Background briefings on emerging issues for fire managers from AFAC and Bushfire CRC.

bushfire CRC

AUSTRALASIAN FIRE AUTHORITIES COUNCIL

FIRE NOTE

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GUIDANCE FOR PEOPLE IN VEHICLES DURING BUSHFIRES

AFAC'S BEST PRACTICE GUIDELINES AND THE BUSHFIRE CRC'S CURRENT RESEARCH

In December 2005 the Australasian Fire Authorities Council (AFAC), in collaboration with the Australian State and Territory fire agencies, released a 'best practice' guideline for members of the public using vehicles during bushfires.

The guideline is aimed at providing advice on how members of the public can minimise the level of risk if they are in vehicles during bushfires. Research conducted by AFAC, its member fire agencies and the CSIRO has found that any member of the public who finds themselves on the road during a bushfire, stands a better chance of survival by taking shelter inside their vehicle, rather than fleeing on foot.

The AFAC position is one taken against an historical backdrop of past fires where fatalities have occurred when members of the public have attempted to flee a vehicle during a bushfire. Two prominent examples of this occurred during the Eyre Peninsula fire (2005) – where eight of the nine fatalities were found in or near vehicles – and the Lara fire (1969) – where seventeen people who abandoned their vehicles died whilst at least six people who chose to remain inside vehicles survived.

Current research being undertaken by the Bushfire CRC, which is also detailed below, may in time result in modifications to the current AFAC guideline.

AFAC'S 'BEST PRACTICE' GUIDELINE FOR PEOPLE IN VEHICLES DURING BUSHFIRES

SECTION ONE - INTRODUCTION

Aim

This best practice guideline establishes guidance for people in vehicles during bushfires to be promoted by fire agencies and by other associated emergency services and relevant public bodies.

Preamble

It has been widely established that staying with a well prepared home or evacuating/relocating well in advance of the fire threat are the best survival options during a bushfire. History has shown that many of the fatalities which have occurred have done so when people have been caught on the road, either on foot or in vehicles. The Tasmanian Bushfire (1967), Lara Bushfire (1969), Ash Wednesday (1983) and most recently the Eyre Peninsula Fire in January 2005 have all illustrated this.

Eight of the nine fatalities on the Eyre Peninsula were found in or near their vehicles. Reinforcement of the message that last minute evacuation can potentially be a deadly option is clearly a part of the ongoing education of communities. However, there are some people who are potentially more likely to be out and about during a bushfire and who may be confronted with the dilemma of what they should do.

PEOPLE AT RISK

There will inevitably be residents who have not heeded the advice to have a bushfire plan in place and decide to evacuate at the last minute, or who have made a plan but change their mind when confronted with the situation and decide to flee. In addition, there may be people unfamiliar with the area, such as tourists and visitors, who inadvertently expose themselves to the dangers. Further, there are those who may be more at risk of being caught on the road during a bushfire due the nature of their work. This category includes employees of utility companies and farmers.

SHELTERING INSIDE A VEHICLE

Research and investigations into fatalities in grass and wildfires have shown that many occur when people have been caught on the road in their vehicles (e.g. Krusel & Petris, 1992). People have either fled their vehicle on foot, or tried to drive through the thick smoke and flames which has resulted in accidents and vehicles getting stuck and entrapped. In contrast, many of those who have survived being caught out on the road during a bushfire have sheltered inside their vehicle until the fire front passed and it was safe to get out. This was well illustrated by the Lara bushfire when motorists on the Melbourne-Geelong Freeway were confronted with a fast moving grassfire. Seventeen people abandoned their vehicles and died whilst at least six people sheltered in their cars and survived.

SUMMARY

Where a member of the public is caught on a road during a bushfire, AFAC suggests the following general guidelines should be followed to help minimise the level of risk:

- Whilst travelling, dress in suitable non-synthetic clothing and shoes and always carry woollen blankets and a supply of water.
- Know the local bushfire warning system (such as your local ABC radio station) and tune in accordingly when travelling.
- If you see a bushfire in the distance, carefully pull over to the side of the road to assess the situation. If it is safe to do so, turn around and drive to safety.
- If you have been trapped by the fire it will be necessary to find a suitable place to situate the car and shelter from the intense radiant heat. Find a clearing away from dense bush and high ground fuel loads. If possible, park behind a natural barrier such as a rocky outcrop. Position your vehicle facing towards the oncoming fire front. Park your vehicle off the roadway to avoid collisions in poor visibility. Don't park too close to other vehicles.
- Stay inside your vehicle – it offers the best level of protection from the radiant heat as the fire front passes.
- Turn headlights and hazard warning lights on to make the vehicle as visible as possible.
- Tightly close all windows and doors.
- Shut all air vents and turn the air conditioning off.
- The engine may be left running to enable the headlights to continue to operate and not flatten the battery.
- Get down below the window level and shelter under woollen blankets.
- Drink water to minimise the risks of dehydration.
- Stay in the vehicle until the fire front has passed and the temperature has dropped outside.
- Fuel tanks are very unlikely to explode.
- As the fire front approaches, the intensity of the heat will increase along with of smoke and embers.
- Smoke gradually gets inside the vehicle and fumes will be released from the interior of the car. Stay as close to the floor as possible to minimise inhalation and cover your mouth with a moist cloth.
- Tyres and external plastic body parts may catch alight. In more extreme cases the vehicle interior may catch on fire.
- Once the fire front has passed and the temperature has dropped cautiously exit the vehicle. (Be careful - internal parts will be extremely hot.)
- Move to a safe area e.g. a strip of land that has already burnt.
- Stay covered in woollen blankets, continue to drink water and await assistance.

However, even sheltering inside a vehicle is a high risk strategy as research into vehicle survivability has shown. There are many factors which come into play which can make survival very difficult in certain situations. Not least the increased use of plastic in vehicle manufacture, which appears to reduce the level of protection afforded by many new model vehicles. It is worth noting that much of the advice currently provided to the general public is based on the experiences and tests on older style passenger vehicles (Cheney, 1972) or fire fighter vehicle burnover tests. Therefore, it is with extreme caution that people should be advised to take refuge in their automobile. Whilst they offer a higher chance of survival than being caught in the open, existing stay or go strategies are much safer options to follow and it is essential all people likely to be exposed to the bushfire risk realise this.

GUIDELINES FOR SHELTERING IN A VEHICLE

Recognising that there are groups, as previously identified, who may find themselves in a vehicle during a bushfire necessitates the development of key messages that help to minimise the danger to them (Section Four). These key messages were derived from a refinement of the best existing advice and research. It is intended that CSIRO's ongoing work into technical aspects of vehicle survivability will help to validate or amend this interim position as their results become available.

The requirements for utility companies and their contractors are different from that of the general public. Under the instruction and accompaniment of the fire service, they are often the second people on the scene of a bushfire to reconnect communications and carry out other essential work. As such there are greater chances of them being caught by a fire whilst responding to an incident and therefore the employees need additional skills and training for such eventualities. The key messages outlined in this paper focus on information for the general public. Whilst there is considerable overlap, the specific needs of utility companies are also addressed in the Section Five of this paper.

The suggested key messages attempt to dispel any misconceptions that the public may have about the safety or otherwise of sheltering in a vehicle. For example, fears of fuel tanks exploding which prompt vehicle abandonment are not well founded in reality, despite what may be reported in the media. However, there are sizeable risks involved in sheltering in a vehicle during a bushfire that mean survival is by no means guaranteed, especially in moderate to high-intensity bushfires. As such the public need to understand the inherent dangers of being out on the road in a bushfire but also the actions that need to be taken to maximise their survival chances.

SECTION TWO - GUIDELINES

There are a multiplicity of factors and scenarios that impact on the chances of survival in a vehicle during a bushfire. These include the size of the fuel load, topography, type of fire (low intensity grass fire through to high intensity forest fire), the type of vehicle (its exterior and interior design and materials) and the amount of time there is to prepare. However, if someone is caught on the road during a bushfire the following general guidelines may help to minimise the level of risk.

TRAVELLING DURING THE BUSHFIRE SEASON

People should avoid unnecessary journeys in areas where bushfires are burning, and always check that it is safe to travel the intended route before leaving. People should be cautious when driving into areas where the fire danger is high to extreme. People need to know who the local emergency services broadcaster is and keep up-to-date with the information being provided about a fire's progress and any related road closures. They should pay attention to fire danger warnings, postponing journeys or finding alternative safe routes if necessary.

During the bushfire season carrying a supply of water on journeys and keeping woollen blankets in the vehicle (at least one for each passenger) is recommended. These items ought to be readily accessible so that they can be utilised immediately if the need arises. Dressing in suitable non-synthetic clothing and shoes is also advisable.

ENCOUNTERING SMOKE OR FLAME

If confronted with smoke or flames whilst on the road a driver should stop as soon as it is safe to do so and immediately turn on the vehicle's headlights and hazard warning lights. The likelihood of having an accident or running off the road is high if they continue to drive through smoke or flames. Accidents can not only prove fatal but jeopardise the shelter a vehicle can provide in a bushfire. Taking a few moments to assess the situation and make a rational decision about the safest course of action can make all the difference. Even if the smoke is in the distance, or can only be smelt in the air, it is vital to pull over and determine how to proceed.

If it is possible, it is best to u-turn and drive away from the danger. However, there may be occasions where the fire front is getting too close and in this situation it is better to look for the safest place to park the vehicle.

POSITIONING THE VEHICLE

It is essential to park away from high ground fuel loads, overhanging branches and dense vegetation. Ideally, a non-combustible surface such as gravel or a dirt track in a clearing offers the best location. Care should be taken not to leave the vehicle on the roadway as it increases the risk of collisions with other vehicles.

Use could also be made of local features such as natural or constructed barriers. For example, parking behind a solid brick object or a natural feature (e.g. a rocky outcrop) will shield the vehicle from the radiant heat. If there are other vehicles nearby it is best not to park too close to them in case one vehicle does become engulfed by flames. This additional flame contact and radiant heat exposure could hasten the demise of nearby vehicles.

Positioning the vehicle towards the oncoming fire front offers a couple of possible advantages. Firstly, if the fuel tank vents then the vapours will be blown away from the vehicle. Secondly, it reduces the amount of window surface exposed to the oncoming fire, thus reducing heat soak into the car and the possibility of glass breaking (the windscreen is tougher than the side windows).

ACTIONS TO TAKE INSIDE THE VEHICLE

Once a satisfactory location has been found it is necessary to prepare for the approaching fire front.

Windows and doors should be tightly shut. Whilst entry of smoke into the vehicle is inevitable, the rate at which is occurs is reduced by ensuring all windows and doors are secured. Furthermore, it helps to prevent embers entering the vehicle and setting alight to the interior of the vehicle which could force people to leave the vehicle before it is safe to do so.

The car vents should be closed. Vents are another avenue for smoke ingress into the vehicle and therefore need to be shut. Some existing advice recommends leaving air-conditioning in the recirculate mode to keep the interior of the car as cool as possible. However, as radiant heat passes through the car it will be recirculated inside the vehicle negating the beneficial effect of lower temperatures at ground level where occupants need to shelter. Therefore, it is best to switch air-conditioning off completely.

Drivers may leave the engine running to enable headlights to continue to operate without flattening the battery.

Passengers need to get down as low as possible below the window level. It is essential to minimise exposure to intense levels of radiant heat. Therefore, people need to remain below the window level and covering their bodies with a woollen blanket to put a shield between themselves and the radiant heat. Extra care needs to be taken if there are multiple occupants in the vehicle which may make it harder to shelter safely. There may be additional protection from the radiant heat by using any spare woollen blankets to cover the windows on the side facing the oncoming fire front. However, the benefit of this could be negated by the effect of re-radiation on the window making the window more likely to break. Likewise, further investigation of the re-radiation effect of silver heat shields and the toxicity of fumes given off by them is required before the true benefits or dangers can be determined.

Water should be drunk if possible to avoid dehydration. The high temperatures people would be exposed to in a vehicle during a bushfire make them susceptible to dehydration. Therefore keeping fluid intake up is very important.

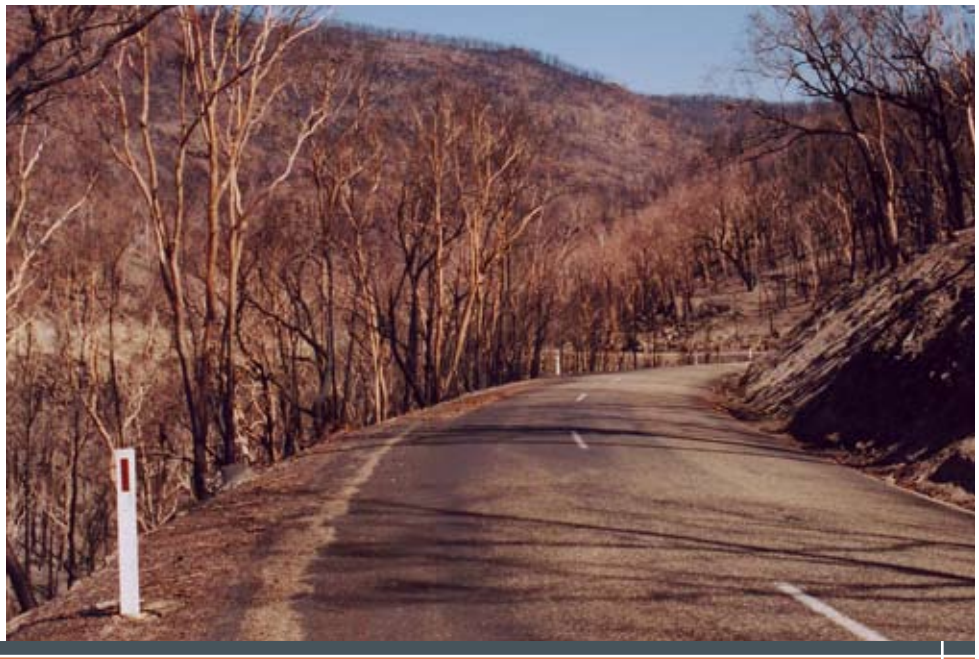
WHAT TO EXPECT AS THE FIRE FRONT PASSES

Conditions in the vehicle will be uncomfortable as the fire front nears. The heat level will rise and the strong winds may rock the vehicle violently. The time it takes for the fire front to pass varies depending on the intensity of the fire and the amount of fuel surrounding the vehicle. It might be considerably longer in the case of a high intensity forest fire.

During this time entry of smoke into the vehicle will occur, plus interior components may begin to give off fumes due to the intense heat. The windows may break either from the heat or from flying debris. It is also possible that the tyres and parts of the bodywork may catch alight.

The fuel tank is very unlikely to explode in the time needed to shelter in the vehicle although it may vent (particularly LPG tanks). As the vehicle fills with smoke and fumes people may need to breath through a moistened cloth to avoid excessive inhalation. However, it is essential to stay inside the vehicle until the temperature has subsided outside.

When the heat level has dropped it is time to leave the vehicle. Whilst remaining low in the vehicle, cautiously raise a hand to determine whether the heat level has dropped sufficiently. As an indicator, anything hotter than the heat sensed when skin is badly sunburned is too hot. When the heat is at a bearable level and people leave the vehicle, it is important to be aware that door handles and internal parts will be extremely hot. Once outside people need to stay covered up in the woollen blankets and make their way to a safe place to await assistance, an already burnt piece of land in a clearing is the best option.



SECTION THREE – RELATIVE LEVELS OF RISK

In relative terms, a well prepared property offers a far higher degree of shelter from radiant heat and other dangers than being in a vehicle during a bushfire. However, anyone who does find themselves on the road during a bushfire stands a better chance of survival sheltering inside their vehicle than fleeing on foot. Driving through thick smoke or flame is extremely risky due to the likelihood of having an accident. Therefore, stopping the vehicle in a clearing and following the guidelines as laid out in this paper is a safer course of action but not without inherent risks. There are a wide range of permutations that may inhibit survival chances in a vehicle, some of which are considered in the proceeding paragraphs.

FIRE INTENSITY AND FUEL LOADS

Levels of radiant heat have been found to become unbearable and force people to leave their vehicles in medium and high intensity forest fires. There is a far higher chance of successfully sheltering in a vehicle during a grass fire or low intensity forest fire where flame heights are relatively small (Cheney & Budd, 1984: 4). This is provided that the vehicle is not surrounded by large fuel loads. High fuel loads will result in more intense radiant heat levels that persist for a longer period of time and fuel the combustion of the vehicle (Cheney & Sullivan, 1997: 87). The net result can be that people cannot safely leave the vehicle for a considerable period of time after the fire front has passed. This prolongs their exposure to radiant heat, high levels of smoke inhalation and toxic gases from synthetic materials in the vehicle. The fire is also more likely to take a hold of the vehicle, with tyres and door seals igniting first, and the persistence of the flame contact leading to destruction of the vehicle. Fire fighting vehicles do not provide survivable conditions in all high intensity bushfire burnover situations (Nichols et al., 2005). Therefore automobiles, that do not have any of the added safety features of fire fighting vehicles, are even less likely to provide shelter in high intensity fires.

Topography can have a large influence on the survivability of a vehicle. Stopping on a steep slope or in a gully adds to the risks and may not be avoidable in some areas (Rogers, 1985: 19). As such, there are scenarios where the topography and volume of fuel may make survival virtually impossible (Cheney & Budd, 1984: 4), even if the guidelines are followed. The small likelihood of finding an adequate clearing to situate a vehicle in a densely forested area can also make survival very difficult. Based on risk assessment, people residing in such areas must understand that this is the reality of their situation and a suitable bushfire plan needs to be developed. Visitors, tourists and rural workers should avoid these areas during bushfires.

DIFFERENT VEHICLE TYPES

Vehicle manufactures increasingly substitute steel for plastic on the bodywork of cars. Plastic bumpers, grills, wing mirrors and other exterior components are likely to ignite more easily than the steel parts used on older model vehicles. The flammability of synthetic materials utilised inside the vehicle may also limit the time a person can shelter inside the vehicle. In addition, the use of synthetic materials such as polyurethanes in automotive manufacture brings an increased risk of exposure to toxic fumes inside the vehicle which may render it uninhabitable before it is safe to leave (Mangan, 1997: 21). There may also be longer-term health implications, for example the exposure to carcinogens.

Other materials that are replacing steel in the manufacture of vehicles include aluminium, fibreglass and composite materials. All three provide less protection from the intense radiant heat and flame contact than older steel chassis vehicles. These materials are particularly used in high performance cars and may well contribute to their destruction by fire. Two further categories of vehicles that do not provide adequate protection in a fire are soft top vehicles and motorcycles.

A further trend in some newer models of car is the increased size of windows. The danger this presents is that a larger surface area of glass in the vehicle increases the radiant heat exposure to the passengers (Paix, 1999: 1). It also makes it harder to shelter safely when there are multiple occupants in the vehicle or the vehicle is heavily loaded with luggage as may be the case with tourists or people evacuating late. Trailers, horse floats and so on may also make it more difficult to locate the vehicle in the most suitable place.

To conclude, the relative level of risk depends on a whole range of factors which are often impossible to mitigate. Therefore, whilst a vehicle can provide adequate shelter in certain conditions and is preferable to being caught outside, there is no guarantee of survival given the range and complexity of the scenarios and circumstances that can eventuate.

SECTION FOUR –

SUGGESTED KEY MESSAGES FOR THE GENERAL PUBLIC

- Being out on the road during a bushfire is extremely dangerous – last minute evacuations are a deadly option.
- A well thought out **bushfire plan**[1] is vital for all residents in bushfire prone areas. Plan to remain with your home and defend it, or relocate to a safe area well before the fire is expected to arrive.
- Travel in the country during the bushfire season needs to be done with extreme caution and vigilance.
- Always carry woollen blankets and a supply of water in the vehicle. Dress in suitable non-synthetic clothing and shoes.
- Know the **local bushfire warning system**[2] and tune in accordingly when travelling.
- If you see a bushfire in the distance, carefully pull over to the side of the road to assess the situation. If it is safe to do so turn around and drive to safety.
- If you have been trapped by the fire it will be necessary to find a suitable place to situate the car and shelter from the intense **radiant heat**[3].

There are a whole range of factors that may impact on survival chances, the following guidelines may help to minimise the level of risk:

POSITIONING YOUR VEHICLE

- Find a clearing away from dense bush and high ground fuel loads.
- If possible minimise exposure to radiant heat by parking behind a natural barrier such as a rocky outcrop.
- Position vehicle facing towards oncoming fire front.
- Park vehicle off the roadway to avoid collisions in poor visibility.
- Don't park too close to other vehicles.

ACTIONS TO TAKE INSIDE YOUR VEHICLE

- Stay inside your vehicle – it offers the best level of protection from the radiant heat as the fire front passes.
- Turn headlights and hazard warning lights on to make the vehicle as visible as possible.
- Tightly close all windows and doors.
- Shut all the air vents and turn air conditioning off.
- The engine may be left running to enable headlights to continue to operate and not flatten the battery.
- Get down below the window level and shelter under woollen blankets.
- Drink water to minimise the risks of dehydration.

WHAT TO EXPECT AS THE FIRE FRONT PASSES

- Stay in the vehicle until the fire front has passed and the temperature has dropped outside.
- Fuel tanks are very unlikely to explode.
- As the fire front approaches, the intensity of the heat will increase along with of smoke and embers.
- Smoke gradually gets inside the vehicle and fumes will be released from the interior of the car. Stay as close to the floor as possible to minimise inhalation and cover mouth with a moist cloth.
- Tyres and external plastic body parts may catch alight. In more extreme cases the vehicle interior may catch on fire.
- Once the fire front has passed and the temperature has dropped cautiously exit the vehicle. (Be careful - internal parts will be extremely hot.)
- Move to a safe area e.g. a strip of land that has already burnt.
- Stay covered in woollen blankets, continue to drink water and await assistance.

1. *Link to relevant agency information regarding stay or go.*
2. *Link to relevant agency information about emergency services broadcaster, e.g. ABC local radio.*
3. *Link to agency information about the dangers of radiant heat.*

SECTION FIVE – ADDITIONAL SUGGESTIONS FOR CONTRACTORS OF UTILITY COMPANIES

Utility companies and their contractors play an important role in the aftermath of bushfires reconnecting essential services such as communication lines. Many exchange facilities, pipelines and other facilities are located in remote bushfire prone areas. The utility companies already work closely with fire services as part of their incident management structure to deal with incidents as and when they arise. Under the instruction and guidance of the emergency services they are often second on the scene of a bushfire which brings with it a higher risk of being caught on the road in their vehicles. The general key messages as drawn up for the public is largely applicable. However, given their greater immediacy of exposure to the bushfire affected area, there are some additional guidelines to add.

- **Training** - employees should complete a training module with their fire agency to help them recognise the signs of bushfire risk and be more able to deal with any situations that arise. Increased awareness and understanding of safety issues on the fire ground and general bushfire behaviour are a major component of this. In addition, gaining a wider appreciation of the roles and responsibilities of the fire services and how their work can be carried out safely in the context of the overall Incident Management structure is very important. Total compliance with the fire services helps to minimise the chances of an employee of a utility company getting caught on the road by a fire.
- **Briefing** – getting the most accurate and up to date information before entering or leaving vulnerable or remote areas at times of high fire risk is essential. The importance of good communications is all the more vital in the context of the remote areas where utility facilities can be located. Abiding by the safety rules and following the advice from the fire services minimises the risk of being caught on the road.
- **Equipment** – employees should carry appropriate personal protective equipment in their vehicles that would help to maximise survival chances if their vehicle does become entrapped by a bushfire.

AFAC'S 'BEST PRACTICE' GUIDELINES FOR PEOPLE IN VEHICLES DURING BUSHFIRES AND RELATED BUSHFIRE CRC RESEARCH

The Bushfire CRC is currently conducting several projects which are designed to enhance community safety during bushfires. Particularly relevant projects to the AFAC Guideline for people in vehicles include;

PROJECT C6 – EVALUATION OF THE STAY AND DEFEND OR GO EARLY POLICY'.

The essence of a related AFAC policy ('Stay and Defend or Go Early') is that people should prepare themselves and their properties and stay and defend when a bushfire is likely, or leave the area well before the fire is likely to arrive.

This research project is working to identify impediments to the effective implementation of this related AFAC policy, and to suggest improvements. In addition, the project is examining ways of integrating the policy with other important factors in bushfire risk management. The project has compiled the evidence base for the policy and has documented the associated legal situation across Australia. The legal aspects are complicated because of the number of jurisdictions involved, the range of relevant fire and emergency service legislation, and the recent changes through legislation to the law of negligence. The global literature on evacuation has also been reviewed. Overseas material is of limited assistance because the 'stay-or-go' policy is not widely used outside Australia, although there is currently much interest in the approach.

Clearly, consistent evacuation policy positions that are well understood by emergency services personnel, the media and the public will result in more effective management of bushfires, and increased community safety.

Research has demonstrated that a well-prepared house can provide protection from fire, and that the presence of people prepared to defend the property is the most significant factor in determining its survival.

Currently, case studies of recent fires where there were significant issues surrounding evacuation or staying are being evaluated. The cases are being drawn from both Australia and from overseas.

Researchers are using a case study approach to assess the current AFAC policy based on the extent to which it meets the requirements of emergency services while also reflecting the choices people are likely to make during a major fire. As well as a comprehensive literature review, workshops with fire and emergency agencies, interviews, surveys and focus group interviews are being conducted.

The issue of evacuation is critical in major emergencies for several reasons, including:

- Early evacuation generally contributes to increased personal safety. However emergency managers must consider associated legal, political, social and logistical issues;
- There is extensive evidence that bushfire property losses are likely to increase if evacuation occurs;
- Late evacuation may put people in greater risk than if they had stayed in the house during a fire.

PROJECT C7 - EVALUATING BUSHFIRE COMMUNITY EDUCATION PROGRAMS.

This project is undertaking a comprehensive analysis of current Community Education Programs regarding bushfires. The effectiveness of these current programs is being assessed using a number of tools.

Fire agencies recognize that public safety and protection of assets during bushfires depends to a large extent on the community's capacity to respond effectively to the risk from bushfire events. This project is designed to advance the capability of fire agencies to evaluate the effectiveness of community safety and education programs. The project is designed to produce a cost-effectiveness model of the impact of current and future community safety programs.

PROJECT D1 – BUILDING AND OCCUPANT PROTECTION.

Houses destroyed in bushfires often survive the fire front but are burned down during the following hours, due to wind-borne burning debris (ember attack). Well prepared house-holders who either stay and defend their homes as a bushfire passes, or who return to their homes once the fire-front has passed can often save their houses without endangering their lives.

This project is developing an improved awareness of the issues surrounding building loss in bushfires. Current research is providing insights into key elements of building design including; the use of timber decking; window glazing; fire resistant vegetation; external water sprays; roofing and external cladding; non-combustible fencing; and the management of domestic gas supplies on the property. The project is designed to directly benefit communities living in the urban/bush interface.

PROJECT D2.4 - SAFE, COST EFFECTIVE EQUIPMENT.

Included in this project is a review of the current range of passive protection measures used for fire agency vehicle crew protection and the development of laboratory evaluation plans for them. While the primary focus of this project is the vehicles and crew protection measures used by fire agencies, the project could potentially have significant 'flow-on' benefits for the wider community.

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DISCLAIMER

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AFAC is the peak representative body for fire, emergency services and land management agencies in the Australasia region. It was established in 1993 and has 26 full and 10 affiliate members.