759585537685
rdh_sum = 38.2324940137266
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 54
dh = 2.08469035537685
rdh_sum = 39.0655406765526
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 55
dh = 2.10178535537685
rdh_sum = 39.9055607125973
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 56
dh = 2.11888035537685
rdh_sum = 40.7524331985891
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 57
dh = 2.12914935537685
rdh_sum = 48.4107997068484
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 58
dh = 2.12574435537685
rdh_sum = 49.2603890202476
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 59
dh =
```



```
2.11549185537685
rdh_sum = 50.1059129679034
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 60
dh = 2.10523935537685
rdh_sum = 50.9473273507472
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 61
dh = 2.09498635537685
rdh_sum = 51.7845882917974
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 62
dh = 2.08473385537685
rdh_sum = 52.6176528504675
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 63
dh = 2.07448135537685
rdh_sum = 53.4464784214811
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 64
dh = 2.06422885537685
rdh_sum = 54.2710229418085
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 65
dh = 2.05397635537685
rdh_sum = 55.0912448960478
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 66
dh = 2.04372335537685
rdh_sum = 55.9071031079421
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 67
dh = 2.03347085537685
rdh_sum = 56.718557385042
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 68
dh = 2.00654885537685
rdh_sum = 57.518259188331
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 83
dh = 0.962549855376849
rdh_sum = 57.7746305814695
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 84
dh = 1.07218435537685
rdh_sum = 58.0854610562565
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 85
dh = 1.18181935537685
rdh_sum = 58.4535146126854
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 86
dh = 1.29145435537685
rdh_sum = 58.8807189829909
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 87
dh = 1.40108885537685
rdh_sum = 59.3681374326918
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 88
dh =
```

```
1.51072335537685
rdh_sum =
59.9159537760576
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 89
dh =
1.62035835537685
rdh_sum =
60.5234696939381
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 90
dh =
1.72999335537685
rdh_sum =
61.1891143830965
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 91
dh =
1.83962785537685
rdh_sum =
61.9104675339925
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 92
dh =
1.94926235537685
rdh_sum =
62.6842952154543
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 93
dh =
2.05889735537685
rdh_sum =
63.5065970633593
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 94
dh =
2.12030385537685
rdh_sum =
65.2014721808151
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 109
dh =
0.781146855376848
rdh_sum =
65.3759105951208
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 110
dh =
0.790442855376849
rdh_sum =
65.5542576934972
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 111
dh =
0.799738355376848
rdh_sum =
65.7365470894001
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 112
dh =
0.809033855376848
rdh_sum =
65.9228121910588
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 113
dh =
0.818329855376849
rdh_sum =
66.1130862051501
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 114
dh =
0.827625355376847
rdh_sum =
66.3074014855544
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 115
dh =
0.836920855376848
rdh_sum =
66.5057901759427
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 116
dh =
0.846216855376849
rdh_sum =
66.7082842133126
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 117
dh =
```

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0.855512855376849
rdh_sum = 66.9149148846796
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 118
dh = 0.86480835537685
rdh_sum = 67.1257128170563
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 119
dh = 0.87410385537685
rdh_sum = 67.3407084209133
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 120
dh = 0.883399855376849
rdh_sum = 67.5599318935237
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 121
dh = 0.89269535537685
rdh_sum = 67.7834125327865
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 122
dh = 0.90199085537685
rdh_sum = 68.0111794155471
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 123
dh = 0.911286855376849
rdh_sum = 68.2432614007962
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 124
dh = 0.920582855376848
rdh_sum = 68.4796866639524
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 125
dh = 0.929878355376848
rdh_sum = 68.7204826878386
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 126
dh = 0.939173855376849
rdh_sum = 68.9656767285354
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 127
dh = 0.955090855376849
rdh_sum = 69.2184636065964
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 128
dh = 0.977628855376848
rdh_sum = 69.4821315275072
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 129
dh = 1.00016685537685
rdh_sum = 69.7568265781069
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 130
dh = 1.02270485537685
rdh_sum = 70.0426880289001
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 131
dh = 1.04524285537685
rdh_sum = 70.339848247968
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 132
dh =
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1.06778085537685
rdh_sum = 70.6484326191456
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 133
dh = 1.09031885537685
rdh_sum = 70.9685594645173
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 134
dh = 1.11285685537685
rdh_sum = 71.3003399712766
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 135
dh = 1.13539435537685
rdh_sum = 71.6438778610564
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 136
dh = 1.15793185537685
rdh_sum = 71.9992698454041
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 137
dh = 1.18046985537685
rdh_sum = 72.3666055745815
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 138
dh = 1.19257385537685
rdh_sum = 72.7403899933018
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 139
dh = 1.18380935537685
rdh_sum = 73.1095026054164
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 140
dh = 1.16461035537685
rdh_sum = 73.4684247935182
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 141
dh = 1.14541135537685
rdh_sum = 73.8172198395406
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 142
dh = 1.12621235537685
rdh_sum = 74.1559555680525
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 143
dh = 1.10701335537685
rdh_sum = 74.4847043158355
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 144
dh = 1.08781435537685
rdh_sum = 74.8035428994363
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 145
dh = 1.06861535537685
rdh_sum = 75.1125525807094
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 146
dh = 1.04941635537685
rdh_sum = 75.411819030367
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 147
dh =
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1.03021735537685
rdh_sum = 75.7014322895499
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 148
dh = 1.01101835537685
rdh_sum = 75.9814867294388
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 149
dh = 0.991819355376849
rdh_sum = 76.2520810089232
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 150
dh = 0.972620355376849
rdh_sum = 76.5133180303467
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 151
dh = 0.953421355376848
rdh_sum = 76.7653048933494
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 152
dh = 0.928784855376849
rdh_sum = 77.0055853280902
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 153
dh = 0.898710355376849
rdh_sum = 77.2318362492055
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 154
dh = 0.86863585537685
rdh_sum = 77.444358950153
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 155
dh = 0.838561855376849
rdh_sum = 77.6434700541958
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 156
dh = 0.808487355376849
rdh_sum = 77.8295004997437
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 157
dh = 0.778412855376848
rdh_sum = 78.0027958476773
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 158
dh = 0.748338355376848
rdh_sum = 78.1637156753682
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 159
dh = 0.718263855376849
rdh_sum = 78.3126331809219
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 160
dh = 0.68818985537685
rdh_sum = 78.449934962264
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 161
dh = 0.658115355376848
rdh_sum = 78.5760200156049
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 162
dh =
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0.628040855376849
rdh_sum = 78.6912998788671
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 163
dh = 0.597966855376848
rdh_sum = 78.7961981513885
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 175
dh = -0.339221144623151
rdh_sum = 78.8388566685811
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 176
dh = -0.28063464462315
rdh_sum = 78.8681861634195
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 177
dh = -0.22204814462315
rdh_sum = 78.8866160385371
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 178
dh = -0.163461644623151
rdh_sum = 78.8966319558067
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 179
dh = -0.104875144623152
rdh_sum = 78.9007630064032
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 180
dh = -0.0462886446231519
rdh_sum = 78.9015686567011
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 181
dh = 0.0122978553768487
rdh_sum = 78.9016146688112
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 182
dh = 0.0708838553768505
rdh_sum = 78.9031425634297
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 183
dh = 0.129470355376849
rdh_sum = 78.9082337887642
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 184
dh = 0.188056855376848
rdh_sum = 78.9189549100633
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 185
dh = 0.246643355376849
rdh_sum = 78.9373489841068
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 186
dh = 0.305229855376849
rdh_sum = 78.9654270281186
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 187
dh = 0.36381635537685
rdh_sum = 79.0051596224647
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 188
dh =
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0.42240285537685
rdh_sum = 79.0584686822012
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 189
dh = 0.438199855376849
rdh_sum = 79.1157602569308
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 190
dh = 0.411207355376849
rdh_sum = 79.1663289328094
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 191
dh = 0.384214855376849
rdh_sum = 79.2105731815608
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 192
dh = 0.357222855376849
rdh_sum = 79.2488971881201
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 193
dh = 0.33023035537685
rdh_sum = 79.28171016707
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 194
dh = 0.30323785537685
rdh_sum = 79.3094263325687
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 195
dh = 0.276245355376849
rdh_sum = 79.3324644176763
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 196
dh = 0.249252855376849
rdh_sum = 79.3512473031002
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 197
dh = 0.222260855376849
rdh_sum = 79.3662017092099
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 198
dh = 0.195268355376848
rdh_sum = 79.3777576089276
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 199
dh = 0.168275855376848
rdh_sum = 79.3863480632176
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 200
dh = 0.141283855376848
rdh_sum = 79.3924088050576
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 201
dh = 0.114291355376848
rdh_sum = 79.3963777165881
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 202
dh = 0.087298855376849
rdh_sum = 79.3986945854966
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 203
dh =
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0.0603068553768491
rdh_sum = 79.3998006825281
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 204
dh = 0.0333143553768487
rdh_sum = 79.4001383070601
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 205
dh = 0.00632185537684826
rdh_sum = 79.4001504663273
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 206
dh = -0.0206706446231504
rdh_sum = 79.4003111601138
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 207
dh = -0.0476631446231508
rdh_sum = 79.4011653530891
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 208
dh = -0.0746551446231507
rdh_sum = 79.4032600939857
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 209
dh = -0.101647644623151
rdh_sum = 79.407141117819
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 210
dh = -0.128640144623152
rdh_sum = 79.4133521838758
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 211
dh = -0.165996644623151
rdh_sum = 79.4236800860395
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 212
dh = -0.213718144623151
rdh_sum = 79.4407609078389
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 213
dh = -0.261439644623151
rdh_sum = 79.466248715618
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 214
dh = -0.309160644623152
rdh_sum = 79.501768667096
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 215
dh = -0.356882144623151
rdh_sum = 79.5489117686487
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 216
dh = -0.404603644623151
rdh_sum = 79.6092291190691
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 217
dh = -0.452324644623152
rdh_sum = 79.6842265319591
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 218
dh =
```



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-0.500046144623152
rdh_sum = 79.7753598471694
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 219
dh = -0.547767644623152
rdh_sum = 79.8840294908025
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 220
dh = -0.595488644623151
rdh_sum = 80.0115756199815
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 221
dh = -0.64320964462315
rdh_sum = 80.1592739150573
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 222
dh = -0.690931144623152
rdh_sum = 80.3283312636722
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 223
dh = -0.738652644623151
rdh_sum = 80.5198811911163
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 224
dh = -0.786373644623152
rdh_sum = 80.7349799304322
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 225
dh = -0.83409514462315
rdh_sum = 80.974603549986
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 226
dh = -0.881816644623152
rdh_sum = 81.23964387563
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 227
dh = -0.901140144623151
rdh_sum = 81.5152099117972
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 228
dh = -0.863668644623152
rdh_sum = 81.770484909899
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 229
dh = -0.797799644623151
rdh_sum = 81.9913699182938
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 230
dh = -0.731930644623151
rdh_sum = 82.1796858255001
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 231
dh = -0.666061144623152
rdh_sum = 82.3374657705602
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 232
dh = -0.60019164462315
rdh_sum = 82.4669423602593
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 233
dh =
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-0.534322644623151
rdh_sum = 82.5705330363081
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 234
dh = -0.468453644623152
rdh_sum = 82.6508238912072
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 235
dh = -0.402584644623152
rdh_sum = 82.7105530206748
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 236
dh = -0.336715644623151
rdh_sum = 82.7525926608763
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 237
dh = -0.270846144623151
rdh_sum = 82.7799303505445
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 238
dh = -0.204976644623152
rdh_sum = 82.7956496876913
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 239
dh = -0.139107644623151
rdh_sum = 82.8029101192756
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 240
dh = -0.0948221446231514
rdh_sum = 82.8062879995299
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 241
dh = -0.093704644623152
rdh_sum = 82.8095868179563
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 242
dh = -0.114171144623151
rdh_sum = 82.8144814176275
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 243
dh = -0.13463714462315
rdh_sum = 82.8212837350033
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 244
dh = -0.155103144623151
rdh_sum = 82.8303045396343
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 245
dh = -0.175569144623152
rdh_sum = 82.8418532031769
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 246
dh = -0.196035644623151
rdh_sum = 82.8562375774766
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 247
dh = -0.216502144623151
rdh_sum = 82.8737636694932
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 248
dh =
```

```
-0.23696814462315
rdh_sum = 82.8947354185807
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 249
dh = -0.257434144623153
rdh_sum = 82.9194546659672
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 250
dh = -0.277900144623151
rdh_sum = 82.9482208915393
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 251
dh = -0.298366644623151
rdh_sum = 82.9813311348659
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 252
dh = -0.31883314462315
rdh_sum = 83.019079602944
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 253
dh = -0.339299144623151
rdh_sum = 83.0617574560673
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 254
dh = -0.359765144623152
rdh_sum = 83.1096528581974
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 255
dh = -0.380231144623151
rdh_sum = 83.1630506856582
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 256
dh = -0.400697644623151
rdh_sum = 83.2222324923435
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 257
dh = -0.42116414462315
rdh_sum = 83.2874760564549
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 258
dh = -0.441630144623153
rdh_sum = 83.3590551783273
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 259
dh = -0.462096144623152
rdh_sum = 83.4372398108993
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 260
dh = -0.482562144623151
rdh_sum = 83.5222957449013
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 261
dh = -0.503802644623152
rdh_sum = 83.6147594433648
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 262
dh = -0.526591144623152
rdh_sum = 83.7154782093869
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 263
dh =
```

```
-0.550153144623151
rdh_sum = 83.8250601528309
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 264
dh = -0.573715644623151
rdh_sum = 83.9438315326637
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 265
dh = -0.597278144623152
rdh_sum = 84.0721107483301
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 266
dh = -0.620840644623151
rdh_sum = 84.2102082583982
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 267
dh = -0.64440314462315
rdh_sum = 84.3584263212658
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 268
dh = -0.667965144623151
rdh_sum = 84.5170585186662
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 269
dh = -0.691527644623152
rdh_sum = 84.6863901764792
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 270
dh = -0.715090144623153
rdh_sum = 84.8666974665636
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 271
dh = -0.738652644623151
rdh_sum = 85.0582473940076
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 278
dh = -1.42260614462315
rdh_sum = 85.6448626557696
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 279
dh = -1.44238464462315
rdh_sum = 86.2433975866762
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 280
dh = -1.43029764462315
rdh_sum = 86.8346546350737
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 281
dh = -1.41821014462315
rdh_sum = 87.4186134415003
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 282
dh = -1.40612264462315
rdh_sum = 87.9952555513162
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 283
dh = -1.39403564462315
rdh_sum = 88.5645644218131
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 284
dh =
```

```

-1.38194864462315
rdh_sum = 89.1265248197536
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 285
dh = -1.36986114462315
rdh_sum = 89.681122822199
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 286
dh = -1.35777364462315
rdh_sum = 90.228346428187
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 287
dh = -1.34568664462315
rdh_sum = 90.768185563355
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 288
dh = -1.33359914462315
rdh_sum = 91.3006311655584
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 289
dh = -1.32151164462315
rdh_sum = 91.825676103063
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 290
dh = -1.30942464462315
rdh_sum = 92.343315177292
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 291
dh = -1.29733714462315
rdh_sum = 92.8535442048192
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 292
dh = -1.28524964462315
rdh_sum = 93.3563609372441
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 293
dh = -1.27316264462315
rdh_sum = 93.8517650620582
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 294
dh = -1.26107564462315
rdh_sum = 94.3397575893784
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 295
dh = -1.24898814462315
rdh_sum = 94.8203408518919
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 296
dh = -1.23690064462315
rdh_sum = 95.293519117512
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 297
dh = -1.24853564462315
rdh_sum = 95.7738250842091
ans =
!----- End Berm Factor Calculation, Iter: 2 -----!
berm_width =
261
rB = 1.19028671586523
rdh_mean = 0.366949521395437
gamma_berm =

```

```

0.246488424844862
gamma_berm =
0.6
slope =
-0.113825060820629
Irb =
-0.726608447649742
gamma_berm =
0.6
gamma_perm =
1
gamma_beta =
1
gamma_rough =
1
gamma =
0.6
ans =
!!! - - Iribaren number: -0.44 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:-8.8 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
-1.09876407026219
! 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 =
1.80004383
upper_slope =
0.0551728537467984
upper_slope =
0.0549814463892573
upper_slope =
0.054785333786638
upper_slope =
0.0545843402808336
upper_slope =
0.0543782813599065
upper_slope =
0.0541669630931363
upper_slope =
0.0539501815222504
upper_slope =
0.053727722004819
upper_slope =
0.0534993585053727
upper_slope =
0.0532648528293208
upper_slope =
0.0530239537942115
upper_slope =
0.0527763963322741
upper_slope =
0.0525219005175009
upper_slope =
0.0522601562969684
upper_slope =
0.0519908789898695
upper_slope =
0.051713723371585
upper_slope =
0.0514283385627553
upper_slope =
0.0511343525336961
upper_slope =
0.0508313704863908
upper_slope =
0.0494211182221622
upper_slope =
0.0479663498183526
upper_slope =
0.0464649236737676
upper_slope =
0.0449145422788337
upper_slope =
0.0433128055705313
upper_slope =
0.0416571012143848
upper_slope =
0.0399446549589138
upper_slope =
0.0381724990873066
upper_slope =
0.0363374552538057
upper_slope =
0.0344361154598454
upper_slope =
0.0324648025342239
upper_slope =
0.0304196198740962
upper_slope =

```

```

0.0282963158973391
upper_slope =
0.0260903273669414
upper_slope =
0.02379672859041
upper_slope =
0.0214101947036273
upper_slope =
0.018924960399275
upper_slope =
0.0163347523112545
upper_slope =
0.0136328205015949
R2_new =
0.246605534789728
berm is wider than one wavelength, use full shallow foreshore solution
R2del =
2.31470571175689
Z2 =
9.31050639016658
top_sta =
768.590570439523
ans =
!----- STARTING ITERATION 3 -----!
Ztoe =
6.87585
toe_sta =
689.365955814508
top_sta =
768.590570439523
Z2 =
9.31050639016658
H0 =
1.4239
Tp =
3.7042
T0 =
3.36745454545455
R2 =
0.246605534789728
Z2 =
9.31050639016658
top_sta =
768.590570439523
Lslope =
79.2246146250154
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 1
dh =
2.10633285537685
rdh_sum =
1
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 2
dh =
2.05967235537685
rdh_sum =
2
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 3
dh =
2.01301135537685
rdh_sum =
3
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 4
dh =
1.96635035537685
rdh_sum =
4
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 5
dh =
1.91968935537685
rdh_sum =
5
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 6
dh =
1.87302835537685
rdh_sum =
6
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 7
dh =
1.83625585537685
rdh_sum =
7
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 8

```

```
dh =
    1.81925935537685
rdh_sum =
    8
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 9
dh =
    1.81215085537685
rdh_sum =
    9
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 10
dh =
    1.80504235537685
rdh_sum =
    10
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 11
dh =
    1.79793385537685
rdh_sum =
    11
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 12
dh =
    1.79082535537685
rdh_sum =
    12
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 13
dh =
    1.78371685537685
rdh_sum =
    13
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 14
dh =
    1.77660835537685
rdh_sum =
    14
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 15
dh =
    1.76949985537685
rdh_sum =
    15
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 16
dh =
    1.76239135537685
rdh_sum =
    16
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 17
dh =
    1.75528285537685
rdh_sum =
    17
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 18
dh =
    1.74817435537685
rdh_sum =
    18
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 19
dh =
    1.74106585537685
rdh_sum =
    19
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 20
dh =
    1.73395735537685
rdh_sum =
    20
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 21
dh =
    1.72684885537685
rdh_sum =
    21
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 22
dh =
    1.71974035537685
rdh_sum =
    22
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 23
```



```
dh =
    1.71263185537685
rdh_sum =
    23
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 24
dh =
    1.70552335537685
rdh_sum =
    24
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 25
dh =
    1.70275535537685
rdh_sum =
    25
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 26
dh =
    1.70866785537685
rdh_sum =
    26
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 27
dh =
    1.71892035537685
rdh_sum =
    27
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 28
dh =
    1.72917285537685
rdh_sum =
    28
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 29
dh =
    1.73942535537685
rdh_sum =
    29
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 30
dh =
    1.74967835537685
rdh_sum =
    30
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 31
dh =
    1.75993085537685
rdh_sum =
    31
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 32
dh =
    1.77018335537685
rdh_sum =
    32
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 33
dh =
    1.78043635537685
rdh_sum =
    33
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 34
dh =
    1.79068885537685
rdh_sum =
    34
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 35
dh =
    1.80094135537685
rdh_sum =
    35
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 36
dh =
    1.81119385537685
rdh_sum =
    36
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 37
dh =
    1.82144635537685
rdh_sum =
    37
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 38
```

```
dh =
    1.83169935537685
rdh_sum =
    38
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 39
dh =
    1.84195185537685
rdh_sum =
    39
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 40
dh =
    1.85220435537685
rdh_sum =
    40
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 41
dh =
    1.86416785537685
rdh_sum =
    41
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 42
dh =
    1.87955235537685
rdh_sum =
    42
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 43
dh =
    1.89664685537685
rdh_sum =
    43
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 44
dh =
    1.91374135537685
rdh_sum =
    44
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 45
dh =
    1.93083635537685
rdh_sum =
    45
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 46
dh =
    1.94793135537685
rdh_sum =
    46
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 47
dh =
    1.96502635537685
rdh_sum =
    47
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 48
dh =
    1.98212135537685
rdh_sum =
    48
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 49
dh =
    1.99921635537685
rdh_sum =
    49
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 50
dh =
    2.01631135537685
rdh_sum =
    50
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 51
dh =
    2.03340635537685
rdh_sum =
    51
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 52
dh =
    2.05050135537685
rdh_sum =
    52
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 53
```

```
dh =
    2.06759585537685
rdh_sum =
    53
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 54
dh =
    2.08469035537685
rdh_sum =
    54
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 55
dh =
    2.10178535537685
rdh_sum =
    55
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 56
dh =
    2.11888035537685
rdh_sum =
    56
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 57
dh =
    2.12914935537685
rdh_sum =
    65
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 58
dh =
    2.12574435537685
rdh_sum =
    66
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 59
dh =
    2.11549185537685
rdh_sum =
    67
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 60
dh =
    2.10523935537685
rdh_sum =
    68
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 61
dh =
    2.09498635537685
rdh_sum =
    69
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 62
dh =
    2.08473385537685
rdh_sum =
    70
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 63
dh =
    2.07448135537685
rdh_sum =
    71
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 64
dh =
    2.06422885537685
rdh_sum =
    72
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 65
dh =
    2.05397635537685
rdh_sum =
    73
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 66
dh =
    2.04372335537685
rdh_sum =
    74
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 67
dh =
    2.03347085537685
rdh_sum =
    75
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 68
```

```
dh =
    2.00654885537685
rdh_sum =
    76
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 83
dh =
    0.962549855376849
rdh_sum =
    77
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 84
dh =
    1.07218435537685
rdh_sum =
    78
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 85
dh =
    1.18181935537685
rdh_sum =
    79
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 86
dh =
    1.29145435537685
rdh_sum =
    80
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 87
dh =
    1.40108885537685
rdh_sum =
    81
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 88
dh =
    1.51072335537685
rdh_sum =
    82
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 89
dh =
    1.62035835537685
rdh_sum =
    83
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 90
dh =
    1.72999335537685
rdh_sum =
    84
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 91
dh =
    1.83962785537685
rdh_sum =
    85
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 92
dh =
    1.94926235537685
rdh_sum =
    86
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 93
dh =
    2.05889735537685
rdh_sum =
    87
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 94
dh =
    2.12030385537685
rdh_sum =
    89
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 109
dh =
    0.781146855376848
rdh_sum =
    90
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 110
dh =
    0.790442855376849
rdh_sum =
    91
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 111
```

```
dh =
    0.799738355376848
rdh_sum =
    92
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 112
dh =
    0.809033855376848
rdh_sum =
    93
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 113
dh =
    0.818329855376849
rdh_sum =
    94
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 114
dh =
    0.827625355376847
rdh_sum =
    95
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 115
dh =
    0.836920855376848
rdh_sum =
    96
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 116
dh =
    0.846216855376849
rdh_sum =
    97
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 117
dh =
    0.855512855376849
rdh_sum =
    98
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 118
dh =
    0.86480835537685
rdh_sum =
    99
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 119
dh =
    0.87410385537685
rdh_sum =
    100
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 120
dh =
    0.883399855376849
rdh_sum =
    101
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 121
dh =
    0.89269535537685
rdh_sum =
    102
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 122
dh =
    0.90199085537685
rdh_sum =
    103
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 123
dh =
    0.911286855376849
rdh_sum =
    104
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 124
dh =
    0.920582855376848
rdh_sum =
    105
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 125
dh =
    0.929878355376848
rdh_sum =
    106
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 126
```

```
dh =
    0.939173855376849
rdh_sum =
    107
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 127
dh =
    0.955090855376849
rdh_sum =
    108
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 128
dh =
    0.977628855376848
rdh_sum =
    109
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 129
dh =
    1.00016685537685
rdh_sum =
    110
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 130
dh =
    1.02270485537685
rdh_sum =
    111
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 131
dh =
    1.04524285537685
rdh_sum =
    112
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 132
dh =
    1.06778085537685
rdh_sum =
    113
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 133
dh =
    1.09031885537685
rdh_sum =
    114
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 134
dh =
    1.11285685537685
rdh_sum =
    115
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 135
dh =
    1.13539435537685
rdh_sum =
    116
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 136
dh =
    1.15793185537685
rdh_sum =
    117
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 137
dh =
    1.18046985537685
rdh_sum =
    118
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 138
dh =
    1.19257385537685
rdh_sum =
    119
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 139
dh =
    1.18380935537685
rdh_sum =
    120
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 140
dh =
    1.16461035537685
rdh_sum =
    121
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 141
```

```
dh =
    1.14541135537685
rdh_sum =
    122
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 142
dh =
    1.12621235537685
rdh_sum =
    123
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 143
dh =
    1.10701335537685
rdh_sum =
    124
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 144
dh =
    1.08781435537685
rdh_sum =
    125
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 145
dh =
    1.06861535537685
rdh_sum =
    126
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 146
dh =
    1.04941635537685
rdh_sum =
    127
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 147
dh =
    1.03021735537685
rdh_sum =
    128
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 148
dh =
    1.01101835537685
rdh_sum =
    129
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 149
dh =
    0.991819355376849
rdh_sum =
    130
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 150
dh =
    0.972620355376849
rdh_sum =
    131
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 151
dh =
    0.953421355376848
rdh_sum =
    132
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 152
dh =
    0.928784855376849
rdh_sum =
    133
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 153
dh =
    0.898710355376849
rdh_sum =
    134
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 154
dh =
    0.86863585537685
rdh_sum =
    135
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 155
dh =
    0.838561855376849
rdh_sum =
    136
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 156
```

```

dh =
    0.808487355376849
rdh_sum =
    137
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 157
dh =
    0.778412855376848
rdh_sum =
    138
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 158
dh =
    0.748338355376848
rdh_sum =
    139
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 159
dh =
    0.718263855376849
rdh_sum =
    140
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 160
dh =
    0.68818985537685
rdh_sum =
    141
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 161
dh =
    0.658115355376848
rdh_sum =
    142
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 162
dh =
    0.628040855376849
rdh_sum =
    143
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 163
dh =
    0.597966855376848
rdh_sum =
    144
ans =
!----- End Berm Factor Calculation, Iter: 3 -----!
berm_width =
    144
rB =
    1.81761691971085
rdh_mean =
    1
gamma_berm =
    1
slope =
    -0.0375861351665043
Irb =
    -0.239933131856825
gamma_berm =
    1
gamma_perm =
    1
gamma_beta =
    1
gamma_rough =
    1
gamma =
    1
ans =
!!! - - Iribaren number: -0.24 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:-26.6 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
    -0.604704192018152
!   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 =
    1.80004383
upper_slope =
    0.030947071587065
upper_slope =
    0.0307672683813648
upper_slope =
    0.030585841006305
upper_slope =
    0.0304027673552631
upper_slope =
    0.030218024918596

```



```

upper_slope =
    0.030031590774414
upper_slope =
    0.0298434415790995
upper_slope =
    0.0296535535575638
upper_slope =
    0.0294619024932317
upper_slope =
    0.029268463717746
upper_slope =
    0.0290732121003827
upper_slope =
    0.0288761220371673
upper_slope =
    0.0286771674396819
upper_slope =
    0.0284763169709144
upper_slope =
    0.0282735530212766
upper_slope =
    0.0280688432484573
upper_slope =
    0.0278621595077885
upper_slope =
    0.0276534731091878
upper_slope =
    0.027442754803882
upper_slope =
    0.0268843106780823
upper_slope =
    0.0263203757141537
upper_slope =
    0.0257508685299471
upper_slope =
    0.0251757011620495
upper_slope =
    0.0245947988607293
upper_slope =
    0.0240080703324087
upper_slope =
    0.0234154274830841
upper_slope =
    0.022816780433751
upper_slope =
    0.0222120374749631
upper_slope =
    0.0216011050199963
upper_slope =
    0.0209838824127838
upper_slope =
    0.0203602824266751
upper_slope =
    0.019730200429913
upper_slope =
    0.0190935348285896
upper_slope =
    0.0184501818945769
upper_slope =
    0.0178000357091881
upper_slope =
    0.0171429881050443
upper_slope =
    0.01647892327017
upper_slope =
    0.0158077390010864
R2_new =
    0.285947866013736
berm is wider than one wavelength, use full shallow foreshore solution
R2del =
    0.0393423312240073
Z2 =
    9.34984872139058
top_sta =
    769.045421369913
ans =
!----- STARTING ITERATION 4 -----!
Ztoe =
    6.87585
toe_sta =
    689.365955814508
top_sta =
    769.045421369913
Z2 =
    9.34984872139058
H0 =
    1.4239
Tp =
    3.7042
T0 =

```

```
3.36745454545455
R2 =
0.285947866013736
Z2 =
9.34984872139058
top_sta =
769.045421369913
Lslope =
79.6794655554046
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 1
dh =
2.10633285537685
rdh_sum =
1
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 2
dh =
2.05967235537685
rdh_sum =
2
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 3
dh =
2.01301135537685
rdh_sum =
3
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 4
dh =
1.96635035537685
rdh_sum =
4
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 5
dh =
1.91968935537685
rdh_sum =
5
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 6
dh =
1.87302835537685
rdh_sum =
6
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 7
dh =
1.83625585537685
rdh_sum =
7
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 8
dh =
1.81925935537685
rdh_sum =
8
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 9
dh =
1.81215085537685
rdh_sum =
9
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 10
dh =
1.80504235537685
rdh_sum =
10
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 11
dh =
1.79793385537685
rdh_sum =
11
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 12
dh =
1.79082535537685
rdh_sum =
12
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 13
dh =
1.78371685537685
rdh_sum =
13
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 14
dh =
```

```
1.77660835537685
rdh_sum =
14
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 15
dh =
1.76949985537685
rdh_sum =
15
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 16
dh =
1.76239135537685
rdh_sum =
16
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 17
dh =
1.75528285537685
rdh_sum =
17
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 18
dh =
1.74817435537685
rdh_sum =
18
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 19
dh =
1.74106585537685
rdh_sum =
19
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 20
dh =
1.73395735537685
rdh_sum =
20
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 21
dh =
1.72684885537685
rdh_sum =
21
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 22
dh =
1.71974035537685
rdh_sum =
22
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 23
dh =
1.71263185537685
rdh_sum =
23
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 24
dh =
1.70552335537685
rdh_sum =
24
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 25
dh =
1.70275535537685
rdh_sum =
25
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 26
dh =
1.70866785537685
rdh_sum =
26
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 27
dh =
1.71892035537685
rdh_sum =
27
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 28
dh =
1.72917285537685
rdh_sum =
28
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 29
dh =
```

```
1.73942535537685
rdh_sum =
29
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 30
dh =
1.74967835537685
rdh_sum =
30
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 31
dh =
1.75993085537685
rdh_sum =
31
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 32
dh =
1.77018335537685
rdh_sum =
32
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 33
dh =
1.78043635537685
rdh_sum =
33
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 34
dh =
1.79068885537685
rdh_sum =
34
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 35
dh =
1.80094135537685
rdh_sum =
35
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 36
dh =
1.81119385537685
rdh_sum =
36
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 37
dh =
1.82144635537685
rdh_sum =
37
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 38
dh =
1.83169935537685
rdh_sum =
38
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 39
dh =
1.84195185537685
rdh_sum =
39
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 40
dh =
1.85220435537685
rdh_sum =
40
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 41
dh =
1.86416785537685
rdh_sum =
41
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 42
dh =
1.87955235537685
rdh_sum =
42
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 43
dh =
1.89664685537685
rdh_sum =
43
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 44
dh =
```

```
1.91374135537685
rdh_sum =
44
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 45
dh =
1.93083635537685
rdh_sum =
45
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 46
dh =
1.94793135537685
rdh_sum =
46
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 47
dh =
1.96502635537685
rdh_sum =
47
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 48
dh =
1.98212135537685
rdh_sum =
48
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 49
dh =
1.99921635537685
rdh_sum =
49
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 50
dh =
2.01631135537685
rdh_sum =
50
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 51
dh =
2.03340635537685
rdh_sum =
51
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 52
dh =
2.05050135537685
rdh_sum =
52
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 53
dh =
2.06759585537685
rdh_sum =
53
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 54
dh =
2.08469035537685
rdh_sum =
54
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 55
dh =
2.10178535537685
rdh_sum =
55
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 56
dh =
2.11888035537685
rdh_sum =
56
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 57
dh =
2.12914935537685
rdh_sum =
65
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 58
dh =
2.12574435537685
rdh_sum =
66
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 59
dh =
```

```
2.11549185537685
rdh_sum =
67
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 60
dh =
2.10523935537685
rdh_sum =
68
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 61
dh =
2.09498635537685
rdh_sum =
69
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 62
dh =
2.08473385537685
rdh_sum =
70
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 63
dh =
2.07448135537685
rdh_sum =
71
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 64
dh =
2.06422885537685
rdh_sum =
72
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 65
dh =
2.05397635537685
rdh_sum =
73
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 66
dh =
2.04372335537685
rdh_sum =
74
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 67
dh =
2.03347085537685
rdh_sum =
75
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 68
dh =
2.00654885537685
rdh_sum =
76
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 83
dh =
0.962549855376849
rdh_sum =
77
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 84
dh =
1.07218435537685
rdh_sum =
78
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 85
dh =
1.18181935537685
rdh_sum =
79
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 86
dh =
1.29145435537685
rdh_sum =
80
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 87
dh =
1.40108885537685
rdh_sum =
81
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 88
dh =
```

```
1.51072335537685
rdh_sum =
82
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 89
dh =
1.62035835537685
rdh_sum =
83
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 90
dh =
1.72999335537685
rdh_sum =
84
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 91
dh =
1.83962785537685
rdh_sum =
85
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 92
dh =
1.94926235537685
rdh_sum =
86
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 93
dh =
2.05889735537685
rdh_sum =
87
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 94
dh =
2.12030385537685
rdh_sum =
89
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 109
dh =
0.781146855376848
rdh_sum =
90
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 110
dh =
0.790442855376849
rdh_sum =
91
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 111
dh =
0.799738355376848
rdh_sum =
92
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 112
dh =
0.809033855376848
rdh_sum =
93
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 113
dh =
0.818329855376849
rdh_sum =
94
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 114
dh =
0.827625355376847
rdh_sum =
95
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 115
dh =
0.836920855376848
rdh_sum =
96
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 116
dh =
0.846216855376849
rdh_sum =
97
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 117
dh =
```

```
0.855512855376849
rdh_sum =
98
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 118
dh =
0.86480835537685
rdh_sum =
99
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 119
dh =
0.87410385537685
rdh_sum =
100
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 120
dh =
0.883399855376849
rdh_sum =
101
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 121
dh =
0.89269535537685
rdh_sum =
102
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 122
dh =
0.90199085537685
rdh_sum =
103
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 123
dh =
0.911286855376849
rdh_sum =
104
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 124
dh =
0.920582855376848
rdh_sum =
105
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 125
dh =
0.929878355376848
rdh_sum =
106
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 126
dh =
0.939173855376849
rdh_sum =
107
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 127
dh =
0.955090855376849
rdh_sum =
108
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 128
dh =
0.977628855376848
rdh_sum =
109
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 129
dh =
1.00016685537685
rdh_sum =
110
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 130
dh =
1.02270485537685
rdh_sum =
111
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 131
dh =
1.04524285537685
rdh_sum =
112
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 132
dh =
```



```
1.06778085537685
rdh_sum =
113
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 133
dh =
1.09031885537685
rdh_sum =
114
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 134
dh =
1.11285685537685
rdh_sum =
115
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 135
dh =
1.13539435537685
rdh_sum =
116
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 136
dh =
1.15793185537685
rdh_sum =
117
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 137
dh =
1.18046985537685
rdh_sum =
118
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 138
dh =
1.19257385537685
rdh_sum =
119
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 139
dh =
1.18380935537685
rdh_sum =
120
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 140
dh =
1.16461035537685
rdh_sum =
121
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 141
dh =
1.14541135537685
rdh_sum =
122
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 142
dh =
1.12621235537685
rdh_sum =
123
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 143
dh =
1.10701335537685
rdh_sum =
124
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 144
dh =
1.08781435537685
rdh_sum =
125
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 145
dh =
1.06861535537685
rdh_sum =
126
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 146
dh =
1.04941635537685
rdh_sum =
127
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 147
dh =
```

```
1.03021735537685
rdh_sum =
128
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 148
dh =
1.01101835537685
rdh_sum =
129
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 149
dh =
0.991819355376849
rdh_sum =
130
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 150
dh =
0.972620355376849
rdh_sum =
131
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 151
dh =
0.953421355376848
rdh_sum =
132
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 152
dh =
0.928784855376849
rdh_sum =
133
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 153
dh =
0.898710355376849
rdh_sum =
134
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 154
dh =
0.86863585537685
rdh_sum =
135
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 155
dh =
0.838561855376849
rdh_sum =
136
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 156
dh =
0.808487355376849
rdh_sum =
137
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 157
dh =
0.778412855376848
rdh_sum =
138
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 158
dh =
0.748338355376848
rdh_sum =
139
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 159
dh =
0.718263855376849
rdh_sum =
140
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 160
dh =
0.68818985537685
rdh_sum =
141
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 161
dh =
0.658115355376848
rdh_sum =
142
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 162
dh =
```

```

0.628040855376849
rdh_sum =
143
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 163
dh =
0.597966855376848
rdh_sum =
144
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 175
dh =
-0.339221144623151
rdh_sum =
144.916776329317
ans =
!----- End Berm Factor Calculation, Iter: 4 -----!
berm_width =
145
rB =
1.81979132251051
rdh_mean =
0.999426043650463
gamma_berm =
0.998955519215613
slope =
-0.0378747470826194
Irb =
-0.241775501672662
gamma_berm =
0.998955519215613
gamma_perm =
1
gamma_beta =
1
gamma_rough =
1
gamma =
0.998955519215613
ans =
!!! - - Iribaren number: -0.24 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:-26.4 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
-0.60871107041417
! 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 =
1.80004383
upper_slope =
0.0308337479357856
upper_slope =
0.030653065688491
upper_slope =
0.0304707479716043
upper_slope =
0.0302867724786619
upper_slope =
0.030101116495692
upper_slope =
0.0299137568918655
upper_slope =
0.0297246701098894
upper_slope =
0.0295338321561329
upper_slope =
0.0293412185904777
upper_slope =
0.0291468045158837
upper_slope =
0.0289505645676611
upper_slope =
0.0287524729024388
upper_slope =
0.028552503186818
upper_slope =
0.0283506238227682
upper_slope =
0.0281468169645676
upper_slope =
0.0279410499970052
upper_slope =
0.0277332945064642
upper_slope =
0.0275235215274855
upper_slope =
0.027311701529305
upper_slope =
0.0267513694238024
upper_slope =

```

```

0.0261855155694505
upper_slope =
0.0256140579416344
upper_slope =
0.0250369079067906
upper_slope =
0.0244539900616892
upper_slope =
0.0238652124082927
upper_slope =
0.023270486141255
upper_slope =
0.0226697206516596
upper_slope =
0.0220628234810003
upper_slope =
0.0214497002737439
upper_slope =
0.0208302495725805
upper_slope =
0.0202043833646636
upper_slope =
0.0195719961744145
upper_slope =
0.0189329855536639
upper_slope =
0.0182872468969232
upper_slope =
0.0176346733842989
upper_slope =
0.0169751559225846
upper_slope =
0.0163085777355695
upper_slope =
0.015634835668085
R2_new =
0.282820199299665
berm is wider than one wavelength, use full shallow foreshore solution
R2del =
0.00312766671407066
Z2 =
9.34672105467651
top_sta =
769.00926128304
% final 2% runup elevation
Z2=R2_new+SWEL
Z2 =
9.34672105467651
diary off
-1.000000e+00
-1.000000e+00

```