

Enclosed shopping complexes present many difficulties for designers of smoke control system to ensure the safe escape of shoppers. A serious fire in most shops can usually be expected to penetrate the shop front and cause hot smoky gases to spread rapidly along the malls, leading to a rapid loss of visibility unless preventive measures are taken.

Work at the Fire Research Station, both with models and with a large-scale facility, has shown that the hot smoky gases which enter a mall can be confined to a ceiling reservoir formed by screens, downstands or other features, provided that the gases are removed from the reservoir by some means and that an equal amount of replacement air is allowed to enter below the main smoke layer.

The lateral spread of smoke on the lower level of a multi-storey mall must be controlled and/or channelled by screens or other features, in order to reduce the size of smoke plume rising through the upper level. This minimises the quantity of gases entering the ceiling reservoir. Such systems for controlling smoke movement provide a smoke-free zone below the main layer through which people can escape.

Such systems are designed to cope with a 5 MW sprinkler-controlled shop fire. Reasons for the choice of this value are discussed.

Principles for designing an efficient system are discussed both qualitatively and quantitatively. Some of the problems likely to occur in practice are described, together with ways of overcoming them.

Design advice is also given for smoke ventilation of basement service levels and for enclosed car parks that might be part of the same complex that includes the malls.