Assumptions to make for horizontal:

The spacing between baffles must be at least 45 cm since we are using concrete baffles.

The T/S can be the optimal value of 3.

1. Set P as height of water at end of flocculator.

2. Use S.FlocBaffleIterative to calculate the spacing using a T/S of 3.

3. Make sure that the S is greater than 45 cm, if it isn’t, set it at 45 cm.

4. Calculate T from the T/S ratio of 3 and the S found in step 3.

5. Calculate head loss in flocculator and see if it is significant. If it is, tapered spacing might need to be done.

Create an algorithm using slide 73 of Monroe’s notes on flocculation that chooses a minimum flow rate for horizontal flocculation using the height of the sedimentation tank and a minimum baffle spacing of 45 cm.

Create an if statement for S. If Q> Qmin, recalculate S as higher than 45 cm.

Calculate the number of spaces using this S from N.FlocSpacesF

Need to look up how things are plotted on the y axis

Solution Algorithm

1. Define array of ratio of baffle height to baffle spacing from experimental results ()

2. Define array of the fraction of the maximum collision potential that could be achieved if the energy dissipation rate was uniformly distributed from experimental results ()

3. Define array of collision potential from experimental results ()

4. Define array of minor loss coefficients from experimental results ()

5. Define array of maximum energy dissipation rate over average energy dissipation rate from experimental results ()

6. Use linear interpolation of the experimental results to create functions for , and 

hv1. Define generic variables so that both horizontal and vertical flocculators use the same variables and they are not as confusing.

hv2. Set the minimum T/S value as 3 for horizontal flocculator.

hv3. Set the minimum baffle spacing as 45 cm for a horizontal flocculator. This corresponds to a human width so that someone can walk through it if needed.

hv4. Determine the height of the water at the end of the flocculator (equal to the height of the water in the sed tank). This is equal to the minimum height of the tank. For now, set this value as P (the height of the water in the flocculator). Might need to check to see if the head loss of the water is actually negligible later.

hv5. Create an equation that calculates the minimum flow rate as a function of the energy dissipation and height of the water.

7. Create a function that determines the number of spaces in a flocculator channel.

Vertical: Round instead of floor?

Horizontal: Make sure they create an odd number of baffles. Round to an odd number instead of flooring to get closer to the desired energy dissipation.

Create another function that determines the spacing between the baffles.

8. Calculate S

Create an iterative solution to solve for the space between the baffles since we don’t know H/S before calculating S

Since we know the H/S ratio (optimum is 3) (as opposed to the vertical flocculator where we don’t), create a function that directly solves for S.

9. Create a function for the collision potential

10. Create a function for the maximum energy dissipation rate.

11. Create an algorithm to find the target energy dissipation rate as a function of the collision potential.

12. Create an algorithm to find the number of spaces in each channel with the correct energy dissipation rate and cumulative collision potential.

Here is where solution path varies significantly for vertical and horizontal. Will add in horizontal later.

14. Calculate S using the function created in step 8.

15. Create a function that makes S the maximum of what was found in step 14 and 45 cm.

16. Calculate T (width of channel) as the S found in 15 multiplied by Pi.TS=3.

17. Calculate the number of spaces in each channel using the function created in 7.

18. Determine the collision potential in each space.

19. Divide the target overall collision potential by the collision potential in each space to find the total number of spaces. Round this value up.

20. Divide the total number of spaces by the number of spaces per channel to get the number of floc channels. Round this value up.

20a. Create an array for the number of floc spaces in each channel. Subtract 1 from this array to get the number of baffles per channel.

20b. Calculate the actual spacing in the channels and the actual T of the channels. Verify that the channels are the correct length (length of the sedimentation tank).

20c. Calculate the actual energy dissipation and collision potential in each channel.

21. Calculate the head loss per baffle in each channel, per each channel, and for the whole flocculator. Calculate the height of the floc tank.

22. Make sure the head loss is negligible enough for untapered flocculation? Algorithm or manual? NEED TO LOOK INTO

23. Calculate the total length of all the flocculator channels and the residence time in the flocculator.

24. Determine the height and width, and thus the area, of the ports that connect the floc channels.

For horizontal this is more of a channel than a port. Set the port width equal to a normal baffle spacing and set the height equal to the height of the floc tank.

25. Calculate the **length of the baffles**. Subtract half of the freeboard height from the length of the top baffles to allow a place for water to go in the event of an overflow.

26. Create an array for the X (distance along flocculator) positions of the baffles. **Same as vertical code? Change because odd spaces in all channels?**

27. Create an array for the Y positions of the baffles.

28. Create an array for the Z (height) positions of the baffles. **(All 0)**

29. Create an array for the length of the baffles in each channel.