



CSR Building Products takes a stand on Bush Fire Shelters

In light of the recent bushfires that devastated parts of regional Victoria, building standards have been revised to better protect communities and ensure new homes are built to incorporate improved fire protection. The updated Australian Standard AS3959-2009 Construction in Bushfire Prone Areas was introduced in Victoria on March 11, 2009, this latest code details requirements for construction in six Bushfire Attack Level (BAL) categories from low to extreme risk. While the intent of the Bushfire Construction code is to limit property loss & loss of life due to bushfires, it can not ensure the survival of property or people when exposed to bushfire events. Compliance with AS3959-2009 will delay and in most cases reduce the likelihood of ignition during a bushfire, however it remains to be seen if these standards will result in a reduction in the loss of property and life when the most extreme bush fires strike such as those that ravaged Victoria in February 2009.

In the event that the main dwelling is constructed to comply with AS3959-2009, there is a small but significant risk that the internal conditions within the main dwelling may not provide suitable environment for the duration of the bushfire exposure conditions, for example the likelihood of ingress of smoke into the dwelling is high due to the many door and window openings in a conventional house.

One area that has not been resolved or legislated is the concept of individual Bush Fire shelters for people living in bushfire prone areas. There has been discussion at the recent royal commission into community bush fire shelters but this is not a practical solution for everyone living in remote and rural areas mostly due to the increased risk of traveling to the shelter location. Add to this the controversial issue (which has sparked much public debate) of Stay and Defend your property, or leave early and evacuate (Stay or Go) and you have a topic which seems unlikely to be resolved in the short term.

The reality is some people will choose to stay and defend their property. There will also be families who simply will not be able to evacuate due to the tyranny of distance and rural roads that are not adequate for mass evacuations before a fire strikes. In these cases people need better protection than what is currently available.

In the first two weeks after black Saturday CSR Hebel® receive numerous calls from people asking if they could design and build a bush fire shelter from Hebel® PowerBlock™ and Panels. The reason for this says Hebel's Marketing Manager Paul Mooney Hebel® has long been known for its thermal, acoustic and Fire properties, it simply will not burn and provides an outstanding barrier against the intense heat from a bushfire. Many people that were familiar with Hebel's excellent fire ratings immediately made the connection, Hebel® is the ideal choice.

CSR then set about designing and engineering a Bush Fire shelter which could provide protection during the short yet intense conditions of a bush fire. An independent fire engineering consultant assisted CSR to define the exposure conditions that a shelter would have to withstand along with the internal conditions required to provide a tenable environment. CSR then proceeded to design a shelter to meet these requirements, the final design is a simple structure using 200mm Hebel® PowerBlock™ and 150mm Hebel® Roof

Panels. All components used in the shelter are non combustible and have been tested in accordance AS 1530.4.

It should be noted that due to the extreme and unpredictable nature of bushfires and human behavior in a bush fire, a bushfire shelter is design to increase the chances of survival during a bushfire. An extract from CSR's specification reads:

In many cases there may be NO SAFE PLACE when a bushfire is imminent in the immediate local area and late evacuation is considered more dangerous than staying with your property. When a Stay and Defend decision has been made, the bushfire shelter is designed to provide an improved level of safety for occupants.

If people decide to stay then they should have a shelter that has been design to withstand the conditions said Mooney. While the shelter can not be guaranteed to prevent loss of life due to many variable factors such as human behavior for example, it has been designed and engineered to improve the level of safety in bush fire conditions.

1 CSR Hebel Bushfire Shelter – Specification

The CSR Bushfire shelter is designed to provide an environment within the shelter during a bushfire that increases the chances of survival of bushfire attack. Survival however cannot be guaranteed due to many varied factors including but not limited to the behaviour of the occupants, physical & mental health of the occupants and the ferocity of the particular bushfire.

The shelter may be used as an individual command centre for the inhabitants of the property on which the shelter is located. It is not intended as a community based bushfire shelter, where residents need to travel to the shelter. The shelter is designed to comfortably accommodate up to 8 adults.

In general where it is deemed safe to evacuate prior to a bushfire, young, weak and frail people should be evacuated to a safe area, more able bodied people may also choose to evacuate. In any case evacuation should always be done early.

In many cases there may be NO SAFE PLACE when a bushfire is imminent in the immediate local area and late evacuation is considered more dangerous than staying with your property.

When a "Stay and Defend" decision has been made, the bushfire shelter is designed to provide an improved level of safety for occupants.

The long term performance of the shelter is subject to suitable maintenance of the shelter and its systems.

1.1 Bushfire Exposure Conditions

The anticipated bushfire exposure conditions external to the shelter have been developed by a leading fire engineering consultancy and include:

- | | |
|---|-------------------------|
| ➤ Peak Radiation levels (10 min duration) | 100 kW / m ² |
| ➤ Background Radiation levels | 25 kW / m ² |
| ➤ Convective Flux | 25 kW / m ² |
| ➤ Differential Air Pressure (above standard wind pressures) | 200 Pa |
| ➤ Total required duration of occupancy | 30 minutes |

1.2 Tenability Criteria – Internal Shelter Environment

The required environmental conditions within the shelter have been specified to limit the risk of heat stress in occupants and to maintain suitable levels of respirable air. The conditions include:

- | | |
|---|--|
| ➤ Temperature (ambient is higher) | < 40° C (not always possible if ambient is higher) |
| ➤ Relative Humidity | < 50% |
| ➤ Peak radiation received by occupants | < 2.5 kW / m ² |
| ➤ Carbon Monoxide (<1,000m above sea level) | < 225 ppm |
| ➤ Visibility | 10 metres |
| ➤ Air Movement (near occupants) | > 0.75 m/s |

1.3 Design Requirements

The bushfire shelter design and construction is to comply with the BAL-FZ requirements of AS3959-2009 the bushfire construction code. This bushfire shelter construction specification has been prepared with the view that the requirements of the bushfire code shall be exceeded where possible.

This specification aims to provide a tenable environment for the occupants of the shelter during a bushfire attack in accordance with the requirements detailed in sections 1.1 and 1.2 above.

Just a few weeks after February bushfires it emerged that a house in Steels Creek VIC built using Hebel® PowerBlock™ survived the bushfire. The story was printed on the front page of the age newspaper in Melbourne. The phones started to ring again said Mooney. This was not the first time it had happened either. A fire in California destroyed an entire hill side community, leaving just one house (constructed from Hebel® PowerBlock™) surrounded by charred vacant lots.

It is important to note that Hebel® is only one piece of the puzzle. The main danger of building ignition is presented by embers and wind pressure penetrating openings. Hebel® will not burn but must be used in conjunction with a complete bush fire resistant building design and bush fire action plan.

Hebel® PowerBlocks and panels are non combustible and construction systems using Hebel® have been tested at CSIRO to achieve excellent fire ratings. Also known as Autoclaved Aerated Concrete this unique material delivers the right balance between thermal insulation and mass being used by a growing number of builders and architects in Australia for nearly 20 years and in Europe for over 60 years.

CSRs first response was to support a small number of people who lost their homes and were not adequately covered by insurance.

CSR has teamed up with Habitat for Humanity Australia (HFHA), a not-for-profit home ownership organisation project to help rebuild homes for families affected by the Victorian bushfires, Leading brands from CSR such as Bradford Insulation, Gyprock plasterboard, Cemintel fibre cement and Hebel, have all donated enough product to rebuild 12 homes. CSRs suppliers have also assisted by proving accessories, transport and storage for the materials. These suppliers include Faststud, Bremick Fasteners, Christensen Engineering, Ardex, Wettenhalls Transport and Dulux.

Hebel® is Australia's leading manufacturer of AAC. It delivers the benefits of traditional masonry such as strength, fire and pest resistance but with a unique cellular structure. Hebel® provides excellent acoustic and thermal insulation helping to minimise the use of artificial heating and cooling systems. When used in houses that are designed using passive solar principles, heating and cooling may not be required at all.

For more information on Hebel® and its products, visit www.hebelaustralia.com.au