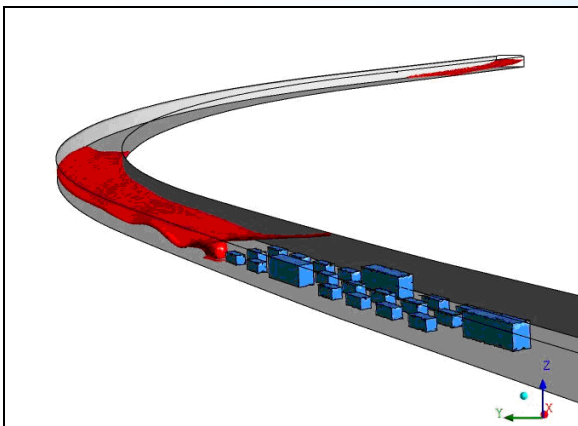


1 Introduction

Computational Fluid Dynamics (CFD) is a powerful numerical modelling technique used to simulate the flow of a gas or liquid through a physical geometry. The technique is highly versatile and can be used to study a wide variety of complex fluid flow phenomena, such as the spread of fire and smoke through a building, the wind loadings on a structure or the flow of air through a tunnel. CFD can also be used to study processes such as mixing systems and chemical reactions, including combustion.

Typically, CFD is used in conjunction with other methods for the following tasks:

1. Verification and optimisation of design performance.
2. Investigations following accidents
3. Development of understanding of particular flow processes



Smoke control in a road tunnel, including the effects of trapped vehicles.

2 Halcrow's experience in CFD

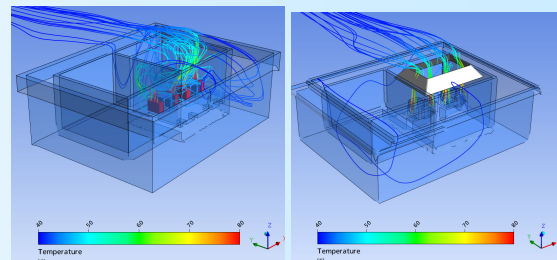
Fire and smoke movement
Building heating, ventilation and cooling
Process plant performance
Multiphase flows
Free-surface flows
Turbomachinery
Dispersion in air and water
Wave loading

Fluid structure interaction, including:
Floating structures in waves
Vortex induced vibration in currents
Heat transfer
Explosions

3 CFD codes

Halcrow uses the general-purpose code CFX, which is part of the ANSYS suite. CFX is one of the world's most widely used general-purpose CFD codes, and includes a wide range of models for flow physics, including chemical reaction and combustion; heat transfer; turbulence; and multi-phase physics. Using the powerful ICEM mesh generator, complex geometries can be created or imported from CAD data.

In addition to our experience using CFX, Halcrow staff have extensive experience with other widely-used CFD codes, including FLUENT and STAR-CD.



Natural ventilation optimisation in a below ground transformer enclosure. Original geometry (left) results in recirculation and high temperatures in the enclosure. Modified geometry (right) eliminates the recirculation and provides acceptable temperatures within the enclosure.

4 Contact

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