

Towards a neighbourhood-scale house loss risk assessment method for houses in the urban interface

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Introduction

Bushfire risk assessments can be performed for various purposes and at different scales. The assessments can be used to determine the risk of values under threat, whether they are built environmental, social or economic. This research focused specifically on the risk posed to houses under threat from a bushfire.

Risk Assessment Approaches

Risk assessment are conducted at varying scales for different purposes. **Single House Scale** approaches typically require fine-scale data relating to the house (i.e. location and materials used for windows, doors, roof etc.) and immediate surrounds. They can be used to assess the benefit, in terms of reducing the likelihood of house loss, in implementing risk mitigation strategies relating specifically to the house. This could be in changing the design of the house or by changing the materials used in construction.

Alternatively, **Landscape Scale** approaches do not require fine scale information relating to the house. These assessments focus on the vegetation hazard which is most likely to impact on the urban area. No consideration is given to the vulnerability of the house, only that it is in proximity to vegetative fuels and it has the potential to be exposed to the hazard given a fire event. These assessments can be used to identify populations under threat, where fuel reduction activities may have the greatest impact and where to conduct community awareness programs.

Both scales of risk assessment are conducted to achieve specific outcomes. However, given the scale limitations affecting both the geographical extent and the information which can be included in both risk assessments approaches, to determine the benefit of implementing town planning strategies in reducing risk, a **Neighbourhood Scale** approach to risk assessment needs to be considered.

Bushfire Protection Measures

Bushfire Protection Measures (BPM's) are examples of planning strategies applied to urban interface areas to reduce the negative impacts of bushfire. The measures include:

- An asset protection zone separating housing from hazardous vegetation
- A sufficient supply of water to houses to assist with suppression activities
- A road network which provides safe access to and from housing
- Building houses to required construction standards
- Location of electricity and gas supplies



Figure 1: GIS analysis of urban interface compliance with BPM's

Where these measures are implemented it is likely that they will result in an increase in the likelihood of house survival when compared to an urban interface area which is non-compliant. Due to the scale at which these measures are implemented, only a risk assessment method which is capable of including the entire urban interface zone can be used to assess the full benefit of implementing BPM's.

Developing a Neighbourhood Scale Approach to Risk Assessment

In terms of house complexity, ranging from fine scale for single house methods to coarse scale for landscape methods, a neighbourhood scale falls in between. To remove the need for complex houses to be used as input to the risk assessment, failure analysis was performed on complex house designs. From the analysis, the following exposure/failure graph was developed.

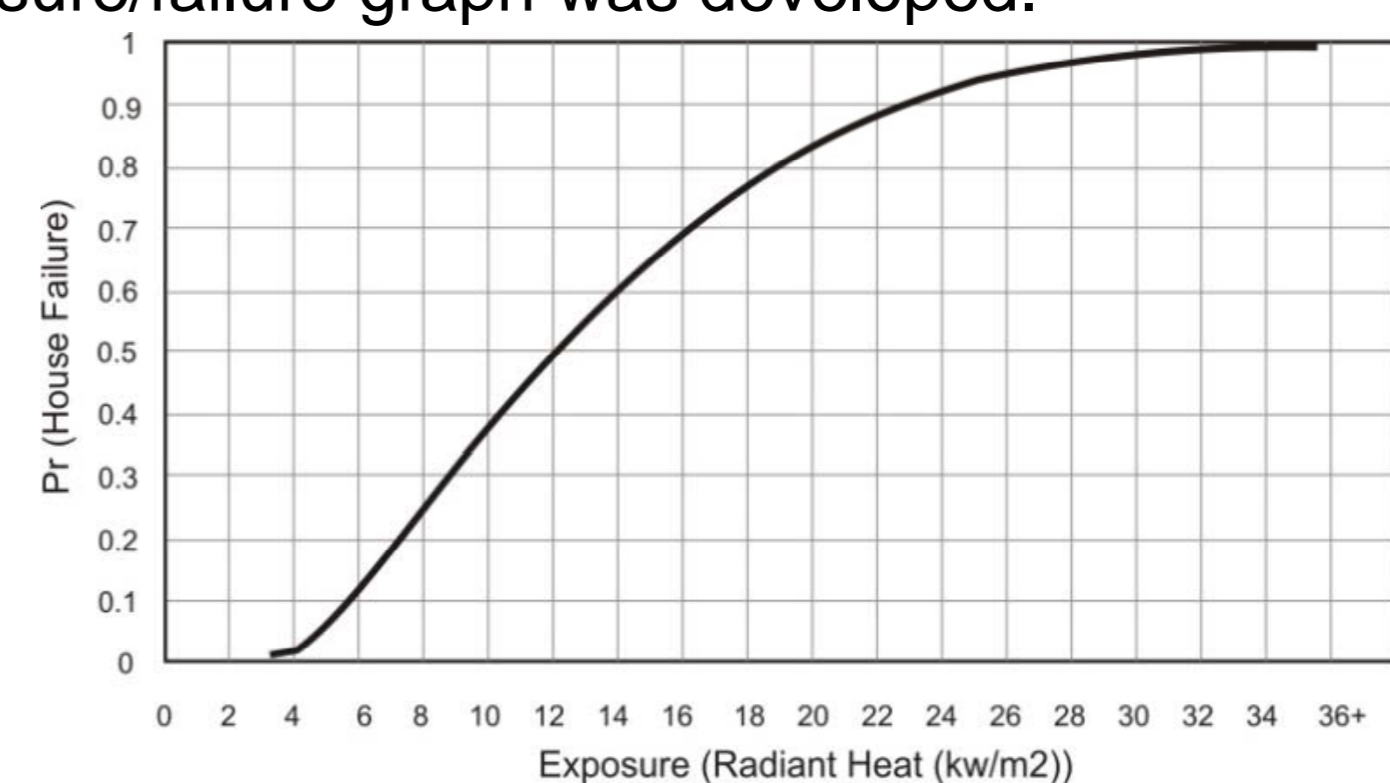


Figure 2: Exposure/Failure Graph

The graph above is an output of initial analysis in developing a fully working neighbourhood scale risk assessment. It determines the probability of failure based on a single observation of exposure to the house from radiant heat, based on house designs from a study area (Duffy, Canberra).

Conclusion

The purpose of conducting a risk assessment determines the spatial scale at which the risk assessment is performed. This research has looked at a neighbourhood scale approach as the most appropriate scale to perform a risk assessment for the purpose of assessing the benefit of implementing town planning measures such as those outlined in BPM's.