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diary on          % begin recording

% FEMA appeal for The Town of Kennebunkport, York county, Maine
% TRANSECT ID: YK-99-1
% calculation by SJH, Ransom Consulting, Inc. 02-Apr-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='infiles/YK-99-1sta_ele_include.csv'; % file with station, elevation, include
% third column is 0 for excluded points
imgname='logfiles/YK-99-1-runup';
SWEL=9.4014; % 100-yr still water level including wave setup.
H0=2.142; % significant wave height at toe of structure
Tp=7.9359; % peak period, 1/fma,
T0=Tp/1.1;

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

setupAtToe=-0.0047506;
maxSetup=0.30665; % only used in case of berm/shallow foreshore weighted average

plotTitle='Iterative TAW for YK-99-1'

plotTitle =

Iterative TAW for YK-99-1

% END CONFIG
%-----

SWEL=SWEL+setupAtToe

SWEL =

          9.3966494

SWEL_fore=SWEL+maxSetup

SWEL_fore =

          9.7032994

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

L0 =

          266.322655115062

% 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 =

        6.1836494

% 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 =

        12.6096494

% 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 =

        62.226972657228

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

        221.143651153487

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

top_sta =

        221.143651153487

toe_sta

toe_sta =

        62.226972657228

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

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

ans =

-!!!- Location of SWEL-1.5*H0 is 144.0 ft landward of toe of slope

ans =

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

ans =

-!!!-      setup is adjusted to 0.04 feet

ans =

-!!!-      SWEL is adjusted to 9.44 feet

k =

    1
    2
    3
    4
    5
    6
    7
    8
    9
   10
   11
   12
   13
   14
   15
   16
   17
   18
   19
   20
   21
   22
   23

% 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

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

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

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

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

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    sprintf('!!! - - slope: 1:%3.1f V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!\n', islope)
end
if TAW_VALID == 0
    TAW_ALWAYS_VALID=0;
end

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

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

end
ans =
!----- STARTING ITERATION 1 -----!
Ztoe =
    6.1836494
toe_sta =
    62.226972657228
top_sta =
    221.143651153487
Z2 =
    12.6096494
H0 =
    2.142
Tp =
    7.9359
T0 =
    7.21445454545455
R2 =
    6.426
Z2 =
    15.8707037567363
top_sta =
    264.630174113033
Lslope =

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202.403201455805
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 5
dh =
1.0892242567363
rdh_sum =
0.151202837587871
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 6
dh =
1.1302347567363
rdh_sum =
0.313335777760792
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 7
dh =
1.1712452567363
rdh_sum =
0.486704385326514
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 8
dh =
1.2122557567363
rdh_sum =
0.671604063627069
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 9
dh =
1.2532662567363
rdh_sum =
0.868319787377875
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 10
dh =
1.2942767567363
rdh_sum =
1.07712584493842
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 11
dh =
1.3352872567363
rdh_sum =
1.29828559024764
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 12
dh =
1.3762977567363
rdh_sum =
1.53205120464829
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 13
dh =
1.4014897567363
rdh_sum =
1.77368049172652
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 14
dh =
1.4108637567363
rdh_sum =
2.01825852347265
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 15
dh =
1.4202377567363
rdh_sum =
2.2657973698659
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 16
dh =
1.4296117567363
rdh_sum =
2.51630896097204
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 17
dh =
1.4389857567363
rdh_sum =
2.76980508637963
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 18
dh =
1.4483592567363
rdh_sum =
3.02629723452129
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 19
dh =
1.4577327567363
rdh_sum =
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3.28579691114652
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 20
dh =
1.4671067567363
rdh_sum =
3.54831564123295
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 21
dh =
1.4764807567363
rdh_sum =
3.81386464697113
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 22
dh =
1.4858547567363
rdh_sum =
4.08245500735574
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 23
dh =
1.4870262567363
rdh_sum =
4.35142622761641
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 24
dh =
1.4717937567363
rdh_sum =
4.61545870169228
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 25
dh =
1.4483592567363
rdh_sum =
4.87195084983394
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 26
dh =
1.4249247567363
rdh_sum =
5.12097458609211
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 27
dh =
1.4014902567363
rdh_sum =
5.36260403012914
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 28
dh =
1.3780557567363
rdh_sum =
5.59691548532961
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 29
dh =
1.3546212567363
rdh_sum =
5.82398741626599
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 30
dh =
1.3383067567363
rdh_sum =
6.04606683764641
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 31
dh =
1.3362337567363
rdh_sum =
6.26751472001163
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 32
dh =
1.3412812567363
rdh_sum =
6.49050144379266
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 33
dh =
1.3463287567363
rdh_sum =
6.71503080434821
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 34
dh =
1.3513762567363
rdh_sum =
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        6.94110657590136
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 35
dh =
    1.3564237567363
rdh_sum =
    7.16873251148779
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 36
dh =
    1.3614712567363
rdh_sum =
    7.39791234290438
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 37
dh =
    1.3511057567363
rdh_sum =
    7.62390514555731
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 38
dh =
    1.3253277567363
rdh_sum =
    7.84204115327452
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 39
dh =
    1.2995497567363
rdh_sum =
    8.05242108825342
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 40
dh =
    1.2737717567363
rdh_sum =
    8.2551484442717
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 41
dh =
    1.2479937567363
rdh_sum =
    8.45032944970455
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 42
dh =
    1.2222157567363
rdh_sum =
    8.63807302956468
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 43
dh =
    1.1964377567363
rdh_sum =
    8.81849076657866
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 44
dh =
    1.1706597567363
rdh_sum =
    8.99169686131365
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 45
dh =
    1.1448817567363
rdh_sum =
    9.15780809136853
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 46
dh =
    1.1191037567363
rdh_sum =
    9.31694376964425
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 47
dh =
    1.0933257567363
rdh_sum =
    9.46922570170817
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 48
dh =
    1.0675477567363
rdh_sum =
    9.61477814226764
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 49
dh =
    1.0417697567363
rdh_sum =
```



```
9.75372775076844
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 50
dh =
1.0159917567363
rdh_sum =
9.88620354613386
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 51
dh =
0.990604256736299
rdh_sum =
10.0124319492909
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 52
dh =
0.965607256736298
rdh_sum =
10.1326356195752
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 53
dh =
0.940610256736299
rdh_sum =
10.2469421757321
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 54
dh =
0.9156132567363
rdh_sum =
10.3554812180484
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 55
dh =
0.890616256736299
rdh_sum =
10.4583842848048
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 56
dh =
0.865619256736299
rdh_sum =
10.5557848080761
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 57
dh =
0.840622756736298
rdh_sum =
10.6478181748891
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 58
dh =
0.815626256736298
rdh_sum =
10.7346214642595
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 59
dh =
0.790629256736299
rdh_sum =
10.8163334120985
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 60
dh =
0.7656322567363
rdh_sum =
10.8930945710975
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 61
dh =
0.756727256736298
rdh_sum =
10.9681263186944
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 62
dh =
0.780005756736298
rdh_sum =
11.047716954516
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 63
dh =
0.819375756736299
rdh_sum =
11.1352959522884
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 64
dh =
0.837237756736299
rdh_sum =
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11.2266130033956
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 65
dh =
0.833592256736299
rdh_sum =
11.3171614297328
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 66
dh =
0.8299472567363
rdh_sum =
11.4069442624037
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 67
dh =
0.826301756736299
rdh_sum =
11.4959643279439
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 68
dh =
0.822656256736298
rdh_sum =
11.5842245635611
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 69
dh =
0.819010756736299
rdh_sum =
11.6717279118934
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 70
dh =
0.8153652567363
rdh_sum =
11.7584773209881
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 71
dh =
0.811720256736299
rdh_sum =
11.8444758470799
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 72
dh =
0.8080747567363
rdh_sum =
11.9297263457666
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 73
dh =
0.8114322567363
rdh_sum =
12.0156656688532
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 74
dh =
0.821792756736301
rdh_sum =
12.1037463564099
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 75
dh =
0.8321532567363
rdh_sum =
12.1939921862321
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 76
dh =
0.842513756736299
rdh_sum =
12.2864268111333
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 77
dh =
0.8528742567363
rdh_sum =
12.3810737575803
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 78
dh =
0.863235256736299
rdh_sum =
12.477956532794
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 79
dh =
0.8735957567363
rdh_sum =
```

```
12.5770982991415
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 80
dh =
0.883956256736299
rdh_sum =
12.6785221959238
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 81
dh =
0.894316756736298
rdh_sum =
12.7822512307076
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 82
dh =
0.885682756736299
rdh_sum =
12.8840576675476
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 83
dh =
0.8390602567363
rdh_sum =
12.9757600737699
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 84
dh =
0.7734432567363
rdh_sum =
13.0540530435747
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 85
dh =
0.707826756736299
rdh_sum =
13.1199129152626
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 86
dh =
0.642210256736298
rdh_sum =
13.1743447033655
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 87
dh =
0.576593256736299
rdh_sum =
13.218379802676
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 88
dh =
0.510976256736299
rdh_sum =
13.2530737671592
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 89
dh =
0.4453592567363
rdh_sum =
13.2795037754089
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 90
dh =
0.4226457567363
rdh_sum =
13.303327722907
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 91
dh =
0.442835756736299
rdh_sum =
13.329461693213
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 92
dh =
0.463025756736299
rdh_sum =
13.3580095635588
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 93
dh =
0.4832157567363
rdh_sum =
13.3890746820197
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 94
dh =
0.503405256736301
rdh_sum =
```

```
13.4227597787067
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 95
dh =
0.5235947567363
rdh_sum =
13.4591670704896
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 96
dh =
0.503194756736299
rdh_sum =
13.4928243224003
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 99
dh =
0.183576256736298
rdh_sum =
13.4973482653468
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 100
dh =
0.240307256736299
rdh_sum =
13.5050919855488
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 101
dh =
0.363338756736299
rdh_sum =
13.5227358070771
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 102
dh =
0.486370256736299
rdh_sum =
13.5542035216754
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 103
dh =
0.5575527567363
rdh_sum =
13.5954183319647
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 111
dh =
-0.0336427432637016
rdh_sum =
13.5954859605948
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 112
dh =
-0.0861362432637005
rdh_sum =
13.5959292274424
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 113
dh =
-0.138629743263699
rdh_sum =
13.5970771277448
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 114
dh =
-0.1911232432637
rdh_sum =
13.5992581926854
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 115
dh =
-0.222291243263701
rdh_sum =
13.6022078720858
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 116
dh =
-0.210808243263701
rdh_sum =
13.6048609396571
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 117
dh =
-0.1780002432637
rdh_sum =
13.606752955123
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 118
dh =
-0.145191743263702
rdh_sum =
```

```

13.6080120517493
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 119
dh =
-0.1123832432637
rdh_sum =
13.6087665382036
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 120
dh =
-0.1169402432637
rdh_sum =
13.6095834351459
ans =
!----- End Berm Factor Calculation, Iter: 1 -----!
berm_width =
107
rB =
0.528647764612378
rdh_mean =
0.127192368552765
gamma_berm =
0.538592196698795
gamma_berm =
0.6
slope =
0.101538042842554
Irb =
1.13219989629533
gamma_berm =
0.6
gamma_perm =
1
gamma_beta =
1
gamma_rough =
1
gamma =
0.6
ans =
!!! - - Iribaren number: 0.68 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:9.8 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
2.57553285289221
! 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 =
1.361585082
upper_slope =
0.07498999999999997
upper_slope =
0.074990013768382
upper_slope =
0.0749900271627767
upper_slope =
0.0749900267988116
upper_slope =
0.0749900396667073
upper_slope =
0.074990039149069
upper_slope =
0.0749900515263559
upper_slope =
0.0755198983560698
upper_slope =
0.0760364374959384
upper_slope =
0.0765401640840408
upper_slope =
0.0770315489959536
w2 =
0.202357731345444
w1 =
0.797642268654556
R2_new =
2.57975154372212
R2del =
3.84624845627788
Z2 =
12.0244553004584
ans =
!----- STARTING ITERATION 2 -----!
Ztoe =
6.1836494
toe_sta =
62.226972657228
top_sta =
213.340022675802
Z2 =

```

```
H0 = 12.0244553004584
Tp = 2.142
    7.9359
T0 = 7.21445454545455
R2 = 2.57975154372212
Z2 = 12.0244553004584
top_sta = 213.340022675802
Lslope = 151.113050018574
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 5
dh = 1.0892242567363
rdh_sum = 0.151202837587871
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 6
dh = 1.1302347567363
rdh_sum = 0.313335777760792
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 7
dh = 1.1712452567363
rdh_sum = 0.486704385326514
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 8
dh = 1.2122557567363
rdh_sum = 0.671604063627069
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 9
dh = 1.2532662567363
rdh_sum = 0.868319787377875
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 10
dh = 1.2942767567363
rdh_sum = 1.07712584493842
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 11
dh = 1.3352872567363
rdh_sum = 1.29828559024764
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 12
dh = 1.3762977567363
rdh_sum = 1.53205120464829
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 13
dh = 1.4014897567363
rdh_sum = 1.77368049172652
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 14
dh = 1.4108637567363
rdh_sum = 2.01825852347265
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 15
dh = 1.4202377567363
rdh_sum = 2.2657973698659
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 16
dh = 1.4296117567363
rdh_sum = 2.51630896097204
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 17
dh =
```

```
1.4389857567363
rdh_sum =
2.76980508637963
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 18
dh =
1.4483592567363
rdh_sum =
3.02629723452129
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 19
dh =
1.4577327567363
rdh_sum =
3.28579691114652
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 20
dh =
1.4671067567363
rdh_sum =
3.54831564123295
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 21
dh =
1.4764807567363
rdh_sum =
3.81386464697113
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 22
dh =
1.4858547567363
rdh_sum =
4.08245500735574
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 23
dh =
1.4870262567363
rdh_sum =
4.35142622761641
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 24
dh =
1.4717937567363
rdh_sum =
4.61545870169228
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 25
dh =
1.4483592567363
rdh_sum =
4.87195084983394
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 26
dh =
1.4249247567363
rdh_sum =
5.12097458609211
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 27
dh =
1.4014902567363
rdh_sum =
5.36260403012914
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 28
dh =
1.3780557567363
rdh_sum =
5.59691548532961
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 29
dh =
1.3546212567363
rdh_sum =
5.82398741626599
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 30
dh =
1.3383067567363
rdh_sum =
6.04606683764641
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 31
dh =
1.3362337567363
rdh_sum =
6.26751472001163
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 32
dh =
```

```
1.3412812567363
rdh_sum =
6.49050144379266
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 33
dh =
1.3463287567363
rdh_sum =
6.71503080434821
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 34
dh =
1.3513762567363
rdh_sum =
6.94110657590136
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 35
dh =
1.3564237567363
rdh_sum =
7.16873251148779
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 36
dh =
1.3614712567363
rdh_sum =
7.39791234290438
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 37
dh =
1.3511057567363
rdh_sum =
7.62390514555731
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 38
dh =
1.3253277567363
rdh_sum =
7.84204115327452
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 39
dh =
1.2995497567363
rdh_sum =
8.05242108825342
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 40
dh =
1.2737717567363
rdh_sum =
8.2551484442717
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 41
dh =
1.2479937567363
rdh_sum =
8.45032944970455
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 42
dh =
1.2222157567363
rdh_sum =
8.63807302956468
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 43
dh =
1.1964377567363
rdh_sum =
8.81849076657866
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 44
dh =
1.1706597567363
rdh_sum =
8.99169686131365
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 45
dh =
1.1448817567363
rdh_sum =
9.15780809136853
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 46
dh =
1.1191037567363
rdh_sum =
9.31694376964425
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 47
dh =
```



```
1.0933257567363
rdh_sum =
9.46922570170817
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 48
dh =
1.0675477567363
rdh_sum =
9.61477814226764
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 49
dh =
1.0417697567363
rdh_sum =
9.75372775076844
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 50
dh =
1.0159917567363
rdh_sum =
9.88620354613386
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 51
dh =
0.990604256736299
rdh_sum =
10.0124319492909
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 52
dh =
0.965607256736298
rdh_sum =
10.1326356195752
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 53
dh =
0.940610256736299
rdh_sum =
10.2469421757321
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 54
dh =
0.9156132567363
rdh_sum =
10.3554812180484
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 55
dh =
0.890616256736299
rdh_sum =
10.4583842848048
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 56
dh =
0.865619256736299
rdh_sum =
10.5557848080761
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 57
dh =
0.840622756736298
rdh_sum =
10.6478181748891
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 58
dh =
0.815626256736298
rdh_sum =
10.7346214642595
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 59
dh =
0.790629256736299
rdh_sum =
10.8163334120985
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 60
dh =
0.7656322567363
rdh_sum =
10.8930945710975
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 61
dh =
0.756727256736298
rdh_sum =
10.9681263186944
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 62
dh =
```

```
0.780005756736298
rdh_sum = 11.047716954516
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 63
dh = 0.819375756736299
rdh_sum = 11.1352959522884
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 64
dh = 0.837237756736299
rdh_sum = 11.2266130033956
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 65
dh = 0.833592256736299
rdh_sum = 11.3171614297328
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 66
dh = 0.8299472567363
rdh_sum = 11.4069442624037
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 67
dh = 0.826301756736299
rdh_sum = 11.4959643279439
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 68
dh = 0.822656256736298
rdh_sum = 11.5842245635611
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 69
dh = 0.819010756736299
rdh_sum = 11.6717279118934
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 70
dh = 0.8153652567363
rdh_sum = 11.7584773209881
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 71
dh = 0.811720256736299
rdh_sum = 11.8444758470799
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 72
dh = 0.8080747567363
rdh_sum = 11.9297263457666
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 73
dh = 0.8114322567363
rdh_sum = 12.0156656688532
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 74
dh = 0.821792756736301
rdh_sum = 12.1037463564099
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 75
dh = 0.8321532567363
rdh_sum = 12.1939921862321
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 76
dh = 0.842513756736299
rdh_sum = 12.2864268111333
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 77
dh =
```

```
0.8528742567363
rdh_sum = 12.3810737575803
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 78
dh = 0.863235256736299
rdh_sum = 12.477956532794
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 79
dh = 0.8735957567363
rdh_sum = 12.5770982991415
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 80
dh = 0.883956256736299
rdh_sum = 12.6785221959238
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 81
dh = 0.894316756736298
rdh_sum = 12.7822512307076
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 82
dh = 0.885682756736299
rdh_sum = 12.8840576675476
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 83
dh = 0.8390602567363
rdh_sum = 12.9757600737699
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 84
dh = 0.7734432567363
rdh_sum = 13.0540530435747
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 85
dh = 0.707826756736299
rdh_sum = 13.1199129152626
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 86
dh = 0.642210256736298
rdh_sum = 13.1743447033655
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 87
dh = 0.576593256736299
rdh_sum = 13.218379802676
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 88
dh = 0.510976256736299
rdh_sum = 13.2530737671592
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 89
dh = 0.4453592567363
rdh_sum = 13.2795037754089
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 90
dh = 0.4226457567363
rdh_sum = 13.303327722907
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 91
dh = 0.442835756736299
rdh_sum = 13.329461693213
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 92
dh =
```

```
0.463025756736299
rdh_sum = 13.3580095635588
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 93
dh = 0.4832157567363
rdh_sum = 13.3890746820197
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 94
dh = 0.503405256736301
rdh_sum = 13.4227597787067
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 95
dh = 0.5235947567363
rdh_sum = 13.4591670704896
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 96
dh = 0.503194756736299
rdh_sum = 13.4928243224003
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 99
dh = 0.183576256736298
rdh_sum = 13.4973482653468
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 100
dh = 0.240307256736299
rdh_sum = 13.5050919855488
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 101
dh = 0.363338756736299
rdh_sum = 13.5227358070771
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 102
dh = 0.486370256736299
rdh_sum = 13.5542035216754
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 103
dh = 0.5575527567363
rdh_sum = 13.5954183319647
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 111
dh = -0.0336427432637016
rdh_sum = 13.5958379028196
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 112
dh = -0.0861362432637005
rdh_sum = 13.598586156761
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 113
dh = -0.138629743263699
rdh_sum = 13.6056944342812
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 114
dh = -0.1911232432637
rdh_sum = 13.6191762645875
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 115
dh = -0.222291243263701
rdh_sum = 13.6373847674904
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 116
dh =
```

```

-0.210808243263701
rdh_sum = 13.6537707294956
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 117
dh = -0.1780002432637
rdh_sum = 13.6654717365485
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 118
dh = -0.145191743263702
rdh_sum = 13.6732670820121
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 119
dh = -0.1123832432637
rdh_sum = 13.6779423703512
ans =
Berm Factor Calculation: Iteration 2, Profile Segment: 120
dh = -0.1169402432637
rdh_sum = 13.6830038460605
ans =
!----- End Berm Factor Calculation, Iter: 2 -----!
berm_width = 107
rB = 0.708079149926812
rdh_mean = 0.127878540617387
gamma_berm = 0.382468978407429
gamma_berm = 0.6
slope = 0.132405396997012
Irb = 1.47638631346688
gamma_berm = 0.6
gamma_perm = 1
gamma_beta = 1
gamma_rough = 1
gamma = 0.6
ans =
!!! - - Iribaren number: 0.89 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:7.6 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new = 3.35848949141971
! 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 = 1.361585082
upper_slope = 0.0749899999999997
upper_slope = 0.0749900468603061
upper_slope = 0.0749900895254236
upper_slope = 0.0749900856897194
upper_slope = 0.0749901232537879
upper_slope = 0.0749901183897912
upper_slope = 0.0749901518601576
upper_slope = 0.0765139928837686
upper_slope = 0.0779302940482169
upper_slope = 0.0792500512406242
upper_slope = 0.0804828106607154
w2 = 0.202357731345444
w1 = 0.797642268654556
R2_new =

```

```

        3.22781036235442
R2del =
        0.648058818632296
Z2 =
        12.6725141190907
ans =
!----- STARTING ITERATION 3 -----!
Ztoe =
        6.1836494
toe_sta =
        62.226972657228
top_sta =
        221.981959182434
Z2 =
        12.6725141190907
H0 =
        2.142
Tp =
        7.9359
T0 =
        7.21445454545455
R2 =
        3.22781036235442
Z2 =
        12.6725141190907
top_sta =
        221.981959182434
Lslope =
        159.754986525206
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 5
dh =
        1.0892242567363
rdh_sum =
        0.151202837587871
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 6
dh =
        1.1302347567363
rdh_sum =
        0.313335777760792
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 7
dh =
        1.1712452567363
rdh_sum =
        0.486704385326514
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 8
dh =
        1.2122557567363
rdh_sum =
        0.671604063627069
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 9
dh =
        1.2532662567363
rdh_sum =
        0.868319787377875
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 10
dh =
        1.2942767567363
rdh_sum =
        1.07712584493842
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 11
dh =
        1.3352872567363
rdh_sum =
        1.29828559024764
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 12
dh =
        1.3762977567363
rdh_sum =
        1.53205120464829
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 13
dh =
        1.4014897567363
rdh_sum =
        1.77368049172652
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 14
dh =
        1.4108637567363
rdh_sum =
        2.01825852347265
ans =

```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 15
dh =
    1.4202377567363
rdh_sum =
    2.2657973698659
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 16
dh =
    1.4296117567363
rdh_sum =
    2.51630896097204
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 17
dh =
    1.4389857567363
rdh_sum =
    2.76980508637963
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 18
dh =
    1.4483592567363
rdh_sum =
    3.02629723452129
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 19
dh =
    1.4577327567363
rdh_sum =
    3.28579691114652
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 20
dh =
    1.4671067567363
rdh_sum =
    3.54831564123295
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 21
dh =
    1.4764807567363
rdh_sum =
    3.81386464697113
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 22
dh =
    1.4858547567363
rdh_sum =
    4.08245500735574
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 23
dh =
    1.4870262567363
rdh_sum =
    4.35142622761641
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 24
dh =
    1.4717937567363
rdh_sum =
    4.61545870169228
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 25
dh =
    1.4483592567363
rdh_sum =
    4.87195084983394
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 26
dh =
    1.4249247567363
rdh_sum =
    5.12097458609211
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 27
dh =
    1.4014902567363
rdh_sum =
    5.36260403012914
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 28
dh =
    1.3780557567363
rdh_sum =
    5.59691548532961
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 29
dh =
    1.3546212567363
rdh_sum =
    5.82398741626599
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 30
dh =
    1.3383067567363
rdh_sum =
    6.04606683764641
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 31
dh =
    1.3362337567363
rdh_sum =
    6.26751472001163
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 32
dh =
    1.3412812567363
rdh_sum =
    6.49050144379266
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 33
dh =
    1.3463287567363
rdh_sum =
    6.71503080434821
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 34
dh =
    1.3513762567363
rdh_sum =
    6.94110657590136
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 35
dh =
    1.3564237567363
rdh_sum =
    7.16873251148779
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 36
dh =
    1.3614712567363
rdh_sum =
    7.39791234290438
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 37
dh =
    1.3511057567363
rdh_sum =
    7.62390514555731
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 38
dh =
    1.3253277567363
rdh_sum =
    7.84204115327452
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 39
dh =
    1.2995497567363
rdh_sum =
    8.05242108825342
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 40
dh =
    1.2737717567363
rdh_sum =
    8.2551484442717
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 41
dh =
    1.2479937567363
rdh_sum =
    8.45032944970455
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 42
dh =
    1.2222157567363
rdh_sum =
    8.63807302956468
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 43
dh =
    1.1964377567363
rdh_sum =
    8.81849076657866
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 44
dh =
    1.1706597567363
rdh_sum =
    8.99169686131365
ans =
```



```
Berm Factor Calculation: Iteration 3, Profile Segment: 45
dh =
    1.1448817567363
rdh_sum =
    9.15780809136853
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 46
dh =
    1.1191037567363
rdh_sum =
    9.31694376964425
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 47
dh =
    1.0933257567363
rdh_sum =
    9.46922570170817
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 48
dh =
    1.0675477567363
rdh_sum =
    9.61477814226764
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 49
dh =
    1.0417697567363
rdh_sum =
    9.75372775076844
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 50
dh =
    1.0159917567363
rdh_sum =
    9.88620354613386
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 51
dh =
    0.990604256736299
rdh_sum =
    10.0124319492909
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 52
dh =
    0.965607256736298
rdh_sum =
    10.1326356195752
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 53
dh =
    0.940610256736299
rdh_sum =
    10.2469421757321
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 54
dh =
    0.9156132567363
rdh_sum =
    10.3554812180484
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 55
dh =
    0.890616256736299
rdh_sum =
    10.4583842848048
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 56
dh =
    0.865619256736299
rdh_sum =
    10.5557848080761
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 57
dh =
    0.840622756736298
rdh_sum =
    10.6478181748891
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 58
dh =
    0.815626256736298
rdh_sum =
    10.7346214642595
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 59
dh =
    0.790629256736299
rdh_sum =
    10.8163334120985
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 60
dh =
    0.7656322567363
rdh_sum =
    10.8930945710975
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 61
dh =
    0.756727256736298
rdh_sum =
    10.9681263186944
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 62
dh =
    0.780005756736298
rdh_sum =
    11.047716954516
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 63
dh =
    0.819375756736299
rdh_sum =
    11.1352959522884
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 64
dh =
    0.837237756736299
rdh_sum =
    11.2266130033956
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 65
dh =
    0.833592256736299
rdh_sum =
    11.3171614297328
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 66
dh =
    0.8299472567363
rdh_sum =
    11.4069442624037
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 67
dh =
    0.826301756736299
rdh_sum =
    11.4959643279439
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 68
dh =
    0.822656256736298
rdh_sum =
    11.5842245635611
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 69
dh =
    0.819010756736299
rdh_sum =
    11.6717279118934
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 70
dh =
    0.8153652567363
rdh_sum =
    11.7584773209881
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 71
dh =
    0.811720256736299
rdh_sum =
    11.8444758470799
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 72
dh =
    0.8080747567363
rdh_sum =
    11.9297263457666
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 73
dh =
    0.8114322567363
rdh_sum =
    12.0156656688532
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 74
dh =
    0.821792756736301
rdh_sum =
    12.1037463564099
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 75
dh =
    0.8321532567363
rdh_sum =
    12.1939921862321
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 76
dh =
    0.842513756736299
rdh_sum =
    12.2864268111333
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 77
dh =
    0.8528742567363
rdh_sum =
    12.3810737575803
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 78
dh =
    0.863235256736299
rdh_sum =
    12.477956532794
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 79
dh =
    0.8735957567363
rdh_sum =
    12.5770982991415
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 80
dh =
    0.883956256736299
rdh_sum =
    12.6785221959238
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 81
dh =
    0.894316756736298
rdh_sum =
    12.7822512307076
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 82
dh =
    0.885682756736299
rdh_sum =
    12.8840576675476
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 83
dh =
    0.8390602567363
rdh_sum =
    12.9757600737699
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 84
dh =
    0.7734432567363
rdh_sum =
    13.0540530435747
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 85
dh =
    0.707826756736299
rdh_sum =
    13.1199129152626
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 86
dh =
    0.642210256736298
rdh_sum =
    13.1743447033655
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 87
dh =
    0.576593256736299
rdh_sum =
    13.218379802676
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 88
dh =
    0.510976256736299
rdh_sum =
    13.2530737671592
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 89
dh =
    0.4453592567363
rdh_sum =
    13.2795037754089
ans =
```

```
Berm Factor Calculation: Iteration 3, Profile Segment: 90
dh =
    0.4226457567363
rdh_sum =
    13.303327722907
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 91
dh =
    0.442835756736299
rdh_sum =
    13.329461693213
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 92
dh =
    0.463025756736299
rdh_sum =
    13.3580095635588
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 93
dh =
    0.4832157567363
rdh_sum =
    13.3890746820197
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 94
dh =
    0.503405256736301
rdh_sum =
    13.4227597787067
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 95
dh =
    0.5235947567363
rdh_sum =
    13.4591670704896
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 96
dh =
    0.503194756736299
rdh_sum =
    13.4928243224003
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 99
dh =
    0.183576256736298
rdh_sum =
    13.4973482653468
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 100
dh =
    0.240307256736299
rdh_sum =
    13.5050919855488
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 101
dh =
    0.363338756736299
rdh_sum =
    13.5227358070771
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 102
dh =
    0.486370256736299
rdh_sum =
    13.5542035216754
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 103
dh =
    0.5575527567363
rdh_sum =
    13.5954183319647
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 111
dh =
    -0.0336427432637016
rdh_sum =
    13.5956863518373
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 112
dh =
    -0.0861362432637005
rdh_sum =
    13.5974424163652
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 113
dh =
    -0.138629743263699
rdh_sum =
    13.6019868196658
ans =
```

Berm Factor Calculation: Iteration 3, Profile Segment: 114

dh =
-0.1911232432637
rdh_sum =
13.6106125789783

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 115

dh =
-0.222291243263701
rdh_sum =
13.6222692080817

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 116

dh =
-0.210808243263701
rdh_sum =
13.6327567588217

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 117

dh =
-0.1780002432637
rdh_sum =
13.6402415152792

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 118

dh =
-0.145191743263702
rdh_sum =
13.6452255837132

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 119

dh =
-0.1123832432637
rdh_sum =
13.648213669594

ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 120

dh =
-0.1169402432637
rdh_sum =
13.6514487278381

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

berm_width =
107
rB =

0.669775650371437
rdh_mean =

0.12758363297045
gamma_berm =

0.415676760378097
gamma_berm =

0.6
slope =

0.123000026092138
Irb =

1.37151172986248
gamma_berm =

0.6
gamma_perm =

1
gamma_beta =

1
gamma_rough =

1
gamma =

0.6
ans =

!!! - Iribaren number: 0.82 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =

!!! - slope: 1:8.1 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =

3.11992036913809
! 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 =

1.361585082
upper_slope =

0.07498999999999996
upper_slope =

0.0749900333533904
upper_slope =

0.0749900645536965
upper_slope =

0.0749900625352556
upper_slope =

0.074990090958817
upper_slope =

0.0749900882821374
upper_slope =

```

0.0749901143446532
upper_slope =
0.0761479691864119
upper_slope =
0.0772432067484291
upper_slope =
0.0782807728482262
upper_slope =
0.0792651058052282
w2 =
0.202357731345444
w1 =
0.797642268654556
R2_new =
3.02921212729136
R2del =
0.198598235063055
Z2 =
12.4739158840277
ans =
!----- STARTING ITERATION 4 -----!
Ztoe =
6.1836494
toe_sta =
62.226972657228
top_sta =
219.333629604316
Z2 =
12.4739158840277
H0 =
2.142
Tp =
7.9359
T0 =
7.21445454545455
R2 =
3.02921212729136
Z2 =
12.4739158840277
top_sta =
219.333629604316
Lslope =
157.106656947088
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 5
dh =
1.0892242567363
rdh_sum =
0.151202837587871
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 6
dh =
1.1302347567363
rdh_sum =
0.313335777760792
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 7
dh =
1.1712452567363
rdh_sum =
0.486704385326514
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 8
dh =
1.2122557567363
rdh_sum =
0.671604063627069
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 9
dh =
1.2532662567363
rdh_sum =
0.868319787377875
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 10
dh =
1.2942767567363
rdh_sum =
1.07712584493842
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 11
dh =
1.3352872567363
rdh_sum =
1.29828559024764
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 12
dh =
1.3762977567363
rdh_sum =

```

```
1.53205120464829
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 13
dh =
1.4014897567363
rdh_sum =
1.77368049172652
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 14
dh =
1.4108637567363
rdh_sum =
2.01825852347265
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 15
dh =
1.4202377567363
rdh_sum =
2.2657973698659
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 16
dh =
1.4296117567363
rdh_sum =
2.51630896097204
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 17
dh =
1.4389857567363
rdh_sum =
2.76980508637963
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 18
dh =
1.4483592567363
rdh_sum =
3.02629723452129
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 19
dh =
1.4577327567363
rdh_sum =
3.28579691114652
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 20
dh =
1.4671067567363
rdh_sum =
3.54831564123295
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 21
dh =
1.4764807567363
rdh_sum =
3.81386464697113
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 22
dh =
1.4858547567363
rdh_sum =
4.08245500735574
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 23
dh =
1.4870262567363
rdh_sum =
4.35142622761641
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 24
dh =
1.4717937567363
rdh_sum =
4.61545870169228
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 25
dh =
1.4483592567363
rdh_sum =
4.87195084983394
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 26
dh =
1.4249247567363
rdh_sum =
5.12097458609211
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 27
dh =
1.4014902567363
rdh_sum =
```

```
5.36260403012914
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 28
dh =
1.3780557567363
rdh_sum =
5.59691548532961
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 29
dh =
1.3546212567363
rdh_sum =
5.82398741626599
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 30
dh =
1.3383067567363
rdh_sum =
6.04606683764641
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 31
dh =
1.3362337567363
rdh_sum =
6.26751472001163
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 32
dh =
1.3412812567363
rdh_sum =
6.49050144379266
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 33
dh =
1.3463287567363
rdh_sum =
6.71503080434821
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 34
dh =
1.3513762567363
rdh_sum =
6.94110657590136
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 35
dh =
1.3564237567363
rdh_sum =
7.16873251148779
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 36
dh =
1.3614712567363
rdh_sum =
7.39791234290438
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 37
dh =
1.3511057567363
rdh_sum =
7.62390514555731
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 38
dh =
1.3253277567363
rdh_sum =
7.84204115327452
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 39
dh =
1.2995497567363
rdh_sum =
8.05242108825342
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 40
dh =
1.2737717567363
rdh_sum =
8.2551484442717
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 41
dh =
1.2479937567363
rdh_sum =
8.45032944970455
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 42
dh =
1.2222157567363
rdh_sum =
```



```
8.63807302956468
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 43
dh =
1.1964377567363
rdh_sum =
8.81849076657866
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 44
dh =
1.1706597567363
rdh_sum =
8.99169686131365
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 45
dh =
1.1448817567363
rdh_sum =
9.15780809136853
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 46
dh =
1.1191037567363
rdh_sum =
9.31694376964425
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 47
dh =
1.0933257567363
rdh_sum =
9.46922570170817
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 48
dh =
1.0675477567363
rdh_sum =
9.61477814226764
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 49
dh =
1.0417697567363
rdh_sum =
9.75372775076844
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 50
dh =
1.0159917567363
rdh_sum =
9.88620354613386
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 51
dh =
0.990604256736299
rdh_sum =
10.0124319492909
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 52
dh =
0.965607256736298
rdh_sum =
10.1326356195752
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 53
dh =
0.940610256736299
rdh_sum =
10.2469421757321
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 54
dh =
0.9156132567363
rdh_sum =
10.3554812180484
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 55
dh =
0.890616256736299
rdh_sum =
10.4583842848048
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 56
dh =
0.865619256736299
rdh_sum =
10.5557848080761
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 57
dh =
0.840622756736298
rdh_sum =
```

```
10.6478181748891
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 58
dh =
0.815626256736298
rdh_sum =
10.7346214642595
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 59
dh =
0.790629256736299
rdh_sum =
10.8163334120985
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 60
dh =
0.7656322567363
rdh_sum =
10.8930945710975
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 61
dh =
0.756727256736298
rdh_sum =
10.9681263186944
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 62
dh =
0.780005756736298
rdh_sum =
11.047716954516
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 63
dh =
0.819375756736299
rdh_sum =
11.1352959522884
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 64
dh =
0.837237756736299
rdh_sum =
11.2266130033956
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 65
dh =
0.833592256736299
rdh_sum =
11.3171614297328
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 66
dh =
0.8299472567363
rdh_sum =
11.4069442624037
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 67
dh =
0.826301756736299
rdh_sum =
11.4959643279439
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 68
dh =
0.822656256736298
rdh_sum =
11.5842245635611
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 69
dh =
0.819010756736299
rdh_sum =
11.6717279118934
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 70
dh =
0.8153652567363
rdh_sum =
11.7584773209881
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 71
dh =
0.811720256736299
rdh_sum =
11.8444758470799
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 72
dh =
0.8080747567363
rdh_sum =
```

```
11.9297263457666
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 73
dh =
0.8114322567363
rdh_sum =
12.0156656688532
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 74
dh =
0.821792756736301
rdh_sum =
12.1037463564099
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 75
dh =
0.8321532567363
rdh_sum =
12.1939921862321
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 76
dh =
0.842513756736299
rdh_sum =
12.2864268111333
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 77
dh =
0.8528742567363
rdh_sum =
12.3810737575803
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 78
dh =
0.863235256736299
rdh_sum =
12.477956532794
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 79
dh =
0.8735957567363
rdh_sum =
12.5770982991415
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 80
dh =
0.883956256736299
rdh_sum =
12.6785221959238
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 81
dh =
0.894316756736298
rdh_sum =
12.7822512307076
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 82
dh =
0.885682756736299
rdh_sum =
12.8840576675476
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 83
dh =
0.8390602567363
rdh_sum =
12.9757600737699
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 84
dh =
0.7734432567363
rdh_sum =
13.0540530435747
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 85
dh =
0.707826756736299
rdh_sum =
13.1199129152626
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 86
dh =
0.642210256736298
rdh_sum =
13.1743447033655
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 87
dh =
0.576593256736299
rdh_sum =
```

```
13.218379802676
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 88
dh =
0.510976256736299
rdh_sum =
13.2530737671592
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 89
dh =
0.4453592567363
rdh_sum =
13.2795037754089
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 90
dh =
0.4226457567363
rdh_sum =
13.303327722907
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 91
dh =
0.442835756736299
rdh_sum =
13.329461693213
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 92
dh =
0.463025756736299
rdh_sum =
13.3580095635588
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 93
dh =
0.4832157567363
rdh_sum =
13.3890746820197
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 94
dh =
0.503405256736301
rdh_sum =
13.4227597787067
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 95
dh =
0.5235947567363
rdh_sum =
13.4591670704896
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 96
dh =
0.503194756736299
rdh_sum =
13.4928243224003
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 99
dh =
0.183576256736298
rdh_sum =
13.4973482653468
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 100
dh =
0.240307256736299
rdh_sum =
13.5050919855488
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 101
dh =
0.363338756736299
rdh_sum =
13.5227358070771
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 102
dh =
0.486370256736299
rdh_sum =
13.5542035216754
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 103
dh =
0.5575527567363
rdh_sum =
13.5954183319647
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 111
dh =
-0.0336427432637016
rdh_sum =
```

```

13.5957226434831
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 112
dh =
-0.0861362432637005
rdh_sum =
13.5977163566135
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 113
dh =
-0.138629743263699
rdh_sum =
13.6028751040111
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 114
dh =
-0.1911232432637
rdh_sum =
13.6126651400801
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 115
dh =
-0.222291243263701
rdh_sum =
13.6258933179201
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 116
dh =
-0.210808243263701
rdh_sum =
13.637795435817
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 117
dh =
-0.1780002432637
rdh_sum =
13.6462909006194
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 118
dh =
-0.145191743263702
rdh_sum =
13.6519486374239
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 119
dh =
-0.1123832432637
rdh_sum =
13.6553409126061
ans =
Berm Factor Calculation: Iteration 4, Profile Segment: 120
dh =
-0.1169402432637
rdh_sum =
13.6590135263059
ans =
!----- End Berm Factor Calculation, Iter: 4 -----!
berm_width =
107
rB =
0.681065984594379
rdh_mean =
0.12765433202155
gamma_berm =
0.405875038731616
gamma_berm =
0.6
slope =
0.12553754066391
Irb =
1.39980628483498
gamma_berm =
0.6
gamma_perm =
1
gamma_beta =
1
gamma_rough =
1
gamma =
0.6
ans =
!!! - - Iribaren number: 0.84 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:8.0 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
3.18428493596774
! 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 =

```

```

1.361585082
upper_slope =
0.0749899999999997
upper_slope =
0.074990036584969
upper_slope =
0.0749900705874969
upper_slope =
0.0749900681811293
upper_slope =
0.0749900989001326
upper_slope =
0.0749900957437753
upper_slope =
0.0749901237102064
upper_slope =
0.0762399688901144
upper_slope =
0.0774170081829483
upper_slope =
0.0785274231687968
upper_slope =
0.0795767148923705
w2 =
0.202357731345444
w1 =
0.797642268654556
R2_new =
3.08267737234194
R2del =
0.0534652450505795
Z2 =
12.5273811290782
ans =
!----- STARTING ITERATION 5 -----!
Ztoe =
6.1836494
toe_sta =
62.226972657228
top_sta =
220.046594600323
Z2 =
12.5273811290782
H0 =
2.142
Tp =
7.9359
T0 =
7.21445454545455
R2 =
3.08267737234194
Z2 =
12.5273811290782
top_sta =
220.046594600323
Lslope =
157.819621943095
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 5
dh =
1.0892242567363
rdh_sum =
0.151202837587871
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 6
dh =
1.1302347567363
rdh_sum =
0.313335777760792
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 7
dh =
1.1712452567363
rdh_sum =
0.486704385326514
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 8
dh =
1.2122557567363
rdh_sum =
0.671604063627069
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 9
dh =
1.2532662567363
rdh_sum =
0.868319787377875
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 10
dh =

```

```
1.2942767567363
rdh_sum =
1.07712584493842
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 11
dh =
1.3352872567363
rdh_sum =
1.29828559024764
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 12
dh =
1.3762977567363
rdh_sum =
1.53205120464829
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 13
dh =
1.4014897567363
rdh_sum =
1.77368049172652
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 14
dh =
1.4108637567363
rdh_sum =
2.01825852347265
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 15
dh =
1.4202377567363
rdh_sum =
2.2657973698659
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 16
dh =
1.4296117567363
rdh_sum =
2.51630896097204
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 17
dh =
1.4389857567363
rdh_sum =
2.76980508637963
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 18
dh =
1.4483592567363
rdh_sum =
3.02629723452129
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 19
dh =
1.4577327567363
rdh_sum =
3.28579691114652
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 20
dh =
1.4671067567363
rdh_sum =
3.54831564123295
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 21
dh =
1.4764807567363
rdh_sum =
3.81386464697113
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 22
dh =
1.4858547567363
rdh_sum =
4.08245500735574
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 23
dh =
1.4870262567363
rdh_sum =
4.35142622761641
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 24
dh =
1.4717937567363
rdh_sum =
4.61545870169228
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 25
dh =
```

```
rdh_sum = 1.4483592567363
ans = 4.87195084983394
Berm Factor Calculation: Iteration 5, Profile Segment: 26
dh = 1.4249247567363
rdh_sum = 5.12097458609211
ans = 5.12097458609211
Berm Factor Calculation: Iteration 5, Profile Segment: 27
dh = 1.4014902567363
rdh_sum = 5.36260403012914
ans = 5.36260403012914
Berm Factor Calculation: Iteration 5, Profile Segment: 28
dh = 1.3780557567363
rdh_sum = 5.59691548532961
ans = 5.59691548532961
Berm Factor Calculation: Iteration 5, Profile Segment: 29
dh = 1.3546212567363
rdh_sum = 5.82398741626599
ans = 5.82398741626599
Berm Factor Calculation: Iteration 5, Profile Segment: 30
dh = 1.3383067567363
rdh_sum = 6.04606683764641
ans = 6.04606683764641
Berm Factor Calculation: Iteration 5, Profile Segment: 31
dh = 1.3362337567363
rdh_sum = 6.26751472001163
ans = 6.26751472001163
Berm Factor Calculation: Iteration 5, Profile Segment: 32
dh = 1.3412812567363
rdh_sum = 6.49050144379266
ans = 6.49050144379266
Berm Factor Calculation: Iteration 5, Profile Segment: 33
dh = 1.3463287567363
rdh_sum = 6.71503080434821
ans = 6.71503080434821
Berm Factor Calculation: Iteration 5, Profile Segment: 34
dh = 1.3513762567363
rdh_sum = 6.94110657590136
ans = 6.94110657590136
Berm Factor Calculation: Iteration 5, Profile Segment: 35
dh = 1.3564237567363
rdh_sum = 7.16873251148779
ans = 7.16873251148779
Berm Factor Calculation: Iteration 5, Profile Segment: 36
dh = 1.3614712567363
rdh_sum = 7.39791234290438
ans = 7.39791234290438
Berm Factor Calculation: Iteration 5, Profile Segment: 37
dh = 1.3511057567363
rdh_sum = 7.62390514555731
ans = 7.62390514555731
Berm Factor Calculation: Iteration 5, Profile Segment: 38
dh = 1.3253277567363
rdh_sum = 7.84204115327452
ans = 7.84204115327452
Berm Factor Calculation: Iteration 5, Profile Segment: 39
dh = 1.2995497567363
rdh_sum = 8.05242108825342
ans = 8.05242108825342
Berm Factor Calculation: Iteration 5, Profile Segment: 40
dh =
```



```
rdh_sum = 1.2737717567363
ans = 8.2551484442717
Berm Factor Calculation: Iteration 5, Profile Segment: 41
dh = 1.2479937567363
rdh_sum = 8.45032944970455
ans = 8.45032944970455
Berm Factor Calculation: Iteration 5, Profile Segment: 42
dh = 1.2222157567363
rdh_sum = 8.63807302956468
ans = 8.63807302956468
Berm Factor Calculation: Iteration 5, Profile Segment: 43
dh = 1.1964377567363
rdh_sum = 8.81849076657866
ans = 8.81849076657866
Berm Factor Calculation: Iteration 5, Profile Segment: 44
dh = 1.1706597567363
rdh_sum = 8.99169686131365
ans = 8.99169686131365
Berm Factor Calculation: Iteration 5, Profile Segment: 45
dh = 1.1448817567363
rdh_sum = 9.15780809136853
ans = 9.15780809136853
Berm Factor Calculation: Iteration 5, Profile Segment: 46
dh = 1.1191037567363
rdh_sum = 9.31694376964425
ans = 9.31694376964425
Berm Factor Calculation: Iteration 5, Profile Segment: 47
dh = 1.0933257567363
rdh_sum = 9.46922570170817
ans = 9.46922570170817
Berm Factor Calculation: Iteration 5, Profile Segment: 48
dh = 1.0675477567363
rdh_sum = 9.61477814226764
ans = 9.61477814226764
Berm Factor Calculation: Iteration 5, Profile Segment: 49
dh = 1.0417697567363
rdh_sum = 9.75372775076844
ans = 9.75372775076844
Berm Factor Calculation: Iteration 5, Profile Segment: 50
dh = 1.0159917567363
rdh_sum = 9.88620354613386
ans = 9.88620354613386
Berm Factor Calculation: Iteration 5, Profile Segment: 51
dh = 0.990604256736299
rdh_sum = 10.0124319492909
ans = 10.0124319492909
Berm Factor Calculation: Iteration 5, Profile Segment: 52
dh = 0.965607256736298
rdh_sum = 10.1326356195752
ans = 10.1326356195752
Berm Factor Calculation: Iteration 5, Profile Segment: 53
dh = 0.940610256736299
rdh_sum = 10.2469421757321
ans = 10.2469421757321
Berm Factor Calculation: Iteration 5, Profile Segment: 54
dh = 0.9156132567363
rdh_sum = 10.3554812180484
ans = 10.3554812180484
Berm Factor Calculation: Iteration 5, Profile Segment: 55
dh =
```

```
0.890616256736299
rdh_sum = 10.4583842848048
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 56
dh = 0.865619256736299
rdh_sum = 10.5557848080761
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 57
dh = 0.840622756736298
rdh_sum = 10.6478181748891
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 58
dh = 0.815626256736298
rdh_sum = 10.7346214642595
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 59
dh = 0.790629256736299
rdh_sum = 10.8163334120985
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 60
dh = 0.7656322567363
rdh_sum = 10.8930945710975
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 61
dh = 0.756727256736298
rdh_sum = 10.9681263186944
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 62
dh = 0.780005756736298
rdh_sum = 11.047716954516
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 63
dh = 0.819375756736299
rdh_sum = 11.1352959522884
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 64
dh = 0.837237756736299
rdh_sum = 11.2266130033956
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 65
dh = 0.833592256736299
rdh_sum = 11.3171614297328
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 66
dh = 0.8299472567363
rdh_sum = 11.4069442624037
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 67
dh = 0.826301756736299
rdh_sum = 11.4959643279439
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 68
dh = 0.822656256736298
rdh_sum = 11.5842245635611
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 69
dh = 0.819010756736299
rdh_sum = 11.6717279118934
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 70
dh =
```

```
0.8153652567363
rdh_sum = 11.7584773209881
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 71
dh = 0.811720256736299
rdh_sum = 11.8444758470799
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 72
dh = 0.8080747567363
rdh_sum = 11.9297263457666
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 73
dh = 0.8114322567363
rdh_sum = 12.0156656688532
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 74
dh = 0.821792756736301
rdh_sum = 12.1037463564099
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 75
dh = 0.8321532567363
rdh_sum = 12.1939921862321
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 76
dh = 0.842513756736299
rdh_sum = 12.2864268111333
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 77
dh = 0.8528742567363
rdh_sum = 12.3810737575803
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 78
dh = 0.863235256736299
rdh_sum = 12.477956532794
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 79
dh = 0.8735957567363
rdh_sum = 12.5770982991415
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 80
dh = 0.883956256736299
rdh_sum = 12.6785221959238
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 81
dh = 0.894316756736298
rdh_sum = 12.7822512307076
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 82
dh = 0.885682756736299
rdh_sum = 12.8840576675476
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 83
dh = 0.8390602567363
rdh_sum = 12.9757600737699
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 84
dh = 0.7734432567363
rdh_sum = 13.0540530435747
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 85
dh =
```

```
0.707826756736299
rdh_sum = 13.1199129152626
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 86
dh = 0.642210256736298
rdh_sum = 13.1743447033655
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 87
dh = 0.576593256736299
rdh_sum = 13.218379802676
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 88
dh = 0.510976256736299
rdh_sum = 13.2530737671592
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 89
dh = 0.4453592567363
rdh_sum = 13.2795037754089
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 90
dh = 0.4226457567363
rdh_sum = 13.303327722907
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 91
dh = 0.442835756736299
rdh_sum = 13.329461693213
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 92
dh = 0.463025756736299
rdh_sum = 13.3580095635588
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 93
dh = 0.4832157567363
rdh_sum = 13.3890746820197
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 94
dh = 0.503405256736301
rdh_sum = 13.4227597787067
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 95
dh = 0.5235947567363
rdh_sum = 13.4591670704896
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 96
dh = 0.503194756736299
rdh_sum = 13.4928243224003
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 99
dh = 0.183576256736298
rdh_sum = 13.4973482653468
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 100
dh = 0.240307256736299
rdh_sum = 13.5050919855488
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 101
dh = 0.363338756736299
rdh_sum = 13.5227358070771
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 102
dh =
```

```

0.486370256736299
rdh_sum = 13.5542035216754
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 103
dh = 0.5575527567363
rdh_sum = 13.5954183319647
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 111
dh = -0.0336427432637016
rdh_sum = 13.5957121802295
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 112
dh = -0.0861362432637005
rdh_sum = 13.5976373801105
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 113
dh = -0.138629743263699
rdh_sum = 13.6026190302111
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 114
dh = -0.1911232432637
rdh_sum = 13.6120734839766
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 115
dh = -0.222291243263701
rdh_sum = 13.6248487351997
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 116
dh = -0.210808243263701
rdh_sum = 13.636343153669
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 117
dh = -0.1780002432637
rdh_sum = 13.6445472887743
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 118
dh = -0.145191743263702
rdh_sum = 13.6500108296017
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 119
dh = -0.1123832432637
rdh_sum = 13.6532865830673
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 120
dh = -0.1169402432637
rdh_sum = 13.6568330570931
ans =
!----- End Berm Factor Calculation, Iter: 5 -----!
berm_width = 107
rB = 0.677989204907491
rdh_mean = 0.127633953804609
gamma_berm = 0.408545237951696
gamma_berm = 0.6
slope = 0.124828392784613
Irb = 1.39189893175902
gamma_berm = 0.6
gamma_perm = 1
gamma_beta =

```

```

1
gamma_rough =
1
gamma =
0.6
ans =
!!! - - Iribaren number: 0.84 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:8.0 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
3.16629725756114
! 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 =
1.361585082
upper_slope =
0.07498999999999997
upper_slope =
0.0749900356549523
upper_slope =
0.0749900688548871
upper_slope =
0.0749900665632834
upper_slope =
0.074990096628955
upper_slope =
0.0749900936136906
upper_slope =
0.0749901210412159
upper_slope =
0.0762137934656641
upper_slope =
0.0773676347160195
upper_slope =
0.0784574565346839
upper_slope =
0.0794884431578102
w2 =
0.202357731345444
w1 =
0.797642268654556
R2_new =
3.06772757778519
R2del =
0.0149497945567498
Z2 =
12.5124313345215
ans =
!----- STARTING ITERATION 6 -----!
Ztoe =
6.1836494
toe_sta =
62.226972657228
top_sta =
219.847237425277
Z2 =
12.5124313345215
H0 =
2.142
Tp =
7.9359
T0 =
7.21445454545455
R2 =
3.06772757778519
Z2 =
12.5124313345215
top_sta =
219.847237425277
Lslope =
157.620264768049
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 5
dh =
1.0892242567363
rdh_sum =
0.151202837587871
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 6
dh =
1.1302347567363
rdh_sum =
0.313335777760792
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 7
dh =
1.1712452567363
rdh_sum =
0.486704385326514
ans =

```

```
Berm Factor Calculation: Iteration 6, Profile Segment: 8
dh =
    1.2122557567363
rdh_sum =
    0.671604063627069
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 9
dh =
    1.2532662567363
rdh_sum =
    0.868319787377875
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 10
dh =
    1.2942767567363
rdh_sum =
    1.07712584493842
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 11
dh =
    1.3352872567363
rdh_sum =
    1.29828559024764
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 12
dh =
    1.3762977567363
rdh_sum =
    1.53205120464829
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 13
dh =
    1.4014897567363
rdh_sum =
    1.77368049172652
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 14
dh =
    1.4108637567363
rdh_sum =
    2.01825852347265
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 15
dh =
    1.4202377567363
rdh_sum =
    2.2657973698659
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 16
dh =
    1.4296117567363
rdh_sum =
    2.51630896097204
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 17
dh =
    1.4389857567363
rdh_sum =
    2.76980508637963
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 18
dh =
    1.4483592567363
rdh_sum =
    3.02629723452129
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 19
dh =
    1.4577327567363
rdh_sum =
    3.28579691114652
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 20
dh =
    1.4671067567363
rdh_sum =
    3.54831564123295
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 21
dh =
    1.4764807567363
rdh_sum =
    3.81386464697113
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 22
dh =
    1.4858547567363
rdh_sum =
    4.08245500735574
ans =
```

```
Berm Factor Calculation: Iteration 6, Profile Segment: 23
dh =
    1.4870262567363
rdh_sum =
    4.35142622761641
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 24
dh =
    1.4717937567363
rdh_sum =
    4.61545870169228
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 25
dh =
    1.4483592567363
rdh_sum =
    4.87195084983394
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 26
dh =
    1.4249247567363
rdh_sum =
    5.12097458609211
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 27
dh =
    1.4014902567363
rdh_sum =
    5.36260403012914
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 28
dh =
    1.3780557567363
rdh_sum =
    5.59691548532961
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 29
dh =
    1.3546212567363
rdh_sum =
    5.82398741626599
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 30
dh =
    1.3383067567363
rdh_sum =
    6.04606683764641
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 31
dh =
    1.3362337567363
rdh_sum =
    6.26751472001163
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 32
dh =
    1.3412812567363
rdh_sum =
    6.49050144379266
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 33
dh =
    1.3463287567363
rdh_sum =
    6.71503080434821
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 34
dh =
    1.3513762567363
rdh_sum =
    6.94110657590136
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 35
dh =
    1.3564237567363
rdh_sum =
    7.16873251148779
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 36
dh =
    1.3614712567363
rdh_sum =
    7.39791234290438
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 37
dh =
    1.3511057567363
rdh_sum =
    7.62390514555731
ans =
```



```
Berm Factor Calculation: Iteration 6, Profile Segment: 38
dh =
    1.3253277567363
rdh_sum =
    7.84204115327452
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 39
dh =
    1.2995497567363
rdh_sum =
    8.05242108825342
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 40
dh =
    1.2737717567363
rdh_sum =
    8.2551484442717
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 41
dh =
    1.2479937567363
rdh_sum =
    8.45032944970455
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 42
dh =
    1.2222157567363
rdh_sum =
    8.63807302956468
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 43
dh =
    1.1964377567363
rdh_sum =
    8.81849076657866
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 44
dh =
    1.1706597567363
rdh_sum =
    8.99169686131365
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 45
dh =
    1.1448817567363
rdh_sum =
    9.15780809136853
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 46
dh =
    1.1191037567363
rdh_sum =
    9.31694376964425
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 47
dh =
    1.0933257567363
rdh_sum =
    9.46922570170817
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 48
dh =
    1.0675477567363
rdh_sum =
    9.61477814226764
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 49
dh =
    1.0417697567363
rdh_sum =
    9.75372775076844
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 50
dh =
    1.0159917567363
rdh_sum =
    9.88620354613386
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 51
dh =
    0.990604256736299
rdh_sum =
    10.0124319492909
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 52
dh =
    0.965607256736298
rdh_sum =
    10.1326356195752
ans =
```

```
Berm Factor Calculation: Iteration 6, Profile Segment: 53
dh =
    0.940610256736299
rdh_sum =
    10.2469421757321
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 54
dh =
    0.9156132567363
rdh_sum =
    10.3554812180484
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 55
dh =
    0.890616256736299
rdh_sum =
    10.4583842848048
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 56
dh =
    0.865619256736299
rdh_sum =
    10.5557848080761
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 57
dh =
    0.840622756736298
rdh_sum =
    10.6478181748891
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 58
dh =
    0.815626256736298
rdh_sum =
    10.7346214642595
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 59
dh =
    0.790629256736299
rdh_sum =
    10.8163334120985
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 60
dh =
    0.7656322567363
rdh_sum =
    10.8930945710975
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 61
dh =
    0.756727256736298
rdh_sum =
    10.9681263186944
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 62
dh =
    0.780005756736298
rdh_sum =
    11.047716954516
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 63
dh =
    0.819375756736299
rdh_sum =
    11.1352959522884
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 64
dh =
    0.837237756736299
rdh_sum =
    11.2266130033956
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 65
dh =
    0.833592256736299
rdh_sum =
    11.3171614297328
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 66
dh =
    0.8299472567363
rdh_sum =
    11.4069442624037
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 67
dh =
    0.826301756736299
rdh_sum =
    11.4959643279439
ans =
```

```
Berm Factor Calculation: Iteration 6, Profile Segment: 68
dh =
    0.822656256736298
rdh_sum =
    11.5842245635611
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 69
dh =
    0.819010756736299
rdh_sum =
    11.6717279118934
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 70
dh =
    0.8153652567363
rdh_sum =
    11.7584773209881
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 71
dh =
    0.811720256736299
rdh_sum =
    11.8444758470799
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 72
dh =
    0.8080747567363
rdh_sum =
    11.9297263457666
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 73
dh =
    0.8114322567363
rdh_sum =
    12.0156656688532
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 74
dh =
    0.821792756736301
rdh_sum =
    12.1037463564099
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 75
dh =
    0.8321532567363
rdh_sum =
    12.1939921862321
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 76
dh =
    0.842513756736299
rdh_sum =
    12.2864268111333
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 77
dh =
    0.8528742567363
rdh_sum =
    12.3810737575803
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 78
dh =
    0.863235256736299
rdh_sum =
    12.477956532794
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 79
dh =
    0.8735957567363
rdh_sum =
    12.5770982991415
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 80
dh =
    0.883956256736299
rdh_sum =
    12.6785221959238
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 81
dh =
    0.894316756736298
rdh_sum =
    12.7822512307076
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 82
dh =
    0.885682756736299
rdh_sum =
    12.8840576675476
ans =
```

```
Berm Factor Calculation: Iteration 6, Profile Segment: 83
dh =
    0.8390602567363
rdh_sum =
    12.9757600737699
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 84
dh =
    0.7734432567363
rdh_sum =
    13.0540530435747
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 85
dh =
    0.707826756736299
rdh_sum =
    13.1199129152626
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 86
dh =
    0.642210256736298
rdh_sum =
    13.1743447033655
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 87
dh =
    0.576593256736299
rdh_sum =
    13.218379802676
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 88
dh =
    0.510976256736299
rdh_sum =
    13.2530737671592
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 89
dh =
    0.4453592567363
rdh_sum =
    13.2795037754089
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 90
dh =
    0.4226457567363
rdh_sum =
    13.303327722907
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 91
dh =
    0.442835756736299
rdh_sum =
    13.329461693213
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 92
dh =
    0.463025756736299
rdh_sum =
    13.3580095635588
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 93
dh =
    0.4832157567363
rdh_sum =
    13.3890746820197
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 94
dh =
    0.503405256736301
rdh_sum =
    13.4227597787067
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 95
dh =
    0.5235947567363
rdh_sum =
    13.4591670704896
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 96
dh =
    0.503194756736299
rdh_sum =
    13.4928243224003
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 99
dh =
    0.183576256736298
rdh_sum =
    13.4973482653468
ans =
```

```

Berm Factor Calculation: Iteration 6, Profile Segment: 100
dh =
    0.240307256736299
rdh_sum =
    13.5050919855488
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 101
dh =
    0.363338756736299
rdh_sum =
    13.5227358070771
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 102
dh =
    0.486370256736299
rdh_sum =
    13.5542035216754
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 103
dh =
    0.5575527567363
rdh_sum =
    13.5954183319647
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 111
dh =
    -0.0336427432637016
rdh_sum =
    13.5957150509144
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 112
dh =
    -0.0861362432637005
rdh_sum =
    13.5976590482675
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 113
dh =
    -0.138629743263699
rdh_sum =
    13.6026892885245
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 114
dh =
    -0.1911232432637
rdh_sum =
    13.6122358195303
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 115
dh =
    -0.222291243263701
rdh_sum =
    13.6251353485881
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 116
dh =
    -0.210808243263701
rdh_sum =
    13.636741633821
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 117
dh =
    -0.1780002432637
rdh_sum =
    13.6450257032442
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 118
dh =
    -0.145191743263702
rdh_sum =
    13.6505425258127
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 119
dh =
    -0.1123832432637
rdh_sum =
    13.6538502488505
ans =
Berm Factor Calculation: Iteration 6, Profile Segment: 120
dh =
    -0.1169402432637
rdh_sum =
    13.657431331368
ans =
!----- End Berm Factor Calculation, Iter: 6 -----!
berm_width =
    107
rB =
    0.678846721628462
rdh_mean =

```

```

0.127639545152972
gamma_berm =
0.407800965148781
gamma_berm =
0.6
slope =
0.125024670722706
Irb =
1.39408752881026
gamma_berm =
0.6
gamma_perm =
1
gamma_beta =
1
gamma_rough =
1
gamma =
0.6
ans =
!!! - - Iribaren number: 0.84 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:8.0 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
3.17127588688769
! 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 =
1.361585082
upper_slope =
0.0749899999999997
upper_slope =
0.0749900359102045
upper_slope =
0.0749900693307287
upper_slope =
0.0749900670078763
upper_slope =
0.0749900972534412
upper_slope =
0.0749900941996931
upper_slope =
0.0749901217758419
upper_slope =
0.0762210014987774
upper_slope =
0.077381236900161
upper_slope =
0.0784767400942829
upper_slope =
0.0795127813981428
w2 =
0.202357731345444
w1 =
0.797642268654556
R2_new =
3.07186474320676
R2del =
0.0041371654215645
Z2 =
12.5165684999431
% final 2% runup elevation
Z2=R2_new+SWEL
Z2 =
12.5165684999431
diary off
-1.000000e+00

```