FLUID DESIGN
FLUID OPERATION
FLUID PERFORMANCE

The Fluid Group

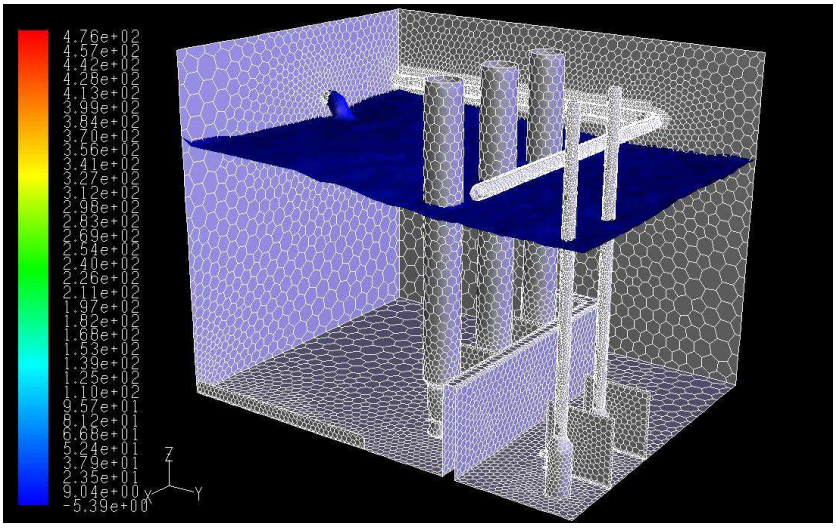
Advanced CFD and Process Simulation

Pumping Station CFD – Polyhedral meshing speeds up simulation

Staying at the leading edge of research is part of The Fluid Group's activities and using a polyhedral mesh for multiphase applications has the advantage of vastly reducing computation time.

Back in the 90's, tetrahedral meshing revolutionised the scope and accuracy of CFD models, removing the need for hexahedral (six sided, or "cuboid") blocks to define the fluid domain - allowing complex curvature in detailed structures to be modelled accurately.

However, an issue with tetrahedral meshes is that the number of cells increases significantly. The ideal solution is to take the next step forward and develop polyhedral mesh routines, with the mesh resembling a honeycomb. Detail is retained, but the number of cells are reduced by up to 80%, improving computation time dramatically.



The above pumping station, with polyhedral mesh, was modelled over a full pump cycle (top water level to bottom water level) in less than 24 hours on a typical workstation at The Fluid Group. The level of accuracy is unprecedented and now with a step change in speed, more complex analysis can be completed as routine.

The Fluid Group provides expertise in a range of simulation techniques including:

- CFD (ANSYS Fluent)
- Process (GPS-X)

Recent projects using CFD include:

- Kennick Reservoir Spillway Modelling – Dartmoor National Park
- Hornsey WTW Pumping Stations
- Helsinki WwTW Clarifiers
- Boltenhagen WwTW Settlement Tanks
- Lound WTW – Northumbrian Water
- Integrated Process/CFD simulation
- Reservoir improvement
- Clarifier optimisation
- Flow split prediction
- Digester mixing, and
- Acoustic modelling

plus …

air profiling and fluid flow in and around a range of structures: from commercially sensitive turbo-machinery, to new designs in the built environment.

To discuss potential projects, contact us:

Tel. 0845 055 8571, or
email: info@thefluidgroup.com

The Fluid Group are specialists in Computational Fluid Dynamics & Process Modelling for Chemical Engineering, Water and Wastewater Treatment.

Dynamic Simulation or Steady State
- Effective selection of the best technique for each job,
- The ability to combine techniques in-house.

Multiphase
- Air, water/chemical & solids modelled simultaneously, standard within our models,

3 Dimensional
- Accurate 3D model of existing structures,
- Model wireframes can be imported from existing 2D and 3D CAD designs.

Fully Inclusive Quotation
- All known options inclusive at fixed price,
- Fast turnover, one-to-one availability,
- No hidden costs.

Animation and still images included
- Images and animation at client's request, all free within the project, for commercial use.

Flexibility and Innovation
- All-inclusive combination with Process and 2D Hydraulic/Network modelling if required.

The Fluid Group

The Fluid Group, The Magdalen Centre, Robert Robinson Avenue, The Oxford Science Park, Oxford OX4 4GA, UK
Tel. 0845 055 8571 **Web** www.thefluidgroup.com **Email** info@thefluidgroup.com

Registered in England and Wales, Company Reg. No. 5356487