

Vaughan Co.

Municipal Wastewater Treatment and Heavy Industry

USA



www.chopperpumps.com



ANSYS® CFX®

Overview

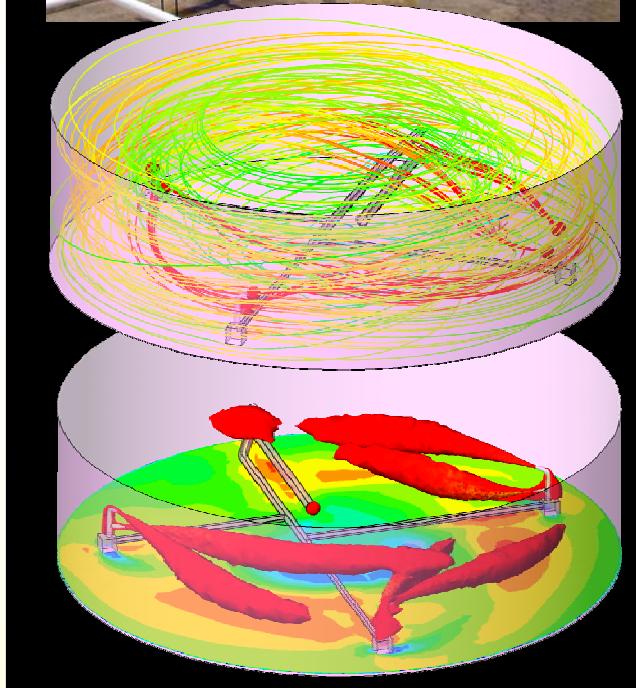
Vaughan Company has been the world leader in chopper pumps since Jim Vaughan's invention back in 1960. Since then, over 35 patents have been issued and 20,000 pumps installed worldwide. Vaughan chopper pumps have tackled the toughest pumping applications where many other types of pumps have failed in both heavy industry and municipal wastewater applications. The key to their operation is a scissor action which occurs between the impeller vanes and the housing, which causes incoming solids to be chopped. Chopper pumps are combined with tank floor-mounted nozzles to form the Rotamix® process mixing system, a very cost-effective and low life cycle cost process mixing system available for digester, sludge storage and other high-volume large tank mixing applications.



Testimonial

"We had no idea when we started using ANSYS CFX software how much we, and our customers, would come to depend on it. It has given us ground-breaking insight into the inner workings of large tank mixing, and we have been able to bring several new pump models to market, and achieve our performance objectives, without the need for a prototype. ANSYS CFX software has integrated easily with our Pro/ENGINEER® solid models, and the outstanding technical support we have received from ANSYS has been pivotal in our success with this software."

Glenn R. Dorsch
Vice President & Chief Engineer
Vaughan Co, Inc.



Challenge

The goal is to develop process mixing installations which minimize dead zones in the tank where solids can collect. These solids decrease active volume and reduce process capacity.

On-site process optimization is impractical and model testing for each installation is expensive, offers limited information, and may be unreliable due to scale-up issues.

Numerical simulation of these tank flows poses a challenge for conventional CFD solvers as the nature of the flow (large variation in length scales, low velocity) makes it difficult to achieve convergence.

Solution

By using ANSYS CFX, Vaughan has been able to develop process mixing systems with an optimum active mixed volume. CFD has allowed computer modelling of each unique installation. Multiple configurations can be investigated to determine the effect of nozzle position, aiming, and flow rate.

The installed systems have confirmed the predictions of the CFD simulations.

CFD has also been applied with great success to improve the operating efficiency of the chopper pumps themselves.

Benefits

When CFD has been used to optimize and/or verify the characteristics of each unique system, Vaughan's customers can have confidence that their installation will meet their operating needs.

The ease of use of ANSYS CFX, combined with excellent technical support, has allowed Vaughan to make the most productive use of their CFD investment.

The coupled algebraic multigrid solver that forms the heart of ANSYS CFX ensures rapid and reliable convergence for these challenging flows.