

## Is your house safe in a cyclone?

### Is your house built to code?

Generally speaking houses and units built since Cyclone Tracy in cyclonic areas of the Northern Territory are designed to withstand a mid-range category 4 cyclone. Category 4 cyclones have wind speeds between (225-279km/hr). Buildings that comply with the Building Code of Australia are generally referred to as being “built to code”.

Excluding consideration of the impact of wind-borne debris, a building designed and built to code should be able to withstand the wind loads from a low level Category 4 cyclone with minimal structural damage. However, at ultimate design wind loads, as would be applicable to a mid-range Category 4 cyclone, the building (or at least some elements of the building) would be expected to be at design capacity and it is likely that significant structural damage and/or structural failure may occur.

Over time buildings that were originally built to code may deteriorate unless they are appropriately maintained. The following guideline has been prepared to assist you in ensuring your house or unit is safe.

### Inspection Guide for Buildings in Cyclonic Regions of the NT

This guideline has been developed as a general guide for the inspection and maintenance of structural elements in buildings. It is not meant to be exhaustive nor a substitute for professional building or structural advice.

There is no practical method of construction that can guarantee 100% protection of a building from a cyclone. This is particularly so for residential buildings where, for the vast majority of the time, the building needs to function in an open manner with windows and doors in prominent locations. What the code provides for is cyclone resistant construction to certain minimum levels – commensurate with the practicality and cost of construction, risk factors (eg the relatively low frequency of cyclonic events), community safety etc.

There are many factors that ultimately have an effect on cyclone-resistant construction and whether a building will sustain significant damage or not. For example:

- older structures are more likely to have deteriorated components (corrosion, rot, termite/insect attack, weathering) leading to a reduction in strength along the critical load path within the building;
- the effect of flying debris generated by loose items, trees, power lines or disintegrating buildings can be a significant factor. In older suburbs where buildings that survived Cyclone Tracy remain without upgrading there could be an increase in debris risk;
- incorrect or poor construction practice; and
- the intensity and path of the cyclonic winds.

Experience with Cyclones Ingrid (2005) and Monica (2006) has shown that buildings built to code can withstand severe conditions very well. Recent reports on both these events indicate that where failures to buildings from wind forces (not falling trees or debris) were observed, they were generally associated with the following:

- older buildings that had not been built to current building codes; or
- deterioration of building components and/or fixings (lack of maintenance); or
- incorrect or poor construction practices on newer structures.

The reports highlighted the need for regular inspection and maintenance of structural elements (including those in the roof space) to look for signs of deterioration (e.g. corrosion, rot, termite/insect attack, weathering etc).

The ongoing maintenance of buildings is particularly important in cyclonic regions as it may be many years until a severe cyclone impacts on a building. Often, only one element of the structure needs to be compromised for the risk of damage to increase significantly.



Corroded screws and cladding

Any building has the potential, if not appropriately maintained, to fail at some stage.

### **What can affect buildings?**

Building owners and occupiers need to be aware that there are a many things that can affect the structural adequacy of a building over a period time. These include:

#### Corrosion

Corrosive environments can affect steel structures, reinforcing steel in concrete structures, metal cladding, metal battens, bolts, fixing plates and fixings such as cyclone assemblies (screws) and metal batten straps. This is particularly relevant to areas that are in close proximity to the coast.



Corrosion of top hat batten



Corroded batten straps

#### Rotting Timber

Timber is affected by moist damp conditions. Wet rot is basically timber decaying naturally in the presence of high levels of moisture. This can affect structural components such as bearers, joists, flooring, timber external cladding and timber framing - particularly in exposed locations or where water leaks are present.

## Termites

Timbers are subject to insect attack. The Territory is in an area of high termite risk. Appropriate timber selection and treatments are important factors. Termite protection systems require on-going inspection and maintenance to afford continuing protection to timber components.

## Weathering

Climatic conditions such as high humidity, high rainfall, strong winds and long dry periods can cause structural components to shrink or expand and to deteriorate over time within the building. Effects of weathering could be to loosen tie-down bolts or fixings. Regular maintenance should be undertaken to eliminate loose fixings and replace deteriorated timbers.



Deteriorated timber  
(Floor joist at external wall connection)

## **What should a building owner do?**

As a safety measure homeowners, commercial and industrial property owners and body corporates should ensure that:

- all buildings and/or structures are constructed in accordance with the approved building permit;
- the building or structure is inspected on a regular basis for any warning signs of potential compromise to key structural elements as a result of the likes of corrosion, rot, termite activity or weathering;
- a maintenance program is followed to extend the design life of structural components; and
- where there is a doubt or a problem, an inspection by a structural engineer or other qualified building practitioner is carried out and remedial measures, as necessary, are undertaken.

## **What should a building owner look out for?**

A general visual inspection on a yearly basis should identify most problems. Some risk factors to look out for are:

- corrosion of metal cladding and fixing;
- corrosion of metal structural components including columns, beams, column to beam and column base connections;
- corrosion of and/or loose brackets and bolts;
- corrosion of fencing supports and sheeting;
- deterioration of structural timbers (exterior and interior) at verandahs, balconies, fencing, carports, pergolas, door and window frames, first floor timber framing;

- evidence of termite attack to structural members;
- loose roof and wall sheeting; and
- deterioration of roof attachments such as roof vents, solar hot water systems, satellite dishes etc.

If any of these conditions exist, maintenance measures should be put in place to stop the further deterioration of the building component and in extreme situations it may need to be replaced entirely.

Prior to taking any action to replace a building component, a structural engineer or other suitably qualified building practitioner should be consulted. Building permits may be required for more significant works.

### **Who can I contact to undertake an inspection?**

There are a number of building practitioners who have the skills and experience to inspect buildings and provide advice on their safety and maintenance requirements. These include:

- building certifiers;
- structural engineers;
- architects; and
- builders.

Industry associations may also provide advice on appropriate building practitioners.

A list of NT registered building practitioners can be found on the Building Practitioners Board web site: [www.nt.gov.au/bpb](http://www.nt.gov.au/bpb).

Photos courtesy of: Cyclone Testing Station  
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