



Welcome to **FireSafe™** Solutions Issue 3, showcasing steel framed retail projects that benefited from the application of performance based Fire Safety Engineering assessments, to provide alternative solutions using bare steel construction that can offer benefits such as:

- Increased Safety Levels
- Reduced Building Costs
- Architectural Flexibility
- Faster Construction

Focus on Shopping and Retail Centres

Modern shopping centres are complex buildings for which it is sometimes difficult to satisfy the Building Code of Australia's (BCA) prescriptive deemed-to-satisfy provisions and achieve the desired functionality. Access between levels is important and this, combined with the desire to have buildings that are more open and connected, means that substantial openings are provided between levels. Traditional "compartmentation" therefore has little meaning and is unlikely to offer much assistance in containing the effects of a major fire. This, combined with the fact that these buildings contain massive quantities of combustibles, means that extremely severe fires could develop within these buildings. Such fires could have disastrous effects due to the associated smoke and heat.

A significant amount of research has been undertaken over the last eight years and supported by funding from OneSteel (and previously BHP Steel) and the Building Commission of Victoria. The original work was undertaken under the guidance of the Fire Code Reform Centre (FCRC) and the results were published in a summary report prepared for that organisation [1]. This report and other detailed reports prepared for the FCRC dealing with aspects of the fire safety of shopping centres are available directly from the website of the Australian Building Codes Board (ABCB). This work was extended following further testing and slightly revised but more complete design and management recommendations were given in the OneSteel publication "Design of Sprinklered Shopping Centres for Fire Safety", 2001 [2]. The essential content of the approach has been described in the technical

paper by Bennetts and Thomas [3]. The advocated design and management approach only applies to low-rise (typically 4 storeys or less), sprinklered shopping centres.

It is important to note that shopping centre buildings are examples of buildings for which there are strong economic motives to avoid a significant fire, and management practices within these buildings are often conducive to achieving this outcome. Examples of these practices are:

Avoiding fire starts

- house-keeping audits
- audits of electrical cabinets (e.g. infrared evaluation)
- residual current protection
- regular replacement of old electrical (light) installations
- maintenance of electrical equipment

Minimising fire size

- camera surveillance within centre (security)
- fire awareness and fire-fighting training for all staff
- sprinkler management policies

None of the above factors are considered in building codes or regulations, yet it is possible that these may have a bigger impact on fire safety than the specific matters addressed by the regulations. In reality, the fire safety of these buildings is a complex function of building management, the reliability of systems, occupant behaviour, smoke management, building layout, fire-fighting facilities and personnel, and the behaviour of the building structure.

It has been found that the achievement of high levels of fire safety will be almost totally dependent on limiting the fire size and providing alternative paths for occupants to move to safer places within the

building. Although it can be argued that such a philosophy could be applied to every building it is particularly critical with such buildings because of their size and interconnectedness. Current deemed-to-satisfy regulations are confused on this matter as they frequently allow smoke exhaust systems to be designed for relatively small fires but the structure (which is only affected locally) is required to have very high levels of fire resistance, suggesting a much more severe fire. The reality is that it will be impossible to design a smoke exhaust system for a major unsprinklered fire - yet testing undertaken as part of the above research has illustrated the fact that such fires are quite possible.

The achievement of high levels of safety in these buildings is actually a risk management exercise where the objective could be taken as eliminating the occurrence of a major unsprinklered fire. This will be achieved through appropriate design and through proper management of the fire-safety systems. Therefore fire-safety practitioners must have a significant input into developing and maintaining appropriate management practices and procedures. Under these circumstances it can be argued that the design fires appropriate to all fire-safety systems (including the building structure) should be sprinklered fires.

The buildings described in this booklet have been mostly based on the recommendations of the above publications. These buildings include two shopping centre complexes in Adelaide – West Lakes Mall redevelopment and Norwood shopping plaza, Adelaide airport redevelopment since this building contains significant retail and Rhodes Shopping Centre in NSW.

Would you like to find out more?

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REFERENCES

1. Fire Code Reform Centre, "Fire Safety in Shopping Centres", Final Research Report, Project 6
2. OneSteel/BHP Special Publication, "Design of Sprinklered Shopping Centres for Fire Safety", 2001
3. Bennetts, I. D. and Thomas, I. R., Design of Sprinklered Shopping Centre Buildings, Journal of Fire Protection Engineering, Vol 12 No. 4, 2002, Society of Fire Protection Engineers