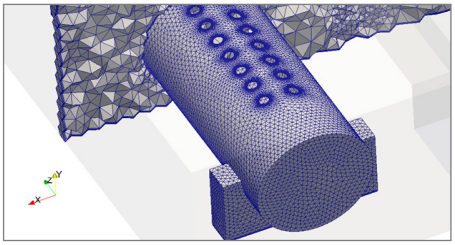
Case Study

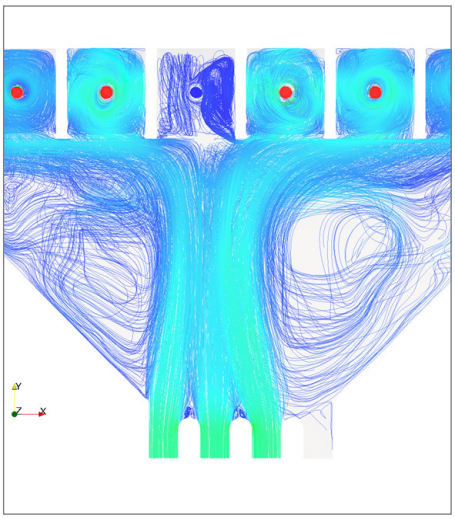
RENUDA
FLUID SOLUTIONS

Water, the source of life... and CFD

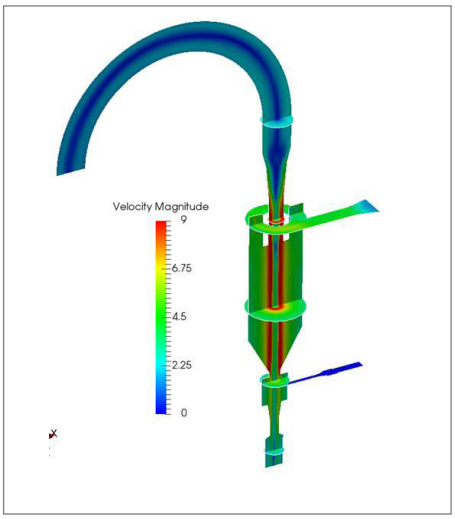


An ever increasing world population is putting water resources under immense pressure and therefore finding the best possible method of delivering safe, affordable drinking water from source to end-user is critical. This, along with growing concerns for the environment has compelled environmentalists to look at new ways of optimising the planet's resources. Due to its increasing accuracy in predicting outcomes the utilisation of digital modelling, such as CFD, to supplement more traditional methods is becoming common practise in many industries, none more so than the water industry.

For a number of years Renuda has worked with water treatment companies on projects ranging from building water treatment plants to calculating hydrocyclone performance. In one of our projects, we worked in collaboration with a water utility company to help them optimise the design of a drinking water plant for a major West African city. Renuda was asked to analyse the design of the raw water collection and treated water pumping stations in order to allow for a more even distribution flow. Using a series of CFD calculations, we went through a redesign of the structures with the water utility and were able to demonstrate more uniform flow in the stations. In a separate but related project, CFD was used to model the river flow into and around the river intake for different water levels and flow rates. The analysis also made it possible to determine the environmental impact of the intake on the river and surrounding river banks before and after the river was diverted into the intake, as well as the performance of the water intake for these flows.



In other projects CFD models were developed and applied to calculate the performance of hydrocyclones for world renowned water treatment company Veolia. Performance is established based on accurately predicting the degree to which water is purified for different waste water injection rates and the amount of water and particulate matter going out at the top and bottom of the cyclone. These complicated multiphase flow calculations were performed using Code_Saturne and SALOME. Applying different turbulence models and meshes, water flow rates were calculated followed by simulations to determine the proportion of water going out of the top and bottom of the cyclones for different flow rates. Additional calculations were then carried out to determine the distribution of the sand. The results were in line with Veolia's production experience and expectations, proving the validity of the models.



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