

Optimising plant operation using CFD modelling

Using advanced three-dimensional simulation services to optimise plant efficiency

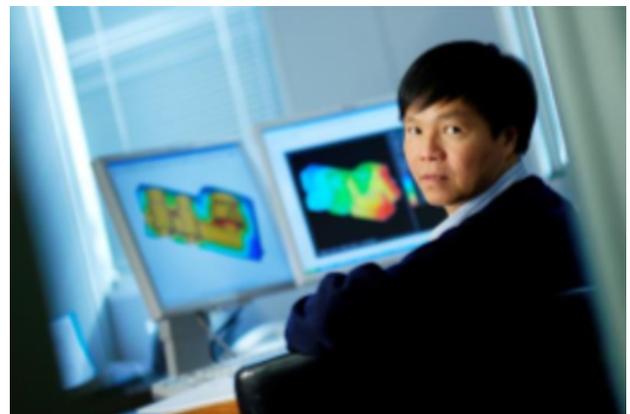
Large energy generators, minerals processors and energy users face extremely competitive and challenging environments that include considerable pressure to maximise their plant's performance. In such an environment plant operators face growing pressure to limit their emissions, and to minimise their fuel use and maintenance costs

HRL uses these modelling tools to complement other client services including evaluating resources and fuel, emissions and environmental monitoring, materials engineering and project implementation.

Challenges

Plant operators wishing to optimise plant performance face several challenges including:

- determining current plant efficiency and comparing plant efficiency to build specifications or expectations
- identifying options for improving plant performance
- predicting and quantifying the exact impact each option will have on plant processes
- determining which options are the most cost-effective
- in light of government policy to reduce greenhouse gas emissions and the proposed carbon tax, re-evaluating efficiency projects originally considered to be cost-prohibitive
- evaluating long-term abatement actions for continuing operations in a lower-emissions-intensity economy.



HRL's expert process modelling service can 'look inside' an operating plant

Solutions

Critical in determining plant performance – and in gaining the benefits from optimising that performance – is understanding exactly what is happening inside a plant. HRL Technology Group's expert process modelling service can 'look inside' an operating plant. Using a range of simulation packages, including computational fluid dynamics (CFD) modelling, hrl: provides data and analysis to assist clients in identifying options for optimising processes and increasing plant efficiency.

CFD modelling is a powerful method of producing computer-based three-dimensional models of any flow system. Such modelling allows different combinations of operating conditions, conceptual designs and modifications to be tested and proven before they are implemented.

CFD modelling can be used to determine the performance of systems with two-phase flow and those in which chemical reactions occur.

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Case Study

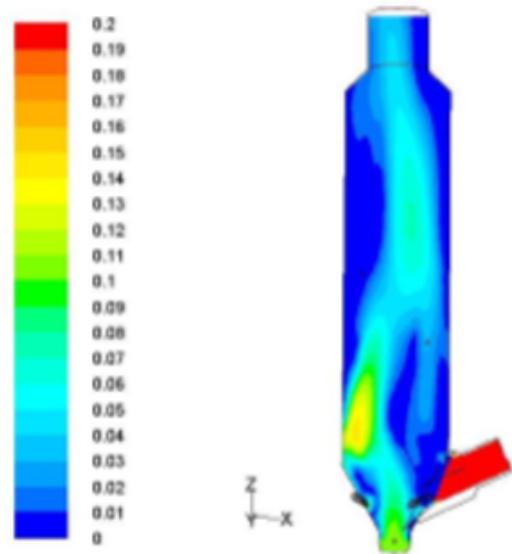
Determining the suitability of a replacement biomass fuel

A leading cement producer was interested in replacing natural gas with biomass as fuel for their combustion process. hrl: proposed using CFD modelling as a non-invasive method to determine the alternative fuel's combustion characteristics and effectiveness. HRL personnel also used modelling to identify design changes to stabilise flow, change fuel-residence time and alter fuel-injection height and angle to optimise combustion of the proposed biomass fuel. The modelling determined that biomass was a viable fuel alternative without any detrimental effect on performance, as long as the suggested design changes developed from the CFD model were implemented.

Benefits

The benefits clients enjoy by drawing on hrl: extensive expertise in CFD modelling include:

- assistance in understanding the current performance of their plant and its limitations
- modelling alternative modification options and operational conditions, quantifying performance improvements, and determining the cost-benefit equation before committing to any plant modification work
- drawing on highly skilled technologists using state-of-the-art modelling software who employ methodologies, and produce results and recommendations that withstand external scrutiny and in which clients can have confidence
- providing a strong theoretical understanding that is backed by years of practical experience and expertise in applying the technology
- drawing on the services of a supplier that looks to provide the best solution, not just a research program.



Oxygen concentration in calciner

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The company's NATA Accredited Laboratories number is 561.

HRL Technology Group's ISO 9001 Quality Management is certified by BSI under certificate FS605116

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