



Inquiry into the Recent Australian Bushfires

Joint Submission to:
House Select Committee on the Recent
Australian Bushfires

From

Fire Protection Association Australia

and

Fire Contractors Federation

May 2003

Contact:
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Mr Gary Nairn
Committee Secretary
House Select Committee on the recent Australian bushfires
Department of the House of Representatives
Parliament House
Canberra ACT 2600

Dear Mr Nairn,

Inquiry into the Recent Australian Bushfires

This Submission from Fire Protection Association Australia (FPA Australia) addresses the following Term of Reference;

The appropriateness of existing planning and building codes, particularly with respect to urban design and land use planning, in protecting life and property from bushfires

Executive Summary

Fire Protection Association Australia (FPA Australia) and Fire Contractors Federation (the Federation) are of the view, that the loss of property and threat to life from bushfires can be considerably reduced by addressing research needs, planning and building codes and the development of Australian Standards for buildings constructed in areas of risk. A number of research projects have been undertaken to look at reducing the impact of ember attack and radiant heat emanating from bushfires.

Organisations such as CSIRO, FPA Australia and many of the state and territory fire services agencies have undertaken their own reviews and studies into preparing for, and minimising the impact of bushfires. This submission largely focuses on a report prepared by FPA Australia from a study into external water spray systems. Unfortunately to date while much of this work is highly creditable, there is a lack of connection to pool all the outcomes and provide rigorous advice for people who live or intend to build in high-risk bushfire areas.

This Inquiry provides an excellent platform to provide outcomes that can build upon what has already been learnt from existing research and studies. It can pave the way for further work and the introduction of dependable mechanisms/systems and guidelines (codes, standards, regulations, etc) to protect assets and provide assistance for people building new properties and also provide options for protecting existing buildings.

Introduction

FPA Australia and the Federation welcome the "Inquiry into the Recent Australian Bushfires" by the Commonwealth Government of Australia.

FPA Australia is a not for profit technical and educational organisation for enhancing the understanding of fire risk and the advancement of fire safety. Our Vision; aims, through education and representation to ensure the highest possible level of protection of life, assets and the Australian environment from fire and related emergencies.

Fire Contractors Federation is an industrially registered organisation with objects including the promotion of the interests of the fire protection industry in Australia and all such activities as will provide safety from fire for the Australian community and to establish or assist in the establishment of standards of quality in respect of equipment and services in the fire protection industry.

FPA Australia and the Federation are of the view that much can be done to mitigate the potential for, and severity of bushfires that regularly devastate Australian communities. Other organisations are better placed to address the Inquiry's broader terms of reference and provide comment on reducing the potential causes and severity of bushfire. FPA Australia and the Federation are however cognisant of the fact that the combination of climate and landscape will ensure wildfire is an inherent part of living in rural and urban fringes of southeastern Australia. Therefore when wildfire does occur mechanisms that can minimise loss of or threat to life and property should be an integral part of any recommendations addressing research needs, planning and building codes and the development of Australian Standards, emanating from this Inquiry.

Australia, particularly the southeast of the continent has a history of serious bushfires cumulating in massive loss of property and life. After serious occurrences of bushfires there have been regular inquiries and subsequent research program to minimise affects. While there has been considerable progress in assisting people to reduce hazards and become better prepared to actually fight fire, more study and research needs to be done to provide property owners/occupants with the mechanisms required to cover a holistic approach to building and protecting their assets from the affects of:

- Ember attack; and
- Radiant Heat

emanating from bushfires.

External Water Spray Systems (EWSS) to Aid Building Protection from Wildfire

In 1999-2000 FPA Australia with the support of Emergency Management Australia (EMA) and funding through United Nations International Decade for Natural Disaster Reduction (IDNDR) – Program, conducted a study to resulting in a report titled; *External Water Spray Systems (EWSS) to Aid Building Protection from Wildfire*. The study was undertaken through extensive consultation with relevant stakeholders. The report generated from the project was the culmination of gathering information on sprinkler type products and spray systems that had the potential to be an effective EWSS in the advent of a bushfire. The process involved the gathering and studying available data, field investigations of systems being designed, erected and tested, discussion with component suppliers and reviewing documented studies of existing experiences in the fire protection field. However no actual experimental research was undertaken.

The report; *External Water Spray Systems to Aid Building Protection from Wildfire* provided a considerable level of detail regarding options and scope for designing an installing an EWSS. The report has taken into account studies conducted after significant bushfires that have identified the vulnerability of properties from ember build up. The conclusions are that a properly engineered EWSS should be capable of coping satisfactorily with the problems of embers, sparks, etc which may be continuous during a bushfire, although, individually are only small ignition sources.

FPA Australia receives many requests (up to 300 per year) for copies of the report and for more information regarding the design and installation of for EWSS. Unfortunately while the report recommended further studies and work no resources have been made available to build on the recommendations and conclusions to provide property owners with a more formal suite of guidelines in the form of codes and standards to protect their assets from Bushfires.

Upon the ending of this study into EWSS, items requiring additional work were identified, which were concerned with the classification and the maximum heat output of particular types of forest or scrub type and the attenuation of such heat over distance. When these matters are clarified and agreed by all interested parties it would then be possible to provide better engineering and hydraulic guidelines to increase the beneficial effects of EWSS.

Impact of EWSS on Building Controls

The two major sources of information in Australia in relation to construction of dwellings in wildfire areas within the legislative context of the country are:-

- AS3959 – 1999: Australian Standard of Buildings in Bushfire-Prone Areas

➤ SAA HB36 – 1993: Building in Bushfire Prone Areas – Standards Australia

Supplementing these documents are various planning condition guidelines, wildfire management overlays and other publications issued by fire brigades, building control or other authorities.

In essence all material deals with the siting of residence, the method of construction and fuel minimisation around and beyond the residence. In this context they give advice, rules or techniques to mitigate the effect of wildfire on homes.

Consideration of the EWSS and its effect can only be applied to the home and its features and to the fuel mitigation. An external water spray system will have little or no effect on siting, location, aspect, slope or windbreaks.

With those factors in mind it would appear to be reasonable conclusion if an EWSS system was installed in basic compliance with the best aspects of existing systems detailed in the report.

Building Construction

Although the constructional constraints in AS3959 1999, Section 3, will provide a degree of resistance to radiant heat and flame contact, they appear to be primarily in place to protect against embers, brands etc. attacks whether by an initial large source such as a flaming piece or by a building up of many sources leading to the creation of an ember bed at a vulnerable point.

In this area it is felt that an EWSS system can provide significant assistance in the protection of a residence in the following instances.

Floors, Poles, Cladding etc

In accepting that suspended timber floors, posts, columns etc. exist and where “the timber flooring, bearers are of fire retardant treated timber”, it appears that an EWSS system with mist spray nozzles in the under floor space, or projecting a spray onto the poles and cladding etc should give equivalent protection.

External Doors

The requirement to provide screens fitted with corrosion resistant steel, bronze or aluminium mesh also appears an area that a misting nozzle specifically located to wet the entire door surface would provide adequate protection.

If the door(s) fitted with strips or extruders and have no glass panels, any coals, embers etc. should penetrate to the interior of the residence and would thus be under a continual water mist which should preclude ignition of the door.

Roof-lights, Evaporative Cooling Units

The prohibition in Level 2 construction of thermoplastic material and toughened glass in skylights and “combustible” case for evaporative cooling units could overcome by strategically placed misting nozzles.

A build up of embers around these features would be extinguished by an operating EWSS and a continual water film would mitigate radian heat.

Verandahs and Decks

The requirements to sea joints in flooring, ensure separation of the decking from the residence and require the use of fire retardant timber in decking all appear to be requirements that the water spray of a EWSS could be satisfactorily protect to an equivalent level.

However caution should be required in considering the decking, as to provide a film of water over this feature would be dependent upon the area of the deck and the capability of the spray nozzles used.

General

There are other aspects of AS3959 – 1999, which could conceivably be adequately protected by an EWSS such as windows, and some aspects of the roof provisions.

However until considerably more data relative to the heat output of wildfires burning in various forest and scrub types is available it was not felt prudent to consider those items at this time of conducting the EWSS study.

To date the development of an Australian Standard related to the performance of buildings in bushfires has been subject to a series of unproven areas. AS3959 has lacked comprehensive input of actual fire conditions that might be imposed on building during a bushfire. The Standard has also reportedly suffered from strong commercial and political interference.

Since this standard was written, recent initiatives have generated a vastly improved prediction of radiation and flame impact from an advancing flame front. This has occurred through the current RFS/CFA tanker protection project that developed a flame front prediction model that has been validated against data from project Vesta, and will soon be further validated by CSIRO field trials.

This model will represent the best available prediction of building radiation and flame exposure. This major advance in understanding would have a considerable influence in revising AS3959 in the future.

Fuel Reduction Regimes

The External Water Spray Systems to Aid Building Protection from Wildfire – Project also reviewed fuel reduction regimes. The fuel reduction regimes embodied in various wildfire planning or wildfire-planning overlays rely on a series of concentric rings around a residence where fuel reduction is required before a planning approval may be given.

The purpose of the fuel reduction is to provide an area of 'defendable space' that provides protection to the building from radiant heat, direct flame contact and ember attack. The defendable space consists of a Building Protection Zone (BPZ) and if the surrounding vegetation is tall, medium forest or shrub and heath, A Fuel Modified Buffer Zone (FMBZ). The project report provides a detailed explanation of what the aims of these zones are in reducing the impacts of flame contact, radiant heat and ember attack.

Further Studies and Work

The report at the conclusion of the EWSS study identified several items requiring additional work most of which were concerned with classification and the maximum heat output of particular types of forest or scrub type and the attenuation of such heat over distance. Until these matters are clarified and agreed by all parties it is difficult to scientifically evaluate the precise beneficial effects of EWSS.

The following four matters were identified as requiring further studies and work:

(1) Classification of Risk

Both Section 2 of Australian Standard AS3959 –1999 and Department of Resources and Environment "Overall Level Hazard Guide" (3rd edition, 1999) both attempt to classify forest and scrub types throughout Australia into a series of categories relative to risk.

The Australian Standard method of classification is difficult for an average practitioner to understand due to the poor illustrations and the introduction of material extraneous to the pure classification of forest and scrub. I.e. slope.

The Department of Natural Resource and Environment Victoria (DNRE) guide is clearer to understand and by separating fires from bark hazard and its spotting potential, provides other useful data in assessing hazard.

Recommendation

Standards Australia should consider carefully the layout and/or methodology of the DNRE Guide material together with any other similar material from fires authorities, Government Departments or other sources, and consider incorporation into AS3959 to provide a clear, easy to read, description of vegetation classes, which is suitable for use by the average practitioner. The objective should be a single method of classification applicable to all of Australia.

(2) Recommendation

The assessment of bark hazard and its relationship to fire spotting by DNRE has the potential to enhance the operation of the EWSS. If such assessment could be developed on a time/distance basis then the timing and severity of the ember shower may be capable of judgement given wind speed data.

This would allow a forecast of when was the optimum time to activate an EWSS to both provide protection at the critical time and conserve scarce water resources.

Recommendation

The Department of Natural Resources and Environment – Vic. could be asked to consider this question and determine whether a tabular guide could be developed to provide data on this aspect of wildfire.

(3) Evaluation of Heat Output

A series of maximum values requires to be developed for each classification of forest and scrub which would allow estimation of the maximum impressed value that could be sustained by any particular dwellings.

If these values existed a far better evaluation of the efficiency of water spray systems could be carried out particularly in relation to window etc. openings for which research has already been carried out in North America in regard to water densities under various heat regimes.

Recommendation

It is understood the CSIRO and various fire authorities are working on this problem and every assistance should be given by the fire community as a while to enable them to complete this project.

(4) Evaluation of Spray and Misting Heads

The query of the efficiency of these types of heads in high wind conditions should be the subject of testing.

If heads under certain conditions of pressure and flow can sustain an even pattern in high winds it would considerably enhance coverage and make more efficient designs possible.

Also the use of fire fighting foam in EWSS should be evaluated in relation to its ability to be used in such systems, the quality of foam generated and the coverage achieved in order that an assessment as to the viability of use can be made.

Recommendations

Additional research and testing of the heads supplied to the EWSS market should be undertaken under wind conditions of 60-70 km/h to determine the effect on the spray pattern of the various units.

Further testing foam, through misting nozzles should be carried out to evaluate its viability.

FPA Australia is of the view that the project; External Water Spray Systems (EWSS) to Aid Building Protection from Wildfire, compiles important information in a single document that has never been achieved before. The document provides the basis to address many important aspects of protecting life and property from the ravages of bushfire. FPA Australia urges the Commonwealth Government to review the report in total and consider providing the resources to advance the information and recommendations into the next stage of developing Standards and Legislation to assist people in making informed decisions in building in high bushfire prone areas.

Other Projects, Research and Legislation

Bushfire Cooperative Research Centre

FPA Australia is aware of the establishment of the Bushfire Cooperative Research Centre (CRC) and studies by CSIRO into hazard mitigation of bushfires. The key outputs and outcomes identified in the Bushfire CRC Research Plan will contribute significantly in the future to managing the Bushfire risk. It is important that projects undertaken by the CRC build on existing research as well as taking up new projects.

CSIRO Research

The projects that have been undertaken by CSIRO both current and completed are also significant in the mitigation of hazards from Bushfires. From the research undertaken by CSIRO there is anecdotal evidence to suggest there are concerns with external water spray systems people have

been installing to protect their properties in bushfire prone areas. Of concern is the type of material being used for pipe work, (i.e. poly pipe), and the types and effectiveness of spray heads that have been fitted.

It is critical that any research and development in both mechanisms and guidelines that will assist property owners to protect their assets are extended to those who need to know and will benefit from such information.

Fire-safe Cigarettes

FPA Australia has taken a very firm view that the risk of fires starting from inappropriately discarded cigarettes could be considerably reduced. While there is ample evidence linking death and property damage resulting cigarette use inside buildings, there is also enough facts and information to substantiate cigarettes have also started bush and scrub fires.

In America a lot of research has already been undertaken to determine the ignition propensity of different brands of cigarettes. The research has determined that some products have a higher ignition propensity than others. The research has also identified that cigarette companies have the technology to make "fire-safe cigarettes" and such products are economically feasible. However, what is lacking are legislation and standards to ensure cigarette manufacturers make safer products.

If this Inquiry wants to make a serious contribution to minimise a major cause of fires (both external and internal) recommendations that; research be undertaken into the production of more fire-safe cigarettes and that consideration also be given to legislation supporting the introduction of standards for fire-safe cigarettes would be an excellent outcome.

Conclusion

This Inquiry has a great opportunity to build on the efforts that have already started in the form of studies, research and standards to protect life and property from the ravages of bushfire. A scoping exercise to gather and review all the documentation that has been developed from existing studies and research will provide an excellent platform to work from and will also avoid duplication of work already completed.

Further research and development into the EWSS outlined in this submission would build on the anecdotal reports of the effectiveness of such systems and provide people who live in bushfire prone regions with reliable mechanisms for protecting their properties. Finalising and extending on the work already done on EWSS will provide alternative systems to cover both types of buildings and the location – environment of installation.

FPA Australia and the Federation would be keen to work with the Government in progressing the development of protective mechanisms/systems, building codes and rigorous standards that will minimise the personal tragedy, of bushfires. The Associations would also welcome the opportunity to address the House Select Committee and FPA Australia would be pleased to provide a full copy of the report from the study; *External Water Spray Systems (EWSS) to Aid Building Protection from Wildfire*.

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