

The Robert Clark Horticultural Centre

With its intricate web of steel, fully-glazed walls and roofs, The Robert Clark Horticultural Centre at Ballarat Botanic Gardens has won the inaugural AISC 1995 Victorian Architectural Steel Design Award for Buildings. AISC's Victorian and Tasmanian State Manager, Frances van Reyk, reports on the project.

Likened to a giant crystal rising from the ground, the Robert Clark Horticultural Centre is located between the Prime Ministers Avenue and Victorian Statuary in Ballarat's Botanical Gardens. It was donated to the City of Ballarat by the grandson of Robert Clark, local newspaper pioneer and founder of the Ballarat Courier.

"Derived from natural forms, crystalline and faceted, this building is like a transparent gem stone, held together by an intricate web of steel. My hope is to have created a building that will inspire, uplift and touch the imagination of everyone who sees it," said architect Peter Elliott.

Design

Conceptually, conservatories aim for clarity of form and structure. Designs seek to achieve maximum sunlight. These requirements demand as much transparency as possible without losing structural integrity.

The concept for the Ballarat Conservatory began when Peter Elliot experimented with origami to visualise the structure he wanted - a building which would integrate with the plants it housed and contain within its design the crystalline forms within those plants.

Externally, the building's repetitive sloping angular planes and its sculpted, ridged profile work together to reduce its bulk. Inside, the stepped faceting creates rhythmic bays with a dramatic vertical effect.

Engineering Solution

Made from tubular steel, the structural system is based on a series of six 'A' frame bays. These were fabricated in the workshop of Geelong Fabrications and transported to site.

Commenting on the project, Peter Hoad of Ove Arup & Partners, said steel was the obvious choice. Tube sections were used for their ability to contain services and accept intercepting welded members with simple profiling.



Drawing a unanimous decision from the judging panel, The Robert Clark Horticultural Centre relies on a steel frame to achieve clarity of form and structure.

Although simple in concept, the Centre's design relies on more than one bay to provide structural integrity.





Plane trussing was introduced to enhance the structure's stiffness and improve efficiency by reducing and increasing flexural and axial loads respectively.

"What started as a single 'A' frame member at each primary grid became twin members to aid prefabrication and ease erection," Mr Hoad said.

"Plane trussing was introduced to significantly enhance the stiffness of the structure and improve efficiency by reducing flexural loads and increasing axial loads in the tube sections."

The resulting individual fabrication modules formed a three dimensional grid with trusses which provided orthogonal stiffness.

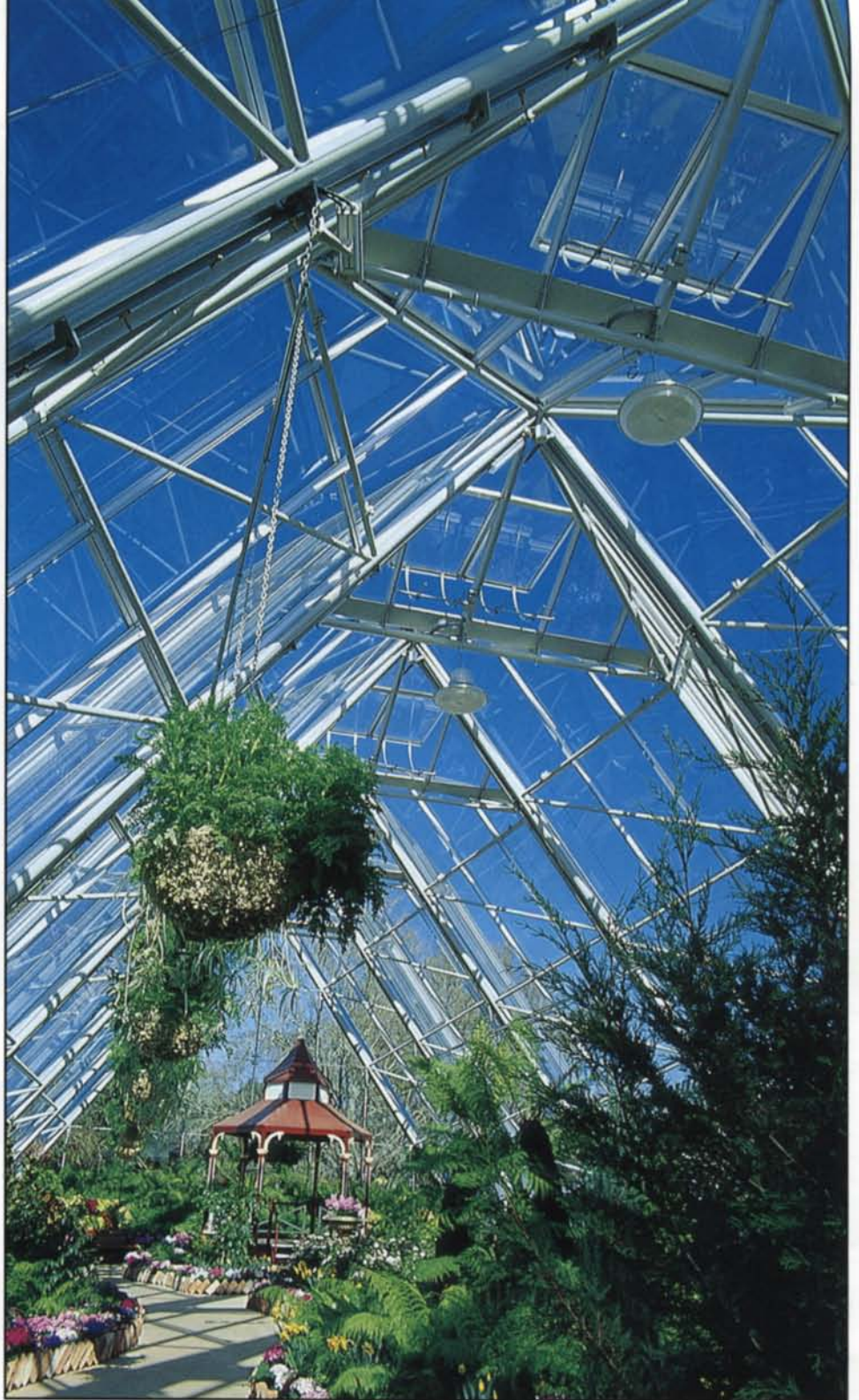
"When steel is exposed to view, a great deal of attention must be paid to the connection details. In this case, the Centre incorporates details which satisfy both the architect's aesthetic goals and structural efficiency requirements," Peter Hoad said.

Fabrication and Erection

"The key to successful completion of the project was the use of purpose-made jigs to assist with fabrication of the 'A' frames," said John Whitehead of Geelong Fabrications.

"The tight tolerances and the requirement of a high standard of finish meant that no fabrication errors could be tolerated. The structure had to fit together when erected." The nature of the Horticultural Centre creates an aggressive and corrosive environment. A high standard of corrosion protection was specified. This included high build paint systems and the galvanising of some components.

The 'A' frames were brought to site and glazed on the ground prior to erection. True to Ove Arup's prediction, Geelong Fabrications found that the structure deflected 12mm when fully erected.



Tube sections intercept welded members with a simple profile.

Judges' Comments

The judging panel consisted of David Sainsbery of The Sainsbery Reed Group and representative of the Royal Australian Institute of Architects (RAIA); Bob Watson, architect; Bob Sturrock, structural engineer with Sturrock Design Associates; and Barry Davis of AMS Fabrications and AISC's Victorian State Committee.

"The judges' decision was unanimous, given the architect's realisation of the design of the steel

framed, free-standing walk-through conservatory," Mr Sturrock said.

The 1995 Victorian Architectural Steel Design Award was presented to Peter Elliot Architects, Ove Arup & Partners, Geelong Fabrications, and builder Hooker Cockram at a dinner sponsored by BHP Long Products and Stramit Industries. Co-sponsors were Galvanizing Industries, Welded Tube Mills, Union Steel, BHP Building Products, Tubemakers Structural & Engineering, and Palmer Tube Mills.