I’ll Huff and I’ll Puff and I’ll Blow Your House Down…

Building Standards and Windstorm Damage

11 April 2013
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Building Standards and Windstorm Damage

11 April 2013
The moral of the story

Windstorm hazard varies by area

But not matched by variations in insurer claim costs

Partly reflects a country / metro effect

But building standards (and age of building) also play an important role
Agenda

- Storm Hazard: Weather Data
- Storm Claims Costs: Insurer Data
- Rural vs Urban differences
- Building Standard Impacts
- Wind Loads and Building Standards
- Steps Forward
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Storm Risk: Weather Data

Average storm score by weather station

Average storm score by CRESTA
Agenda

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Storm Scores vs. Insurer Data: NSW

Average **Storm Score** by CRESTA Zone

Average **Attritional Storm Cost** (per $1,000 SI)
Storm Scores vs. Insurer Data: VIC

Average Storm Score by CRESTA Zone  
Average Attritional Storm Cost (per $1,000 SI)
What is Driving these Results...?

<table>
<thead>
<tr>
<th></th>
<th>Average Claim Size (% of SI)</th>
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<tbody>
<tr>
<td><strong>NSW</strong></td>
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<tr>
<td>Inland</td>
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Agenda

- Storm Hazard: Weather Data
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- Steps Forward
Why Rural Costs More…

Supply & Demand Forces

- Location loadings for workers
- Availability of materials
- The word spreads in rural areas
- Less specialised building expertise available
- Lower levels of competition between builders in smaller communities
Why Inland Costs More…

Building Characteristics

- Older properties in rural areas
- Repair works often costly due to need to meet current building standards
- Asbestos removal on older properties
Agenda

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Age of Building: Another Influencing Factor…

- Green represents decrease in cost per $1,000 sum insured since 1980
- Red is increase, although extent of increase is minor
## Age of Building: Another Influencing Factor

<table>
<thead>
<tr>
<th>NSW</th>
<th>Pre-1980</th>
<th>Frequency</th>
<th>Average Claim Size (% of SI)</th>
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<td>Post-1980</td>
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</table>
“Inspections and post windstorm damage surveys have consistently shown that contemporary houses perform better than older (pre 1980) houses in cyclone and non cyclone areas.”

Source: Housing damage in windstorms and mitigation for Australia – Ginger, Henderson, Edwards, Holmes
Lots of evidence of age of construction on cyclone claims costs

Henderson and Ginger show relationship between damage arising from Cyclone Larry (2006)
Agenda

1. Storm Hazard: Weather Data
2. Storm Claims Costs: Insurer Data
3. Rural vs Urban differences
4. Building Standard Impacts
5. Wind Loads and Building Standards
6. Steps Forward
Regional Wind Speeds
Terrain

Terrain Category 1
$Z^o = 0.002M$
Exposed open terrain with few or no obstructions, in which the average height of objects surrounding the structure is less than 1.5 metres. This category includes water surfaces (open sea coast and lakes), flat and treeless plains, and open snowfields.

Terrain Category 2
$Z^o = 0.02M$
Open terrain, grassland with few well-scattered obstructions having heights generally from 1.5 to 10.0 metres. This category includes open parkland and sparsely built up outskirts of towns and suburbs.

Terrain Category 3
$Z^o = 0.2M$
Terrain with numerous closely spaced obstructions having the size of domestic houses. This includes most suburban areas.

Terrain Category 4
$Z^o = 2.0M$
Terrain with numerous large, high (10.0 to 30.0 metres) and close obstructions, such as large city centres and well-developed industrial complexes.
Topography

**T1 - topography 1 =**
All slopes ≤ 1:10 and the lower two thirds of slopes ≤ 1:15. Most sites fall within these limits.

**T2 - topography 2 =**
Top third of slopes between 1:10 and 1:7.5.

**T3 - topography 3 =**
Top third of slopes between 1:7.5 and 1:5.
Shielding

NO SHIELDING  eg. Less than 2.5 houses per hectare upwind

PARTIAL SHIELDING  eg. 2.5 houses per hectare upwind

FULL SHIELDING  eg. 10 houses per hectare upwind
# Wind Classification System

<table>
<thead>
<tr>
<th>REGION</th>
<th>TERRAIN CATEGORY</th>
<th>TOPOGRAPHIC CLASSIFICATION</th>
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<tbody>
<tr>
<td></td>
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<td>FS</td>
</tr>
<tr>
<td>A</td>
<td>TC 3</td>
<td>N1</td>
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<td></td>
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<td>N1</td>
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<tr>
<td></td>
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<td>N1</td>
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<td>TC 1</td>
<td>N2</td>
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<td>B</td>
<td>TC 3</td>
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<tr>
<td>C</td>
<td>TC 3</td>
<td>C1</td>
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<td>TC 2.5</td>
<td>C1</td>
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<td>TC 1, TC 2</td>
<td>C2</td>
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<td>D</td>
<td>TC 3</td>
<td>C2</td>
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<tr>
<td></td>
<td>TC 2.5</td>
<td>C2</td>
</tr>
<tr>
<td></td>
<td>TC 1, TC 2</td>
<td>C3</td>
</tr>
</tbody>
</table>

- **FS**: full shielding
- **PS**: partial shielding
- **NS**: no shielding
- **C**: cyclonic
- **N**: non-cyclonic
- **N/A**: not applicable
Wind Classification Examples

N1 – 101 km/h
- Sydney
- Suburban
- Full shielding
  - Bottom of hill

N4 – 148 km/h
- Sydney
- Suburban
- No shielding
  - Top of hill

N5 – 216 km/h
- Sydney
- Exposed
- No shielding
  - Top of hill
Wind Classification Examples

**N1 – 101 km/h**
- Sydney
- Suburban
- Full shielding
- Bottom of hill

**N4 – 148 km/h**
- Sydney
- Suburban
- No shielding
- Top of hill

**N5 – 216 km/h**
- Sydney
- Exposed
- No shielding
- Top of hill

**C1 – 148 km/h**
- North Queensland
- CBD
- Full shielding
- Bottom of hill

**C4 – 252 km/h**
- Far North Queensland
- Rural
- No shielding
- Top of hill
Insurer Pricing Practices

Construction Year

- Insurer 1
- Insurer 2
- Insurer 3
ICA Building Resilience Rating Tool

Resilience Rating Tool

Address Information
- Queensland
- 2 Picnic Point Esplanade
- Maroochydore 4558

Location Map - Google Maps

House Design Information

Building Element | Material Element
--- | ---
Air Conditioning | Electronics
Blinds/Curtains | Synthetics/Plastics
Ceiling | Composite (Steel, Concrete)
Chimney | Clay Bricks
Doors/External | Plywood (Waterproofed)

Select your choice(s) and click

Choose All

Resilience Rating

Inundation
Tropical Cyclone
Bushfire
Severe Rain
Halostorm

Hazard Amplifier

- Inundation
- Tropical Cyclone
- Bushfire
- Severe Rain
- Halostorm

Information on the resilience of ceilings...

Powered by
edgeenvironment.com.au
Changes to building code

Cost benefit perspective

- BCA: “...benefits to society greater than the costs.”
- Master Builders: concerns that BCA leading to increased costs of construction, creating affordability issues

May be useful to quantify benefits

- For example, $10,000 saving once every 100 years?
Conclusions - Pricing

- Recognise repair costs higher in more remote areas
- Building standards impact cost of windstorm
- Improve collection of age of building (although not a perfect measure)
- Include consideration of building age in future modelling of windstorm risk
- For older buildings, may be appropriate to construct cost algorithms in a manner that reflects standards
- Link between mitigation and pricing, consistent with insurance industry public positioning
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