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. (What use for Emax?

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

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 

7. Create a function that determines the number of spaces in a flocculator channel and another function that determines the spacing between the baffles.

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

13. 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.

14. Determine the maximum baffle spacing by using the minimum H/S ratio

15. Determine the width of the floc channel as the maximum of the spacing found from step 8 and the width of the floc channel as determined by a human being able to walk through it.

16. Determine the minimum floc baffle spacing and the minimum and maximum number of floc spaces.

17. Calculate the maximum energy dissipation rate given the range of possible baffle spacings and the total collision potential for a channel full of baffles of that spacing.

18. Calculate the number of spaces in each channel, the number of channels, and the number of baffles in each channel.

19. Calculate the actual baffle spacing and verify that the channels are the correct length.

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

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

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

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

24. Calculate the height of the upper and lower values. 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.

25. Create an array for the X (distance along flocculator) positions of the baffles.

26. Create an array for the Z (height) positions of the baffles.

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