

Computational Fluid Dynamics (CFD) Capabilities Statement

MISSION STATEMENT

To deliver results of business advantage for our customer through the application of world class technical computing solutions backed by leading professional expertise, responsive customer relations and long-term business partnerships

INDUSTRY LEADING SOFTWARE SOLUTIONS

- CD-Adapco STAR-CD
- STAR-CCM+
- STAR-Design for CFD flow analysis

EXPERTLY TRAINED AND EXPERIENCED CAE PERSONNEL

Don Campbell

- BSc, BE(Hons), PhD, MIPENZ (Mech), CPEng, IntPE, NAFEMS Advanced Registered Analyst, over 30 years CAE/FEA experience across many industries

Paul Bosauder

- BE(Hons), NAFEMS Advanced Registered Analyst, over 9 years FEA/CFD experience, specialisation in CFD, heat transfer, non-linear, and composites

James Cheng

- BE(Mech), ME(Mech), over 13 years in FEA, fracture mechanics, material and structural failure analysis, pressure vessel design, plastics injection molding

James Hamilton

- BE(Hons), PhD, over 10 years FEA, experience in acoustics, aerospace and software customisation

EXAMPLE CFD CONSULTING PROJECTS

Electronics

- Predictive thermal flow analysis in an LCD unit to optimise geometry for maximum heat transfer (natural and forced convection) from an LCD unit to ambient air

Power Generation

- Conjugate heat transfer analysis of gas turbine cooling flow paths to enable prediction of thermal stresses
- Optimisation of cooling tower layouts to minimise the effect of exhaust plume recirculation
- Aero-acoustic analysis of gas turbine air intake silencer baffles to predict vortex shedding and transverse pressure wave frequencies
- CFD optimisation of hydro intake screen vanes including large scale modelling of channel and headrace to penstock transition
- Analysis of mist flow in a steam turbine exhaust duct to predict total system losses
- Analysis of steam generator/superheater bank to predict pressure losses and estimate local velocities and turbulent intensities
- CFD modelling of the cooling and hot-gas flow paths in an industrial gas turbine to predict thermal loads on key structural components
- Assessment of cavitation in a large scale pump during start-up

Continued/2

WE UNDERSTAND TECHNICAL COMPUTING

CFD Capabilities Statement, *continued*

EXAMPLE CFD CONSULTING PROJECTS

Plant and Process

- Coupled fluid/structural analysis of the flow induced vibration of a vortex separator
- Combined radiation, forced convection and conduction thermal analysis of high temperature gas heat exchanger at cone intersection
- Conjugate heat transfer analysis of steam dryer drum to calculate transient heat-transfer coefficients during system start-up
- CFD analysis of heat exchanges investigating tube bank flow impingement, pressure distributions and general heat transfer design effectiveness
- Flow analysis of primary reformer under extreme storm conditions
- Heat transfer analysis of underwater pipeline
- Analysis of lactose dryer to predict regions of flow stagnation & product build-up
- Prediction of exit velocity profiles from a centrifugal sprayer
- Analysis and optimisation of irrigation pump intake flow quality to improve pump performance and determine likelihood of cavitation

Bio-Mechanics

- Investigation of aortic blood flow with varying geometries observed in humans

Engineering Design

- Investigation into mixing performance of prototype bio-digester plant
- Flow analysis to predict the performance curve for a prototype fan blade
- Transient thermal analysis and subsequent thermal stress analysis of die base
- Evaluation of pressure versus flow rate performance curves and turbulent intensities for swing check valves
- Simulation of flow paths in a rock crusher with a rotating impellor to predict regions of wear and internal mass flow paths
- Evaluation of life and drag coefficients for mast structure

ADDITIONAL CONSULTING CAPABILITIES

- Finite element analysis
- Composites analysis
- Moldflow injection moulding simulation
- Design & optimisation
- Fitness for service assessment

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