FLOOD DAMAGE ASSESSMENT IN URBAN AREAS

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STATISTICAL ANALYSES SHOWS THE CONSIDERABLE IMPACTS OF FLOOD RISK COMPARED TO OTHER TYPES OF NATURAL HAZARDS. IN RECENT DECADES, THE FLOOD RISK DUE TO CLIMATE CHANGE AND THE GROWTH IN VALUE AND VULNERABILITY OF EXPOSED PROPERTIES HAS BEEN INCREASING EXPONENTIALLY. THE RESEARCH PROPOSED IN THIS PROJECT WILL FOCUS ON QUANTIFYING THE FLOOD RISKS AND PERFORMING A FLOOD DAMAGE ASSESSMENT FOR A CASE STUDY AREA WITHIN AUSTRALIA.

INTRODUCTION: In Australia, floods are the most costly of all natural disaster types. While much effort has gone into emergency management in Australia, flood damage assessment is still crude and affected by large uncertainties.

Flood risk can be defined as the probability and magnitude of expected damages. Therefore, damage assessment is an important component of flood risk management, and the results will provide decision-makers with an essential tool for planning better risk mitigation strategies.

RESEARCH AIMS:

This research aims to develop a calibrated flood damage model for the geographical condition of Australia using historic data collected from recent extreme events. This data will then be used to inform disaster management policy in support of the development of risk reduction measures.

RESEARCH OBJECTIVES:

- Select a case study and develop a calibrated flood damage model with the help of data collected from recent extreme events.
- Model different flood scenarios with different probabilities and return periods for the area of study.
- Assess the level of vulnerability for the flooded buildings.
- Assess the extent of damages for the buildings inside the area directly affected by the flood and estimate the magnitude of Average Annual Damage (AAD).
- Develop and analyse a set of structural and non-structural mitigation measures based on the performed damage assessment.

PRIMARY FINDINGS

Stage damage curves are the international standard for flood damage estimation in urban areas. Despite the simplicity of them , invalidated curves would raise the level of uncertainty. Due to a lack of empirical data, few studies have been conducted to explore the transferability of well-known overseas methodologies to Australia. Also, most of the Australian synthetic methodologies are not calibrated with empirical data.

This study has proposed a general methodology for quickly describing the magnitude of damage and suggests some simple and flexible curves with regards to the variability of buildings with different uses (*residential and commercial*) and characteristics.

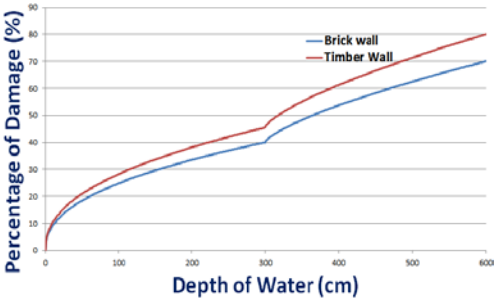
The newly derived model has been calibrated and validated for Australian conditions by using empirical datasets.

Residential Buildings Structure

four common building types for the selected area of study in Australia have been considered: "One/two storey buildings with masonry/timber walls and slab-on-ground"

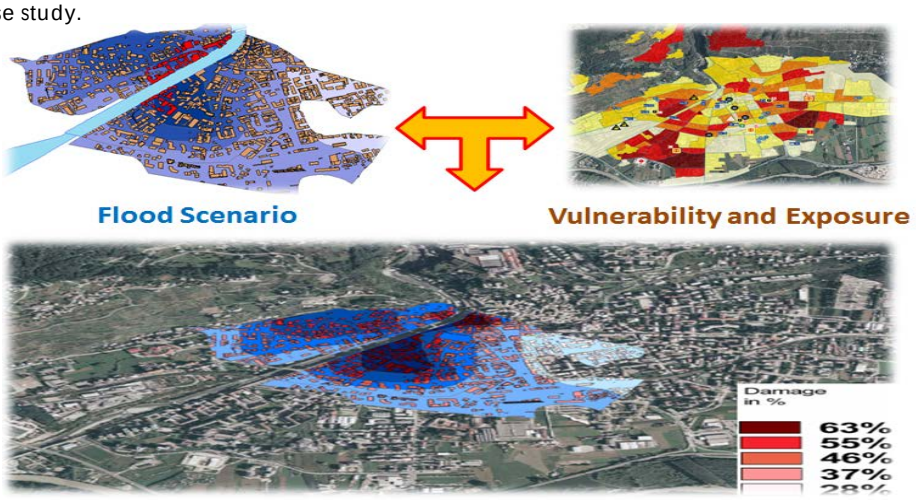
Commercial Buildings Structure

This model has been developed for buildings used for retail trades, repair or personal services, or professional offices with masonry walls



RESEARCH SPATIAL OUTCOMES

- A spatial dataset for the level and magnitude of hazard, exposure and vulnerability in the area of study. In addition, a flood risk map and damage assessment map for the selected case study.



END USER STATEMENT

Most urban fire authorities are projecting an increase in urban flooding events on the basis of climate change modelling. We believe it is important that timely and accurate projections of potential flood damage are available in order to make informed decisions regarding the nature and placement of emergency response capability.