RISK MODEL

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Introduction

The objective of this model is to define the potential risk of loss of a specific house over its 50 year design life.

The spatial representation of the risk model takes into account: the bushfire events (intensity and characteristic of embers radiant heat and flame), the individual element between the bushfire and the house that could contribute to or mitigate structural loss, the house vulnerability (based on material and design), and the influence of human behaviour (see Figure 1).

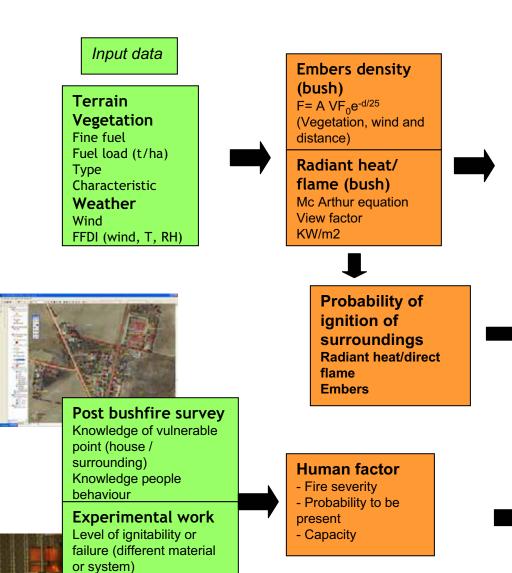
The risk considered in this model has been defined as the risk of building damage to a point where it no longer provides a safe haven for occupants. The probability of destruction of the house in a 50 year period Pr(D50) include the probability of arrival of a fire in 50years time and the probability of the house to be destroyed when the fire arrive. Pr(D50) = Pr(A50).Pr(D

Hazard -**House Interface Hazard** arrival event **Vulnerability** model **Model** Forest (different characteristics) Building design Human behavior Mechanisms of (structure and (before, during and bushfire attack material) after the fire) Direct flame, radiant heat, embers **Environmental conditions**

Figure 1 Representation spatial risk model

The probability of destruction of a house is base on different scenarios of destruction: destruction by embers entry in the envelope, by ember accumulating in re-entrant corner, by ignition from radiant heat from the bush or from surroundings object burning.

Probability of house destruction is the aggregate probability of failure of each object. 1-Pr(D) = [1-Pr(EE)] [1-Pr(EBT)] [1-Pr(RadBush)] [1-Pr(RadSur)]



Embers entry in the envelope Pr(EE)=f(type of space, gap factor, ember density, human factor)

- Type of space: roof, occupiable space, wall cavities, underfloor enclosure
- Gap factor (ease to for ember to enter the building)
- Human behaviour (capacity to extinguish ignition)

Embers accumulating Pr(EBT)= f(geometry, material, ember density, human factor)

- Geometry (configuration and number of surface)
- Material type (combustibility of material)

Ignition from radiation from the bush (Pr (RadBush)= f(fuel load, slope, FDI, view factor, material, threshold exceedance)

Based on radiant heat model and on information from experimental work (threshold)

Ignition from radiation from surrounding element
Pr (RadSur)=f(fuel load, material, view factor, threshold exceedance)
- Threshold from experimental work

Probability of house survival 1-Pr(D) = [1-Pr(EE)] [1-Pr(EBT)] [1-Pr(RadBush)] [1-Pr(RadSur)]





