



*CHAM Limited Pioneering CFD Software for Education & Industry*

## PHOENICS/FLAIR Case Study Wembley Stadium Fire Study

This international sporting icon is in the course of being redeveloped to uphold the unrivalled status of this unique venue well into the 21<sup>st</sup> century. A comprehensive fire engineering review has been undertaken by Australian consulting firm, Connell Wagner, with the aid of PHOENICS/FLAIR, to ensure compliance with Building Regulations as well as conformance to the United Kingdom Green Guide principles for sports stadia.



In support of the fire engineering review, substantial CFD modelling was undertaken to demonstrate compliance with performance requirements. A key design requirement is the use of passive architectural measures as opposed to mechanical smoke management systems, as this approach provides the greatest reliability as well as lowest cost.

An unusual feature of this stadium is that it incorporates an underground service “ring road” below the stadium pitch arena, primarily for access and parking facilities for service and outside broadcast (OB) vehicles. This area is effectively similar to a road tunnel and an effective mechanical smoke extraction system needs to be designed to meet regulatory requirements.

Fires up to 35MW were considered. The fire is assumed to occur within an OB vehicle or similar truck. Various case scenarios were considered, including different fire locations and sizes, different mechanical extraction rates, and with and without the influence of a sprinkler system activated.

The results from the CFD analysis were used to ensure the mechanical extraction system satisfied the criteria of indefinite tenability beyond 60m either side of the fire location and below a vertical height of 2m for temperature and smoke.

