

# Message-matrix

December 2008

## On the fire scene this month

### Pyrotron - new ways to burn stuff (all in the name of science)

CSIRO has unveiled its new toy, a 25 metre long fire-proof wind tunnel with a working section for conducting experiments and a glass observation area. The Pyrotron will be used to study the combustion and spread of fires in bushfire fuel under controlled conditions.



The tunnel is located in Canberra. Wouldn't it be fun to pull some strings to visit it!

<http://www.csiro.au/places/Pyrotron.html>

### It's still all go in the US

The huge bushfires in California last month have caused another potential disaster for residents. A large storm in the area is causing concern that mudslides may occur where the vegetation has been destroyed by the bushfire. Hundreds of homes have been given mandatory evacuation orders.

<http://news.theage.com.au/world/us-mudslide-threat-forces-evacuations-20081216-6z5m.html>

### Bushfire, the game....

Bushfire, Published by Single Brain Cell. Of course, it is for Mac.

Guide fire fighters to fight fires around urban areas. Work from a map of hexagonal units, varying from 10 x 10 to 100 x 100 in size. Units show different types of terrain (which burn more or less easily) and lakes (which cannot be crossed).

Age Group: Age 8 and Up

License: free to try, \$5 to register

[http://forums.info-mac.org/search.php?](http://forums.info-mac.org/search.php?keywords=bushfire)

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## Heat Shields and Barriers

Heat shields and heat barriers (I am going to call them all barriers from now on, despite there being some cause for distinction) are materials or coatings which offer protection from radiant heat and/or direct flame contact. In bushfires they can be used to reduce the risk of bushfire damage (or destruction) to houses, sheds, people, animals and other valuable assets.

Heat barriers need to be strategically placed so they are between the flames and the object being protected. There are many different options for types of barriers both permanent and temporary. This little report will focus mainly on house protection and research and products relevant to Australian conditions.

An important thing to be remembered with all property modifications and equipment used in bushfire protection is that there is no guarantee the property will be safe. Generally a house will still require people to be present to ensure spot fires from embers are extinguished. However, it is useful to reduce the risks house and property loss as much as possible from ember and flame attack and radiant heat regardless of intention to stay or leave. It may make the job of defence easier and increase the chances of house survival if no one is there to defend it.

#### *Permanent Barriers*

These barriers are (obviously) are permanent features of a house or property, they can't be moved and are part of the overall design of the property. Often they will have multiple purposes and providing protection in bushfire may not be the primary function. Examples of permanent barriers include fences, window shutters, strategically placed walls and tree wind breaks.

#### *Temporary Barriers*

Temporary barriers are those which can be added to the as protection to the property when there is a bushfire threat and then removed again. These may be covering particular areas with flame/heat resistant materials (wood, foil) or spary on water based solutions (gels and foams).

Some bits and pieces of interesting information....

**Vegetation** is cited in many publications as useful as a barrier and also a wind break to change the course of the wind, directing embers over the top of the house. I wasn't able to find any specific detail on constructing an effective vegetative barrier. Mention of how to structure the vegetation (location, quantity, management) is made. The type of vegetation is also relevant in regard to how flammable they are and the shape they form in maturity, but again I couldn't find a useful species list. I have a neat picture, but I can't work out how to copy it into the doc....

**Windows** are the most vulnerable features of a house exposed to bushfire attack.

AS 3959 specifies wire mesh on all opening windows including louvres. This reduces, to some extent, the levels of radiant heat impacting on the glazing and, if the glass cracks and falls away, it can help prevent wind-borne burning debris from entering the building. It is, however, less effective on the inside of hopper windows, it is difficult to fit on non-opening sashes, especially with aluminium windows, and it impairs the view from picture windows.

Shutters can provide superior protection for windows, including protection from objects carried by the wind. Shutters, however, need to be closed to be effective. Optimum protection is provided by shutters (hinged or roll-down) that are made from materials which are not combustible, such as aluminium or steel. As well as protecting the glazing, shutters usually cover and protect window sills. This is of considerable advantage in the case of timber window sills which, like all horizontal timber elements of a house, are vulnerable to ember ignition.

for more information see Leonard, J and Anderson, K. (no date) CSIRO newsline (online), <http://www.csiro.au/newsline/featureArticles/text/BushfireBuilding.txt>

**Fences** may act as a barrier, however the effectiveness depends on the building material and how they are constructed (ie, gaps in fencing allow flame, embers and radiant heat to penetrate). Leonard et al (2006) looked at the performance of different fencing types in bushfires and (not surprisingly) concluded a steel fence was your best bet. Best to read the paper though. J.E. Leonard, R. Blanchi, N. White, A. Bicknell, A. Sargeant, F. Reisen and M. Cheng (2006) Research and Investigation into the performance of residential boundary fencing systems in bushfires. Bushfire CRC Melbourne.

Recommendations on the potential and limitations of fencing systems made from non-combustible materials to act as radiant heat barriers are included in several publications [Ramsay & Rudolph 2003; CFS SA & DEAP 2004; CFA & MPEV 1990]. These recommendations are of a general nature. Some specific recommendations are included in the NSW RFS & Planning NSW [2001] *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners*. To be able to infer these recommendations, some understanding and interpretation of the structural forms (Class A–F and Types 1–28) of Australian vegetation is required. These may be broadly summarised as grassland, woodland and forest.

The specific recommendations are:

- Radiant heat barriers are suitable for grassland and other similar vegetation situations.
- Radiant heat barriers are less effective for forest and woodland situations where flame heights can be anticipated to be larger than grasslands.
- Heat barriers are unlikely to be effective against burning debris.
- Fencing systems, which serve as heat barriers, provide limited protection from radiant heat to windows.
- Fencing systems should not be relied upon to reduce the need for setbacks or construction standards.
- Fencing systems should be located within about 5 m of the house and should be up to 2 m high to cover most windows and doors on the side facing the bushfire hazard.

**Products on the market** (admatrix- although we don't endorse them, unless they make it worth our while)

*Wildfire Protection Services* manufacture Radiant Heat & fire Shields to protect your windows, doors or any other vulnerable areas of your home from ember attack through to the intensity of the fire front of the bushfire, holding back more than 1000°C and more than 40kW / m2 of radiant heat from destroying your property, while making your home a much safer shelter from the bushfire. They comply with AS3959 for the construction of homes in bushfire prone areas.

<http://www.wildfireprotection.com.au/>

*Bluescope Steel* and *Colorbond* can provide protection from both radiant heat and ember attack. CSIRO has done a number of studies on their products, such as the fence test mentioned above. Not surprising really.

[www.bluescopesteel.com.au/](http://www.bluescopesteel.com.au/)

Themogel and Thermofoam are products which can be sprayed directly onto the house to provide protection from bushfire attack. They can they be washed off. There is a pretty cool youtube video showing the effectiveness of Themogel as tested by CSIRO on their website.

[www.thermogel.com](http://www.thermogel.com)

**Have a super duper Christmas and New Year Terracrew!**