



Halcrow

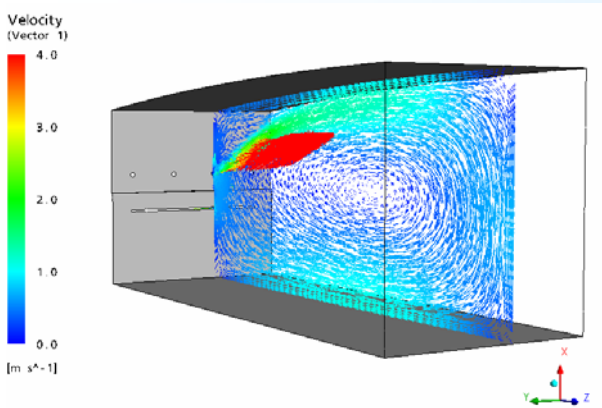
Capability in Computational Fluid Dynamics (CFD) for Building Services

1 Introduction

Computational Fluid Dynamics (CFD) is a powerful numerical modelling technique, which is increasingly used to simulate both the conditions which occur within the built environment and the performance of the HVAC plant used to maintain those conditions. As the open spaces within buildings become larger, and the thermal processes within them become more complex, CFD can provide a full analysis of conditions for optimisation of designs. Plant performance can also be optimised to reduce energy and space requirements.

CFD offers the following benefits to clients:

- Quantitative analysis of conditions within buildings of any scale and complexity
- Includes all thermal and convective processes
- Optimisation of system performance through parametric studies
- Rapid analysis of geometry changes
- Full flowfield visualisation leading to understanding of the principal processes



Velocity vectors on a vertical plane through a proposed airport terminal building. Jet nozzle supply from back wall; glass façade at front.

2 Halcrow's capabilities

Halcrow has extensive experience and the tools necessary to carry out detailed CFD analysis of conditions within the built environment, and the performance of the HVAC plant used to maintain those conditions. The principal CFD code used is the CFX general-purpose code, which has wide

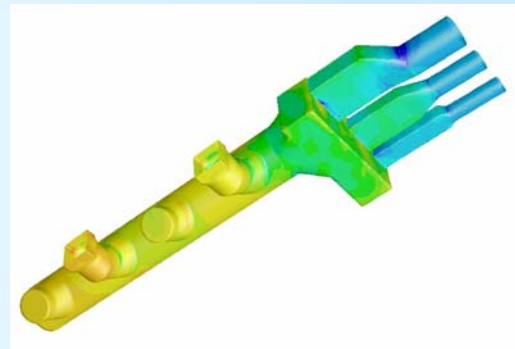
provenance for these types of problem. At Halcrow, CFX is often used in conjunction with simpler methods to provide the fullest set of information on which to base design decisions. CFX may be integrated with specialised building simulation software such as IES.

3 Example applications:

Recent example applications include:

CFD simulation of the proposed ventilation system of the new terminal building at Podgorica Airport, Montenegro. The optimum positions for the supply jet nozzles with regard to the comfort of the occupants of the building were determined using CFD modelling.

CFD calculations of pressure losses in the fan intake / discharge system around a four fan system. The geometries of the regions causing the greatest losses were refined to significantly reduce the overall losses.



Pressures in a fan discharge ductwork system

4 Contacts

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