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BUILDING COMMUNITY CYCLONE RESILIENCE THROUGH ACADEMIC AND COMMUNITY PARTNERSHIP

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OVERVIEW

This paper will present research from collaboration between the Cyclone Testing Station at James Cook University and insurer Suncorp over the last two years. A key outcome of this work in 2016 has been Suncorp's recognition of homeowner mitigation efforts through an insurance premium reduction program known as the 'Cyclone Resilience Benefit'. The research methods and findings that informed this program as well as other key outcomes including recommendations for codes and standards will be discussed. A broader context will also be presented including the political backdrop of the Productivity Commission inquiry into natural disaster funding and the recent Northern Australia Insurance Affordability Taskforce.

CYCLONE RISK: INSURER VIEW

Suncorp has a significant exposure to cyclone risk due to a high market share of business in North Queensland. The occurrence of disasters such as Cyclone Larry and Cyclone Yasi have led to higher claims cost, increased reinsurance costs, and subsequent increases to customer premiums. Increasing costs coupled with the vulnerability of existing housing stock to cyclone risk, leaves Suncorp challenged in generating profitable growth. It is not possible to change the hazard itself, thus reducing exposure (i.e. housing vulnerability) is the only viable action.

Porter and Kramer [19] coined the term 'shared value' which revolves around the idea that a company's success and social progress are intertwined. Addressing issues of insurance premium affordability by improving the vulnerability of the housing stock in North Queensland was essentially a societal problem that would also create economic value for Suncorp and therefore a clear shared value opportunity.

Also important to shared value is the collaboration of different groups whose strategic goals are aligned. Suncorp had a wealth of cyclone claims data, but not the expertise to know how to best make use of it to solve the vulnerability problem. In 2014, Suncorp approached the Cyclone Testing Station (CTS) at James Cook University (JCU) to help improve their understanding of cyclone vulnerability with a common purpose of solving the issue together.

CYCLONE RISK: ACADEMIC VIEW

Damage investigations carried out by the Cyclone Testing Station (CTS) following severe wind storms have typically shown that Australian houses built prior to the mid-1980s do not offer the same level of performance and protection during windstorms as houses constructed to contemporary building standards. Given that these older houses will represent the bulk of the housing stock for many decades, practical structural upgrading solutions based on the latest research will make a significant improvement to housing performance and to the economic and social wellbeing of the community.

Structural retrofitting details exist for some forms of legacy housing but the uptake of these details is limited. There is also evidence that retrofitting details are not being included into houses requiring major repairs following severe storm events, thus missing the ideal opportunity to improve resilience of the house and community. Hence, the issues of retrofitting legacy housing, including feasibility and hindrances on take-up, must be analyzed. The primary objective of this collaborative research is to develop and promote strategies for mitigating damage to housing from severe windstorms across Australia.

Tropical Cyclone Tracy resulted in extreme damage to housing in December 1974, especially in the Northern suburbs of Darwin [18]. Changes to design and building standards of houses were implemented during the reconstruction. The Queensland Home Building Code (HBC) was introduced as legislation in 1982 with realisation of the need to provide adequate strength in housing. By 1984 it is reasonable to presume that houses in the cyclonic region of Queensland were being fully designed and built to its requirements.

Damage investigations of housing, conducted by the Cyclone Testing Station (CTS) in the Northern Territory, Queensland, and Western Australia, from cyclones over the past fifteen years have shown that the majority of houses designed and constructed to current building regulations have performed well structurally by resisting wind loads and remaining intact [1, 5, 7, 8, 12]. However, these reports also detail failures of contemporary construction at wind speeds below design requirements. The poor performance of these structures (Figures 1 and 2) resulted from design and construction failings or from degradation of construction elements (i.e. corroded screws, nails and straps, and decayed or insect-attacked timber). Hence, the development of retrofit solutions for structural vulnerabilities are critical to the performance longevity of all ages of housing.

FIGURE 1. REMOVAL OF ROOF CLADDING AND BATTENS FROM WINDWARD FACE

FIGURE 2. PART OF THE ROOF CLADDING WITH BATTENS STILL ATTACHED FLIPPED ON TO LEEWARD SIDE

INSURED LOSS

Figure 2 shows that cyclone and severe storm events together contributed to nearly half of all nominal natural hazard insurance losses over the period from 1970–2013. Whilst cyclone events are not frequent, the resulting losses are high. As one of the most costly, Cyclone Yasi estimated economic losses were over $2 billion, with insured losses at $1.469 billion (Table 1).

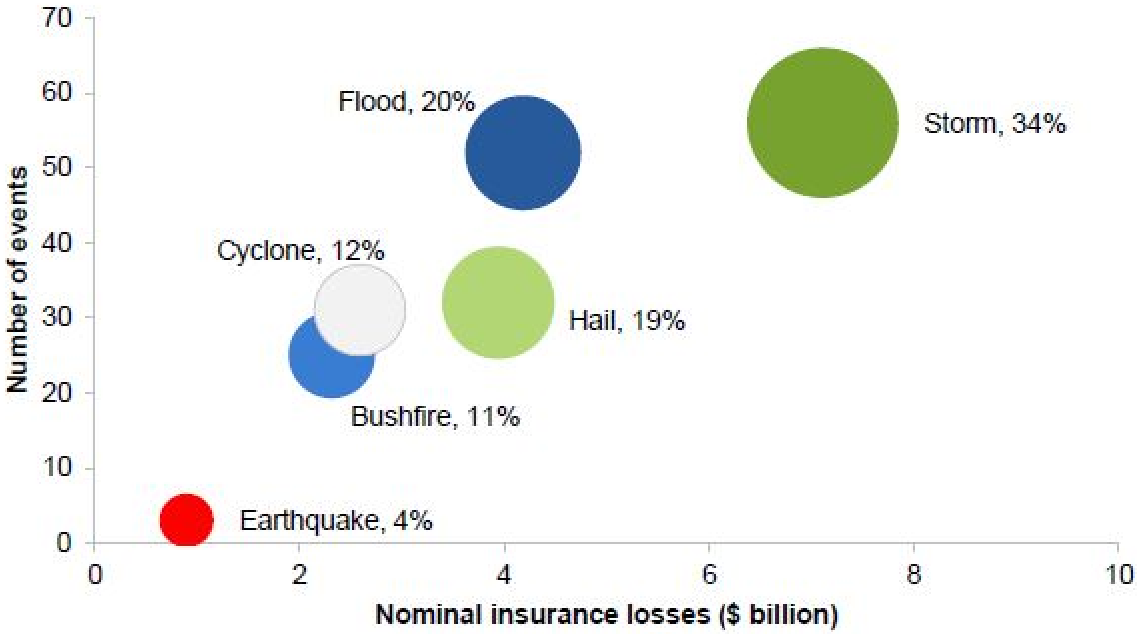

FIGURE 3. INSURANCE LOSSES BY NATURAL HAZARD [10]

Date	Event	2011 normalised economic loss $m[19]	2011 normalised insurance loss $m[20]	Insured %
March 2006	Tropical Cyclone Larry	1,692	609	36%
March 2007	Cyclones George and Jacob	N/A	12	
February 2011	Tropical Cyclone Yasi	2,080	1,469	71%
January 2013	Ex Tropical Cyclone Oswald (NSW & QLD)	1,650	1,098 (as at 31/03/2013)	67%
April 2014	Cyclone Ita (QLD)	N/A	8.4 (as at 15/04/2014)	

TABLE 1. LOSSES FROM WORST LAND FALLING CYCLONES IN AUSTRALIA SINCE 2006 [3]

RESEARCH FINDINGS

The CTS and Suncorp have worked together on two phases of research over the last 18 months. The first phase was concerned with getting a deeper understanding of the drivers of cyclone damage. The CTS used their expertise to investigate Suncorp's 25,000 Cyclone Larry and Yasi claims.

Below are some of the key findings from the Phase 1 study:

• 86 per cent of claims were for minor damage (less than 10 per cent of sum insured), making up a quarter of the total claims cost. These were largely preventable claims involving overgrown trees, shade sails, and outdoor furniture indicating that preparedness can be improved in north Queensland.

• Overall, less than 3 per cent of claims were severe or worse (over 50 per cent of sum insured), yet they accounted for 27 per cent of the total claims cost, presenting a clear case for strengthening older homes in the region.

• Homes built before 1982 (predating modern building codes) were more vulnerable to structural failure

• Windows and doors were often the weakest points in new buildings — when they fail, they allow wind and water into the building leading to further damage.

The second phase involved estimating the Benefit-Cost Ratio (BCR) with different cyclone mitigation options in collaboration with economic consultant Urbis. Key findings of the Phase 2 study included:

• Some upgrades pay for themselves after one cyclone — using Cyclone Yasi as a case study, low cost strapping upgrades at a cost of around $3,000 achieved a BCR of 1.5 for pre-1960 homes and a BCR of 1.4 for 1960-1980 homes

• Minor claims, for less than 10 per cent of the sum insured, can often be easily prevented. Targeting minor claims through a community awareness program achieves an average return of $10 for every dollar invested.

• Upgrading windows and doors in newer homes can result in significant claims cost reductions — after-market bracing costs just $300, and could save between $1,500 and $10,0000 in the event of a cyclone. DIY window protection can be installed for around $1,360, and can reduce claims costs by up to $15,000.

Mitigation option	Cost per household	Total benefit per household	BCR	Payback period
Community awareness campaign	$55–$136	$440–$820	3.2–14.8	‹1–6 years
Opening protection – self installed (low cost scenario)	$1,660	$1,990–$6,400	1.2–3.9	4–21 years
Roofing option – strapping only (low cost scenario)	$3,000	$12,900–$38,800	4.3–12.9	2–4 years
Roofing option – over-batten system (medium cost scenario)	$12,000	$13,500–$39,400	1.1–3.3	5–37 years

TABLE 2. BENEFIT COST RATIOS FOR CYCLONE MITIGATION

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