COST-EFFECTIVE MITIGATION STRATEGY DEVLOPMENT FOR FLOOD PRONE BUILDINGS

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THE MAIN OBJECTIVE OF THIS RESEARCH IS TO DEVELOP COST-EFFECTIVE STRATEGIES TO MITIGATE DAMAGE TO RESIDENTIAL BUILDINGS FROM RIVERINE FLOODS. THE RESEARCH WILL PROVIDE EVIDENCE-BASED RETROFIT STRATEGIES FOR DECISIONS CONCERNING THE BUILDINGS WITH GREATEST VULNERABILITY IN AUSTRALIAN COMMUNITIES.

WHAT IS THE PROBLEM?

Australia has experienced floods on a regular basis and some communities have been impacted repeatedly over a period of few years due to inappropriate urban development in flood plain areas.

The flood events have resulted in significant logistics for emergency management and disruption to communities. They have also resulted in considerable costs to all levels of government to repair damage and enable community recovery.

WHY IS IT IMPORTANT?

Retrospective analyses show large benefits of flood risk mitigation in the contexts of many developed and developing countries. A study conducted by the U.S. Federal Emergency Management Agency found an overall benefit-cost ratio of four suggesting that disaster risk reduction through investment in mitigation can be highly effective in future loss reduction*.

HOW ARE YOU GOING TO SOLVE IT?

Research is underway at Geoscience Australia (GA) to improve the understanding of flood risk by assessing the vulnerability of the elements at risk. In recent years GA has taken a number of initiatives to better understand flood vulnerability. These include developing tools for capturing building stock information, conducting post-disaster surveys to assess building damage and develop an empirical database, and developing vulnerability models for key Australian building types. Within this project GA will build on research done to date to broaden the knowledge of the vulnerability of Australian building stock to flood hazard and will identify suitable retrofitting strategies.

PROJECT ACTIVITIES

Building stock classification

A literature review has been conducted to study seven published schemas developed in the United States of America, Germany, Philippines, New Zealand, Australia and within the United Nation's Global Assessment of Risk 2015 Report (GAR15) to identify key building attributes strongly related to flood damage.

The selected key attributes are *Construction Period*, *Fit-out Quality*, *Storey Height*, *Bottom Floor System*, *Internal Wall Material* and *External Wall Material*. Based on these six attributes a new building schema is proposed for the project. The proposed schema divides each building into the sub-elements of foundations, bottom floor, upper floors (if any) and roof to describe its vulnerability (see Figure 1).

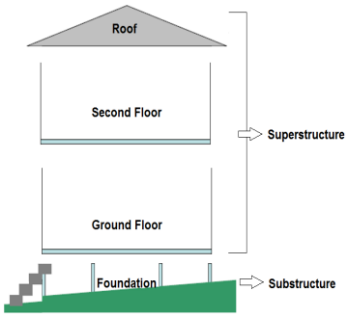

Figure 1. Building structure and main components

Review of flood mitigation options

Existing publically available research on retrofitting of flood prone buildings and their components and the strength implications of immersion of key structural elements will be examined to ascertain where deterioration due to wetting and subsequent drying needs to be addressed as part of repair strategies.

Development of Australian specific retrofit options

New strategies will be developed as required and all appropriate strategies will be costed for key building types through the engagement of quantity surveying specialists. The research may also entail experimental testing of preferred material types to ascertain their resilience to flood water exposure.

Vulnerability assessment of current and retrofitted building types

Vulnerability of selected building types to a wide range of inundation depths will be assessed and supplemented by a significant body of flood vulnerability research by GA, post-disaster damage surveys and socio-economic survey activity undertaken by GA in Australia.

Cost benefit analysis

Retrofit options entail an investment that will realise a benefit over future years through reduced average annualised loss. In this exercise selected retrofit options will be assessed against a range of severities and likelihoods of flood hazard covering a selection of catchment types.

END-USERS PERSPECTIVE

The outcomes of this research will integrate into flood impact and risk assessment. It will enable a better understanding of current flood risk to communities, the demands on emergency management and generate opportunities for reducing these.

*MMC. 2005. Natural hazard mitigation saves: an independent study to assess the future savings from mitigation activities. Multi-hazard Mitigation Council.

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