Tillamook County Runup Coding Explained

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**master\_runup\_code\_ENVISION.m**

This file calls and loads all the data necessary for transect by transect TWL calculations (e.g., wave parameters, bathymetry data, transect information…)

If there is no bathymetry data, the code will not run, and you will receive an error message (line 126).

Once a transect is selected in the loop,

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**runup\_calculations\_ENVISION.m** runs

The runup calculations code goes through the steps of calculating the runup for each transect based on the type of back beach. The different runup formulations are:

1. TAW Local Slope (TAW approach using the local beach slope)
2. TAW Snsh (TAW approach using an iterative approach)
3. Stockdon

The different beach backing types for Tillamook County are:

1. Sandy beach backed by dune
2. Sandy beach backed by bluff
3. Beach backed by riprap

6. Sandy beach backed by cobble berm

(categories 4 and 5, seawall or wooden bulkhead backing do not exist here)

Each of these categories fits an approach, where

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| --- | --- |
| **Category** | **Approach** |
| 1. Sandy beach backed by dune | Stockdon (3) |
| 1. Sandy Beach backed by bluff | TAW Local (1) |
| 1. Sandy beach backed by riprap | TAW Local (1) |
| 6. Sandy beach backed by cobble berm | TAW Snsh (2) |

The code first computes all Stockdon related parameters necessary for flags (more on flags below) and/or anything else (lines 22 – 47)

Next we run the runup conditions based on the category of the beach slope. For cat 1, TWL are calculated using Stockdon. For cat 2 and cat 3, TWL are calculated using TAW\_local slope. For cat 6, TWL are calculated using a variety depending on the wave conditions. Right now we will just use TAW\_snsh.

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**runup\_calculations\_TAW\_local.m**

TAW stands for the Technical Advisory Committee for Water Retaining Structures and the TAW method provides a mechanism for calculating runup on a barrier, adjusted for various reduction factors (surface roughness, influence of a berm, effects associated with angle of approach) (See attached document for more information about metrics). Once the wave height and period at the toe of the barrier are calculated, the barrier slope must be considered. Because the runup process is influenced by the change in slope from the breaking point to the maximum wave runup, the characteristic slope should be specified for the same region. For this formulation, the local structure slope is used. The slope is computed with Stockdon and the level of the static setup + tide.

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**runup\_calculations\_TAW\_snsh.m**

For this formulation, an iterative slope is used. The local slope is found as before, then we compute the local slope a second time with the new information.

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Finally some flags are set up. Previously set up, if the dynamic water level (still water level + setup) is lower than the dune toe, there is an Hmo flag. This flag tells us the water level is not reaching the dune toe, so we should just use the Stockdon formulation.

If the profile is flooded , a flood flag is set up. This is telling us the water level is higher than the structure and that Stockdon will be used to calculate runup.

Other functions called

*abs*

*curveintersect*

*nan*

*zeros*

*isnan*

\*\*Notes\*\*

For some cases, when the berm reduction factor (yb\_or) is 1, we replace it and a value for dh (berm height) is needed. This was a fix that was corrected after Tillamook County was done for the FEMA project, hence no dh value exists in the excel file. This is something we will eventually need, but I would just code it and put a fake column of dh in for now and then I will make sure we have values for each transect soon.