ARCHITECTURAL ASSESSMENT
ST. THERESA'S CHURCH
NGUIU, BATHURST ISLAND

Prepared for
THE NATIONAL TRUST OF AUSTRALIA (N.T.)

by
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DECEMBER, 1986.

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BRIEF HISTORY AND DESCRIPTION.

Completed in 1941 by a resident builder, Peter de Hayer (1870 - 1958), the church is one of a cluster of distinct "Queensland" style buildings consisting of the Presbytery, Convent and Radio Hut.

The church has a cruciform plan shape 25.7 metres from the front door to reredos, the main transept being 7.14 metres wide with two 7.5 X 3.05 metre side transepts. The main and side transepts are supported approximately 1.9 metres above a ground level concrete slab on four longitudinal rows of eleven adze-trimmed, iron-wood stumps approximately 250mm diameter. The perimeter of the ground floor is enclosed with rough sawn vertical boards with 4 pairs of wooden gates similarly clad.

The stumps support 125 mm X 100 mm cypress pine bearers which are secured to the stumps by wrought iron eye bolts, which pass through the bearers and are washered and nutted. The eye of the bolt is dog spiked to the stump. Galvanised iron ant caps are provided.

Cypress pine joists are generally 125 X 50 mm at 450 mm centres. Flooring consists of 150 X 25 mm dressed cypress pine boards. The main first floor structure consists principally of 100 X 100 mm cypress pine posts at approximately 3 m centres and 3.6 m high. These posts are tenoned into a 100 X 75 mm top plate. Three sets of 100 X 75 mm noggins between these posts form window sill, window head and spandrel horizontal supports. End and transept walls are standard stud type Queensland construction. All external cladding consists of 125 X 25 mm weatherboard. A picturesque truss system of dubious structural worthiness consists of 100 X 75 mm cypress pine bottom chords, top chords and short "collar ties". An 18 mm steel tie rod connects the "collar tie" and the bottom chord at mid span.
Attractive bowed 5 veneer laminated knee braces and 7 veneer laminated arches complete the truss system. Laminates consist of 75 X 15 or 17 mm thick cypress pine battens, nailed together to a built-up thickness of 100 mm in knee braces and 120 mm in arches. End connections of the knee braces to bottom chords and posts; and end connections of the arches to bottom chords are of poor structural integrity.

Eight rows of 100 X 50 mm purlins per top chords are top-clad with 100 X 25 mm "V" jointed diagonal boards. Nailing battens support painted, corrugated, galvanised iron roof sheeting.

A structural assessment by S.J. Delahay M.I.E. Australia follows;
Wind loads, resistance, upgrading, extensive work(s) required.

The writer, in company with Mr P. DERMOUDY, inspected the Church on the 13th November 1986, with a view to assessing the resistance of the structure to cyclonic wind loading.

The structure is of traditional 'Queensland' design, built in the 1930's. Workmanship throughout is in keeping with the generally high standards of the time, utilizing local timbers where possible.

The building is of impressive design with a cross shaped floor plan, set on ironwood piers.

Few latter day components are incorporated to resist uplift and racking loads associated with cyclonic wind forces.

Maintaining the structure during high applied wind loading is a question of establishing the applied loads and checking these against the capability of the building to resist these loads with an incorporated safety factor.

Maximum applied loads are assessed from the wind loading code (AS 1170) for coastal areas subject to cyclonic winds.

Resistance of the structure has been calculated on a preliminary basis using a structural computer package. This analysis assumes that all connections are sufficient to resist the applied loading without failure. Excessive deflection occurs under these conditions (400 - 600 mm) showing that complete failure is likely during a cyclone. The single span area accommodating the congregation is more vulnerable due to the lack of shear walls and racking resistance, whereas the area around the alter is considerably more rigid due to the floor plan.
Lack of bracing and uplift resistance to the ground floor area is a further likely area of failure.

It is therefore unlikely that the building would survive in cyclonic wind conditions.

UPGRADING OF THE EXISTING STRUCTURE

As this is a historic building any upgrading work will be complex due to the necessity to preserve the shape and form of the existing structure. Where possible additional cleats, screws, bracing members etc should be hidden or if not possible, blend into the existing architecture.

The following works are required:

1. Provide sufficient mass to footings to resist uplift.
2. Install bracing to ground level structure.
3. Upgrade ALL connections to provide load transfer.
4. Construct a shear wall at the main entrance.
5. Install horizontal longitudinal trusses both sides of main building to transfer lateral loads to shear walls.

SUMMARY

Extensive and relatively costly works are required to ensure that this historic building is capable of surviving cyclonic wind loads.

S.J. DELAHAY  M.I.E. Aust.

NOVEMBER 1986
RECOMMENDATIONS FOR STABILIZATION AND CONSERVATION WORK

Discussion. It is axiomatic to state that a vacant building is at great risk of becoming derelict due to lack of maintenance and tender loving care. Add to that, a paucity of funds and the buildings demise is almost guaranteed. From discussions and general rumour heard whilst on location, it was gleaned that the building was thought to be too small for the present congregation and that the construction of a new building, which may have the multi purpose facility of providing shelter during cyclones etc., was being considered.

A large amount of work and hence money is required to upgrade the existing church to cyclone-proof standard. The fate of the church really hangs in the amount of funding available and the preferred use of that funding.

It seems reasonable to postulate on a combination of church expansion (additions) to cater for growing congregations, along with structural upgrading to provide cyclone shelter in the existing building.

There must be some change to the internal appearance of the church at least, if cyclone standard upgrading is to be carried out - this simply cannot be avoided, as proper connections must be made between purling to trusses, truss member to truss member, truss to columns, columns to stumps, joists to bearers and bearers to stumps and the long walls must be trussed in the horizontal plane to avoid the engineers predicted 600 mm movement in cyclone conditions.

Another consideration is that weight must be added to the building to prevent it simply blowing away complete with it's uprooted stumps.

If the extensions were made on both sides of the main transept, the seating capacity could be doubled. The extensions
could contain all the required weight, structural stiffness and debris penetration resistance required to make the church the cyclone shelter. The church interior, except for the removal of the window panels between the posts, could remain virtually untouched and the original concept would be preserved. Purists maybe alarmed at some of the changes, but it must be argued that expansion is a natural occurrence with buildings in a growing, healthy society, that money must be carefully spent and seen to produce worth while results, that if something is not done quickly, the problem may disappear anyway - into Apsley Strait!
Entrance and Right Hand Transept

North Elevation
Main Transept View to Entrance Vestibule

Main Transept: View to Sanctuary
Main Transept: Knee Brace Detail
Main transept: Ceiling detail
Ground floor looking East

Stump / bearer / joist connections