Resilient Communities Doing Better in Bad Times

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Dwelling, Component and Amenity Resilience Tools

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NZ Hazards Review

- Pre-2010 flooding is the main NZ hazard
  - Slips and landslides
- Storms second
  - High wind and tornado

- Trend changed by the Canterbury earthquakes that account for the largest NZ financial losses ever

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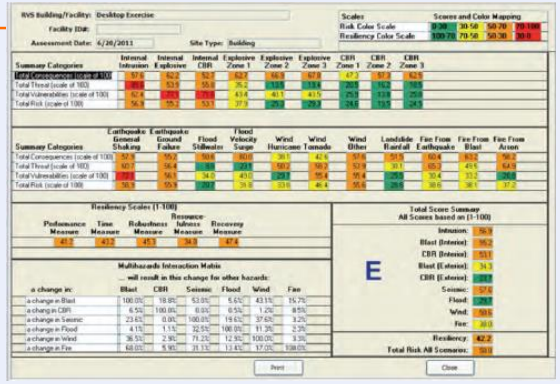
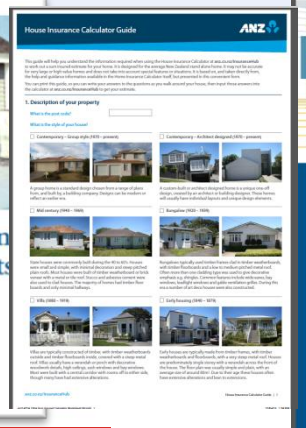
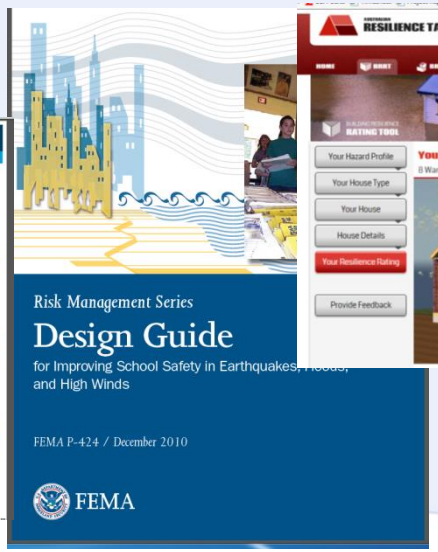
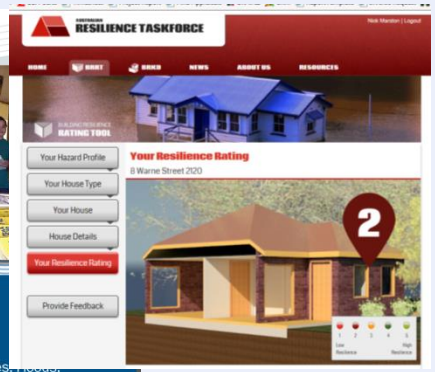
Existing Tools Review

- Review of existing resilience tools
- Few resilience assessment tools
- Some materials guidance and some ratings









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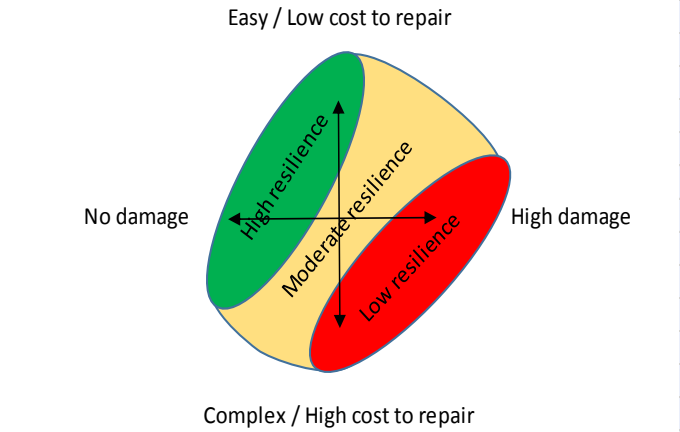
Component Resilience Tool

- Approach mirrors FEMA and ART BRKD
- Building component rating for all hazards
- Component resilience rating scaled
  - Low
  - Moderate
  - High



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Component Resilience

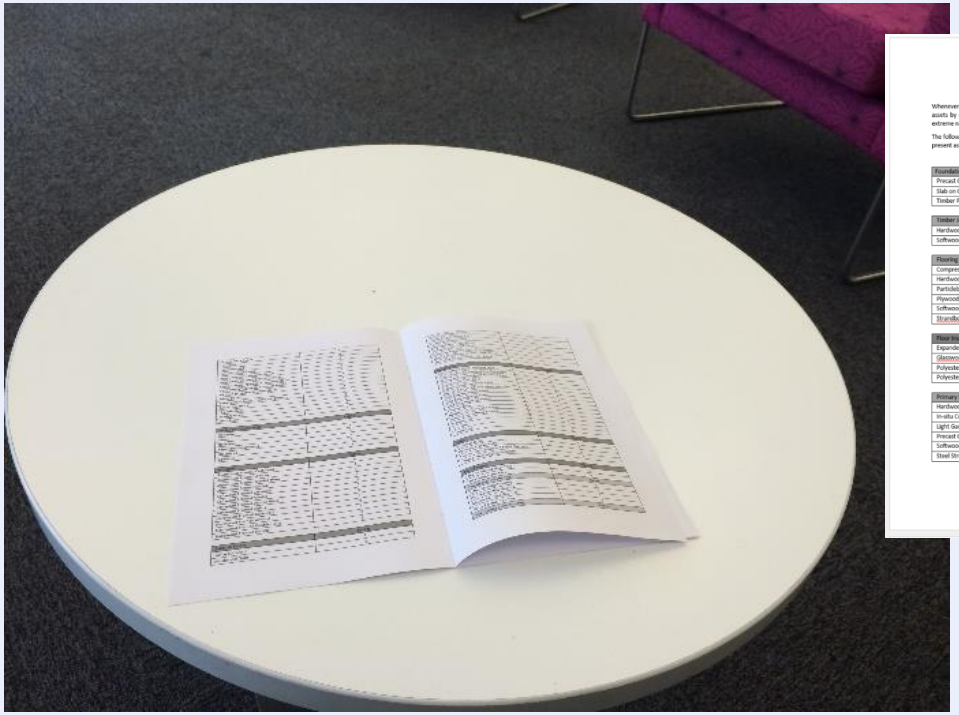
- Components rated from low to high

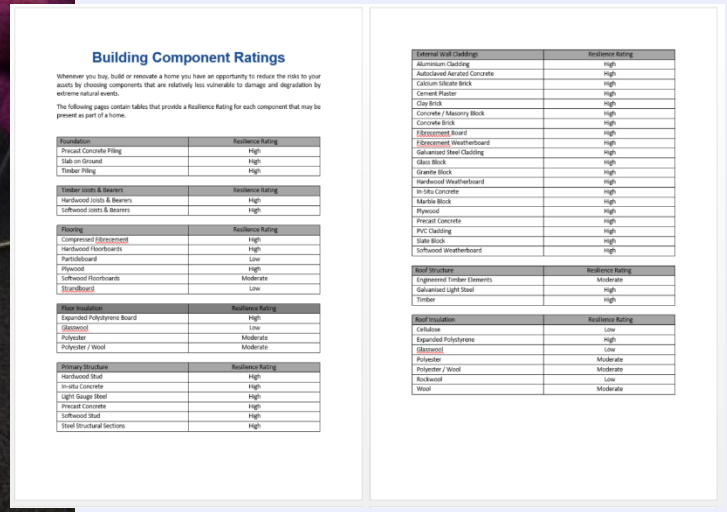
Bedroom Furniture	Resilience Rating
Hardwood Based	High
Laminated MDF Based	Low
Laminated Particleboard Based	Low
Metal Framed	High
Softwood Based	High

Flooring	Resilience Rating
Compressed Fibrecement	High
Hardwood Floorboards	High
Particleboard	Low
Plywood	High
Softwood Floorboards	Moderate
Strandboard	Low

Wall Insulation	Resilience Rating
Expanded Polystyrene	High
Glasswool	Low
Polyester	Moderate
Polyester / wool	Moderate
Rockwool	Low
Wool	Moderate

Component Tool





Building Component Ratings

Whenever you buy, build or renovate a home you have an opportunity to reduce the risks to your assets by choosing components that are relatively less vulnerable to damage and degradation by extreme natural events.

The following pages contain tables that provide a Resilience Rating for each component that may be present as part of a home.

Foundation	Resilience Rating
Precast Concrete Piling	High
Slab on Ground	High
Timber Piling	High

Timber Joists & Bearers	Resilience Rating
Hardwood Joists & Bearers	High
Softwood Joists & Bearers	High

Flooring	Resilience Rating
Compressed Fibrecement	High
Hardwood Floorboards	High
Particleboard	Low
Plywood	High
Softwood Floorboards	Moderate
StrandBoard	Low

Floor Insulation	Resilience Rating
Expanded Polystyrene Board	High
Glasswool	Low
Polyester	Moderate
Polyester / Wool	Moderate

Primary Structure	Resilience Rating
Hardwood Stud	High
In-situ Concrete	High
Light Gauge Steel	High
Precast Concrete	High
Softwood Stud	High
Steel Structural Sections	High

External Wall Claddings	Resilience Rating
Aluminium Cladding	High
Autoclaved Aerated Concrete	High
Calcium Silicate Brick	High
Cement Plaster	High
Clay Brick	High
Concrete / Masonry Block	High
Concrete Brick	High
Fibrecement Board	High
Fibrecement Weatherboard	High
Galvanised Steel Cladding	High
Glass Block	High
Granite Block	High
Hardwood Weatherboard	High
In-Situ Concrete	High
Marble Block	High
Plywood	High
Precast Concrete	High
PVC Cladding	High
Slate Block	High
Softwood Weatherboard	High

Roof Structure	Resilience Rating
Engineered Timber Elements	Moderate
Galvanised Light Steel	High
Timber	High

Roof Insulation	Resilience Rating
Cellulose	Low
Expanded Polystyrene	High
Glasswool	Low
Polyester	Moderate
Polyester / Wool	Moderate
Rockwool	Low
Wool	Moderate

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Resilient Homes

- Wind and rain related
- Building complexity
- Building design and features
- Building condition
- Effects of wind-blown debris from adjacent trees etc

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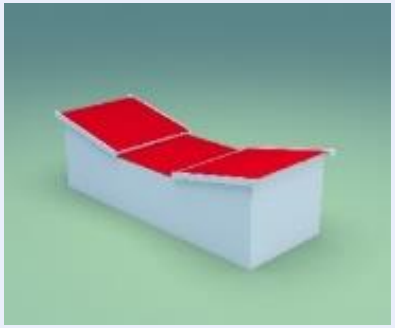
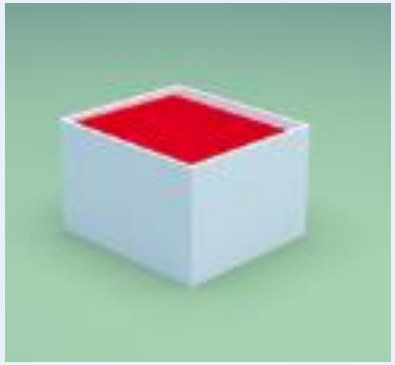
Resilient Roofs?





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Resilient Features?

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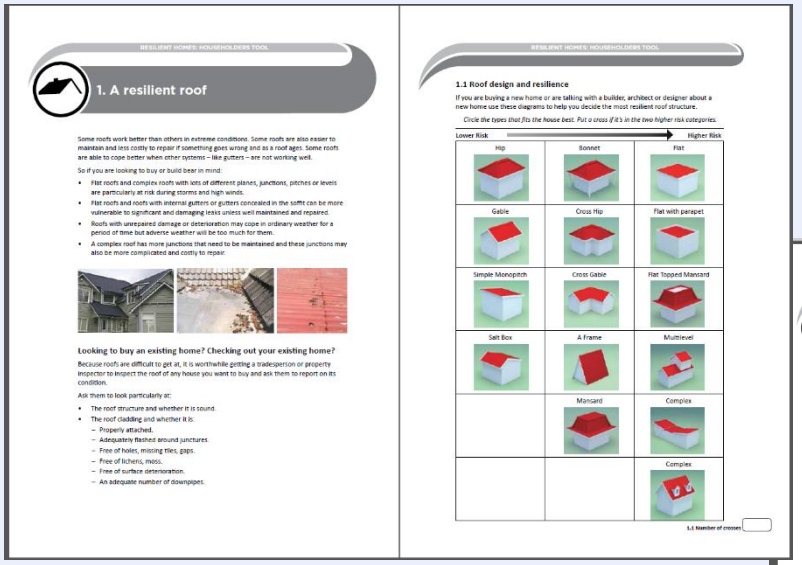
Resilient Homes Tool



RESILIENT HOMES: HOUSEHOLDERS TOOL

1. A resilient roof

Some roofs work better than others in extreme conditions. Some roofs are also easier to maintain and less costly to repair if something goes wrong and as a roof ages. Some roofs are able to cope better when other systems – like gutters – are not working well.

So if you are looking to buy or build bear in mind:

- Flat roofs and complex roofs with lots of different planes, junctions, pitches or levels are particularly at risk during storms and high winds.
- Flat roofs and roofs with internal gutters or gutters concealed in the soffit can be more vulnerable to significant and damaging leaks unless well maintained and repaired.
- Roofs with unrepaired damage or deterioration may cope in ordinary weather for a period of time but adverse weather will be too much for them.
- A complex roof has more junctions that need to be maintained and these junctions may also be more complicated and costly to repair.

Looking to buy an existing home? Checking out your existing home?

Because roofs are difficult to get at, it is worthwhile getting a tradesperson or property inspector to inspect the roof of any house you want to buy and ask them to report on its condition.

Ask them to look particularly at:

- The roof structure and whether it is sound.
- The roof cladding and whether it is:
  - Properly attached.
  - Adequately flashed around junctures.
  - Free of holes, missing tiles, gaps.
  - Free of lichens, moss.
  - Free of surface deterioration.
  - An adequate number of downpipes.

RESILIENT HOMES: HOUSEHOLDERS TOOL

1.1 Roof design and resilience

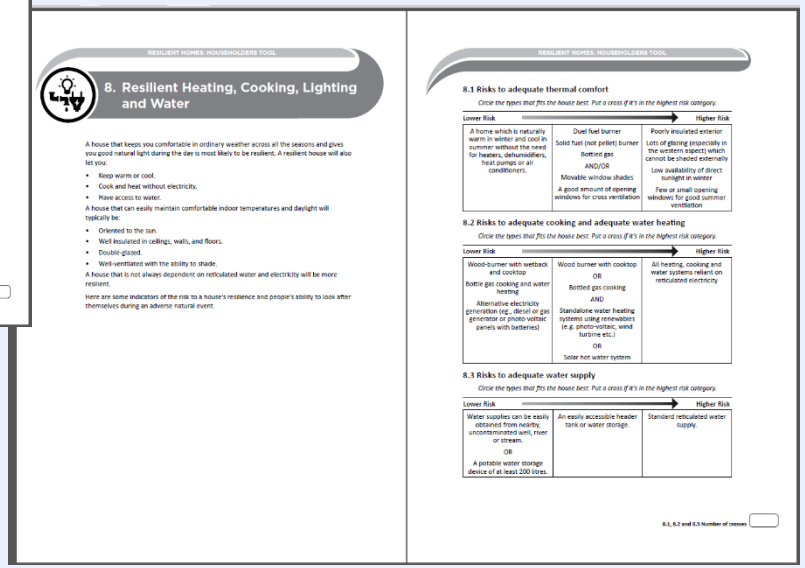
If you are buying a new home or are talking with a builder, architect or designer about a new home use these diagrams to help you decide the most resilient roof structure.

Circle the types that fits the house best. Put a cross if it's in the two higher risk categories.

Lower Risk → Higher Risk

Hip	Bonnet	Flat
Gable	Cross Hip	Flat with parapet
Simple Monopitch	Cross Gable	Flat Topped Mansard
Salt Box	A Frame	Multilevel
	Mansard	Complex
		Complex

1.1 Number of crosses



RESILIENT HOMES: HOUSEHOLDERS TOOL

8. Resilient Heating, Cooking, Lighting and Water

A house that keeps you comfortable in ordinary weather across all the seasons and gives you good natural light during the day is most likely to be resilient. A resilient house will also let you:

- Keep warm or cool.
- Cook and heat without electricity.
- Have access to water.

A house that can easily maintain comfortable indoor temperatures and daylight will typically be:

- Oriented to the sun.
- Well insulated in ceilings, walls, and floors.
- Double-glazed.
- Well-ventilated with the ability to shade.

A house that is not always dependent on reticulated water and electricity will be more resilient.

Here are some indicators of the risk to a house's resilience and people's ability to look after themselves during an adverse natural event.

RESILIENT HOMES: HOUSEHOLDERS TOOL

8.1 Risks to adequate thermal comfort

Circle the types that fits the house best. Put a cross if it's in the highest risk category.

Lower Risk → Higher Risk

A home which is naturally warm in winter and cool in summer without the need for heaters, dehumidifiers, heat pumps or air conditioners.	Duel fuel burner Solid fuel (not pellet) burner Bottled gas AND/OR Movable window shades A good amount of opening windows for cross ventilation	Poorly insulated exterior Lots of glazing (especially in the western aspect) which cannot be shaded externally Low availability of direct sunlight in winter Few or small opening windows for good summer ventilation

8.2 Risks to adequate cooking and adequate water heating

Circle the types that fits the house best. Put a cross if it's in the highest risk category.

Lower Risk → Higher Risk

Wood-burner with wetback and cooktop Bottle gas cooking and water heating Alternative electricity generation (eg., diesel or gas generator or photo-voltaic panels with batteries)	Wood burner with cooktop OR Bottled gas cooking AND Standalone water heating systems using renewables (e.g. photo-voltaic, wind turbine etc.) OR Solar hot water system	All heating, cooking and water systems reliant on reticulated electricity

8.3 Risks to adequate water supply

Circle the types that fits the house best. Put a cross if it's in the highest risk category.

Lower Risk → Higher Risk

Water supplies can be easily obtained from nearby, uncontaminated well, river or stream. OR A potable water storage device of at least 200 litres.	An easily accessible header tank or water storage	Standard reticulated water supply.

8.1, 8.2 and 8.3 Number of crosses

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