Analysis of technological processes and equipment

About us

CFD.HU Ltd. is a Computational Fluid Dynamics consultation company closely associated with the Department of Fluid Mechanics at the Budapest University of Technology and Economics and the distributor and support center of ANSYS simulation software in Hungary. With the support of market-leading ANSYS Fluid Dynamics, Mechanical and Multiphysics software and our own computer cluster the company’s internationally acclaimed staff can precisely analyse complex fluid problems with large cell numbers in order to optimise future engineering designs.

The company is co-led by the former Head of the Fluid Mechanics Department, professor Tamás Lajos and Gergely Kristóf, PhD., the chairman of the sub-committee of Fluid Mechanics and Heat Technology at the Hungarian Academy of Sciences (MTA). All colleagues have a rich academic background with years of experience in the field of Computational Fluid Dynamics. The company’s close relationship with the University also provides the opportunity to perform wind tunnel investigations to validate CFD results and to involve experts of other disciplines.

We use CFD, which makes it possible to:

- Analyse complex flow characteristics
- Investigate multiphase flow profiles
- Examine non-Newtonian and visco-elastic fluids
- Optimise reactor designs
- Optimise oxygen introduction to industrial fermentors
- Improve bacteria productivity and propagation
- Reduce costs associated with inefficient oxygen introduction

Wastewater treatment

Wastewater treatment techniques rely on fluid mechanic and energetic processes to help remove contaminants. Analysis of these processes can be complex because the fluid is composed of multiple phases which are often undergoing complex biochemical reactions. Initial experimental studies are conducted on a laboratory scale before they are scaled up to the larger treatment facilities. In order to determine an optimal design, it is important to investigate the fluid dynamics of the system throughout the scale-up procedure. Optimal mixing, hydraulic interactions and measuring techniques can all be examined with the use of CFD simulations. These are particularly important with respect to biogas systems, sedimentation and activated sludge technology. Our colleagues were involved in the design of Budapest’s new sewage farm, a 5-Billion-Euro investment, modelling the flows within the mixing vessel.
Pharmaceutical application

In pharmaceutical fermentors, the propagation and productivity of bacteria depend strongly on the available nutrients and oxygen. When determining an oxygen addition method, it is important to ensure adequate dissolved oxygen without damaging the bacteria with excessive shear stress. The method of injecting the sterile air influences the dissolved oxygen uniformity and agitation of the fermentor ultimately affecting the efficiency of the bacteria. The appropriate method and its parameters can be investigated using the CFD simulation of two phase flow and the cost of bacteria load can be reduced. Our colleagues modelled the fermentor of a leading Hungarian pharmaceutical manufacturer.
Chemical industry technologies

In the chemical industry, computer aided modelling is traditionally used to describe reaction kinetics. Recently, computer simulation has also been applied to a reactor’s fluid dynamics, as it plays a critical role in the large scale application of the chemical reactions. The flow field within a reactor is often complicated due to complex geometry and the turbulent or multiphase characteristics of the flow. Our colleagues can carry out the quantitative analysis of reactive flows, in order to eliminate design errors, and aid in the reconstruction of the faulty systems.
Polymer, glass, ceramics and food industry

Modelling of non-Newtonian and visco-elastic fluids is a special field of CFD with particular software packages designed to aid in simulation. With ANSYS POLYFLOW, several extrusion, die-casting, blast, hot-working, and coating problems can be modelled and investigated. POLYFLOW can also be applied to glasswork, metalwork and other similar instances of non-Newtonian fluids such as those in the food or ceramic industries. With the ability to analyse fluids with irregular viscosity, our colleagues are able to perform strength analysis and system investigations taking into considerations various fluid dynamics characteristics.

Visit us at www.cfd.hu to learn more about our references, or contact us at info@cfd.hu.