Section 9 - Computer Models

Clause G9.1 Introduction and Overview

The computer-based fire engineering software that is considered to be acceptable will be based on those packages that are used currently in the field of fire engineering, on a common basis and have been well validated. The selection of appropriate computer software will be determined by the authorized person based on appropriate justification and accepted by the Building Authority.

The following aspects should be considered for the selection or use of a software package:

(a) issuing company / institution of the software package;

(b) validation and verification of the package;

(c) availability of the package;

(d) history of use;

(e) applicability;

(f) transparency; and

(g) ease of use.

New software packages will be considered if sufficient evidence and validation material are provided. For all computer-based modelling packages, the authorized person should show that the software is relevant, fit for the purpose, validated and the user is competent. As an example, a spreadsheet program can be utilised for simple smoke modelling to derive extract rates or vent sizes in simple spaces.

The computer models used for fire development to determine sprinkler actuation time or clear smoke height are commonly based on two zones model.

With all computer-based calculations, all input parameters are to be fully and clearly documented and provided with explanatory notes in the FSAR.

Computational fluid dynamic (CFD) analysis software based on field model is the domain of skilled specialists to simulate fire/smoke development with results such as velocity profile and temperature gradient presented in graphic form. They are time consuming to run and are usually used where no other approach appears to be capable of dealing with the complexities of the case. They should be used with caution as the output is highly dependent on the knowledge and skill of the consultant and therefore the results should be verified by appropriate means.

Evacuation time is another simulation field where computer models can be used. Software is used in the simulation of the movement of occupants during evacuation, usually to demonstrate that exit capacity is adequate in a design that is not amenable to simple hand calculation.