NUMERICAL (CFD) INVESTIGATION OF FLOW PROCESSES

Our competence is primarily to provide numerical modelling of flow conditions in fluid engineering equipment and special spaces, as well as numerical investigation of heat exchange processes in thermal engineering equipment using computational fluid dynamics (CFD). This allows us to study industrial processes more cost-effectively and faster in accordance with today's requirements by modelling various flow and thermal engineering processes, with which we can support industrial actors in achieving their research and industrial goals. Tests can provide data that is difficult to measure or cannot be measured due to physical limitations. The simulations allow coupled studies from chemical reactions (combustion, mixing) to mechanical studies (static or dynamic loads).

COMPETENCIES

- We perform complex investigations by numerical modeling of flow and thermal engineering processes in industrial equipment and machines, as well as in special spaces (using commercial or own codes).
- With the help of the tests, we can determine the location for the measuring instruments to be placed in the interior and the typical flow conditions, as well as formulate proposals for the operation or further development of the machines and equipment.
- With our research and teaching experience, we examine flow and heat engineering systems with a complex approach, which we can provide to those interested in the form of consultation or training at different levels.

SERVICES

- Calculation of time-constant and time-varying processes
- Fluid analysis of single and multiphase media
- Investigation of laminar and turbulent flows
- Calculation of heat conduction, heat transfer, heat radiation
- Possibility to model moving parts relative to each other (eg simulation of flow in turbochargers)
- Determination of the flow behavior of powders with different fraction distributions
- Chemical reactions, combustion modeling
- Determination of static and dynamic loads
- Preparation of flow tasks related to or adaptable to other fields

TOOLS

- Software: ANSYS CFD and Mechanical, scTetra, scFlow, OpenFlow, etc. examination of flow and thermal engineering processes with the help of a program system. MATLAB, C ++, OCTAVE, etc. use of software and programming languages to solve flow problems
- Hardware: SUN Fire X4600 (4 processors, 256GB memory); 14 HP-Z440 workstations for various preparation and small simulation tasks, as well as additional networked tools for larger computing tasks

REFERENCES

- Deutscher Akademischer Austauschdienst Projekt – Development of turbulence generators
- Robert Bosch Energy and Body Systems Ltd. – Noise reduction, furnace space inspection
- BorsodChem Ltd. – tank dynamic load test
- ELECTROLUX Lehel Ltd. – Improving the energy efficiency of refrigeration furniture, reducing the noise of vacuum cleaners, developing vacuum cleaner heads
- Thermal and flow engineering modeling of heat treatment furnaces and reactors – TÜKI Ltd., MOL-Group - TVK Ltd.,Columbian Tiszai Koromgyártó Ltd., MAL Ltd., Zoltek Ltd.
- Computer simulation and modeling of superfast aerobic degradation in the turbulent, near-cavitation close flow of a two-phase mixing system, GINOP-2.2.1-15-2017-00069 project
- ISD Kokszoló Ltd. – Energetic analysis of the smoke passage of a coke extinguisher
- Rába VKE K1438 – Determining the system of tools required for modeling flow and thermal engineering processes in an engine
- Olajterv Fővállalkozó és Tervező Ltd. – Flow modelling of noise protection halls of new compressor stations in Croatian transit Báta and Városföld
- FGSZ Ltd. – Numerical modelling of gas pipelines (with a self-developed program)