tms52

Travis Stanislaus' Individual Agua Clara Contribution Page

Fall 2009 Contributions

I began the semester by reading the CFD simulation reports from the Spring 2008 and Fall 2008 because this semesters CFD simulations would be 2D analysis. Fluent was integrated into ANSYS, so I did the tutorial on the Swanson Lab Simulation website for the previous version of Fluent making geometries in Gambit and for the new version of Fluent making geometries in ANSYS workbench. Professor Bhaskaran also started me and Steve off with a MatLab problem set for the Fluent tutorial. When Professor Weber-Shirk and Professor Bhaskaran found the periodic boundary condition in the Fluent user manual with Steve and me, I read the Fluent manual on Periodic Boundary conditions and I began making a five turn mesh with a finite gap for the baffles. I dimensioned the baffle in the sketcher so the essential geometries, center to center baffle width B, baffle thickness t, flocculator height h, and clearance height ch could be adjusted for the whole sketch. When I meshed this sketch I realized the 2mm baffle width prevented the sketch from being meshed properly. Line bodies had to be used for the mesh. The next task was to figure out the meshing of the sketch with the line bodies. Sketches can be meshed, but I had to determine the wall biasing for our meshes of B = 0.1 m, H/B = 1, and ch = 0.15 m that kept the solution of the mesh from having turbulent y+ in the 5 to 30 range with compromises the validity of the results. I had to reference the fluid mechanics textbook from MAE 323 to understand the y+. I found that the smallest biasing that kept the turbulent y+ below 5 was a bias of 25. I ran cases for five turn and ten turn baffle systems to have to compare with the periodic solution and observe the calculation time. We are extending the number of turns in the baffles to observe the behavior far downstream and compare with a hopefully to be correct period solution. I began to run the UDFs, Jesse, Yong, and Wenqi made in the past, on our meshes to see the outputs and how I can change them to correspond to our meshes. I will run H/B = .3 and .4 simulations soon.

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