



# WARP & WEFT

MEMBRANE STRUCTURES ASSOCIATION OF AUSTRALASIA NEWSLETTER



Amid the general atrophy of the world economy, Membrane Structures companies in Australia and New Zealand have been quietly promoting themselves to all parts of the globe.

Not only promoting but doing!

One particular feature stands out and that is the ease with which the Industry is performing on the international field. No longer limited to Australasia, it can boast of projects completed or under way in the Pacific and South East Asia, China, the Middle East, Europe and even Japan! We are building up valuable experience in working 'off-shore'.

Because of small home markets we have become adept at 'one-off' projects, and this is most often what membrane structures are.

In fact projects done within Australia and New Zealand are being noticed off-shore and are cultivating enquiries and requests for our product overseas. The more work done overseas, the more exposure we are getting and the greater the demand for our services.

The Industry has entered the new decade with a keen weather eye overseas. An interesting decade of opportunity beckons.

## President's Message

From its beginning in 1982 the MSAA has largely fulfilled its aims and objectives. It may be timely to look back over these to place past achievements in perspective and to plot the course for the next decade of operations.

The late 70s saw the beginning of a local industry which flowered into mainstream acceptability in the building industry following such notable successes as the major membrane contract at Yulara Village designed by architect, Phillip Cox.

The Association was framed with broad objectives including:-

1. *Establishment of local capability in fabrication of membrane structures in all materials.*
2. *Development of wide skills base in construction allied aspects, e.g. steel work, finishes, erection.*
3. *Production of high industry standards for manufacture and design including specifications.*
4. *Replacement of imported component with local design and production.*
5. *Education of design professionals in special skills and development of computational techniques for analysis, formfinding and patterning.*
6. *Construction of world class structures in all materials and in all scales of work.*
7. *Presentation of a representative professional body to the industry on relevant issues.*
8. *Holding of regular topical and technical meetings and conferences for dissemination of information, meetings of members and provision of public forums.*
9. *Educational programmes into colleges to train architects and generally promote the potential of the field.*

We have added to this list with substantial effort by the committees in technical works, promotion through published literature including 10 issues of our magazine, **Warp & Weft** and a glossy folder with descriptive literature for general use. We have run highly successful biennial awards programmes to recognise excellence in built work.

Looking at how we have a viable, world class industry which does all processes locally with flair and imagination, we can feel rightly proud that all or most of the aims are achieved to varying degrees.

What is next?

Many areas of endeavour require additional work, refinement or shift in emphasis and focus. Most of the founding members are still active with many holding positions in the Executive of the association. Recognising the truth in the old election adage, "IT'S TIME" we would like to see new energy in the executive to take on the next phase of the association's life.

While we have coherent views as to future direction and still wish to participate in activities, we seek interested persons to step forward to be involved in framing change in emphasis in the future plans. The vehicle of the MSAA is healthy and viable with a healthy bank balance and cash flow. It has demonstrated strength in unity of purpose and is good at arranging conferences, publications and associated matters.

Please take this opportunity to be a part of the organising group. All positions will be vacated at the next AGM, and I encourage you to put your name forward to participate in the future work of the Association.

*David McCready — President*

## Surf Club Cafe Fremantle WA



Architect Trevor Salecaba was set a brief to provide 400m<sup>2</sup> of attractive covered outdoor eating space for the existing beach side facilities.

Working closely with the Architect, Brisbane firm Kamols Membrane Structures successfully combined a new tension fabric roof with a series of Shade Structures, 5.3m, 'Pacific' umbrellas already at the site.

The new roof of HAKU Polymar fabric and irregular conical form with a steeply inclined mast and stayed perimeter supports provided an ideal and dynamic solution.

In spite of its complexity, close planning allowed erection to be completed days ahead of schedule.

Interestingly, a severe storm with winds in excess of 130 km/hr occurred within hours of completion adding further to the confidence clients can expect from well executed membrane structures.

## Jurong Bird Park Amphitheatre Completed

Permafab Pty Limited, in association with their Consulting Engineer Bond James Norrie Marsden and Singapore based L & M Prestressing Pte have recently completed the design and construction of the new 1,500m<sup>2</sup> amphitheatre roof at Jurong Bird Park Singapore.

Opened by Lee Kwan Yew, the amphitheatre is covered by the first freeform tension structure in the region manufactured from SHEERFILL Teflon (PTFE) coated fibreglass.

The roof was delivered in two pieces and joined by heat sealing on site before lifting to the 30 metre high mast. Architect for the project is the Jurong Town Council in collaboration with Permafab.



## World Trade Centre Completed

The recently completed upgrading of the Singapore World Trade Centre and addition of a new cruise liner terminal features two SHEERFILL Teflon (PTFE) coated fibreglass roofs, designed and built by Permafab Pty Limited in association with L & M Prestressing Pte of Singapore.

The new 'Expo Gateway' Exhibition Hall is clad with two membranes totalling 3,500m<sup>2</sup>, the smaller Maritime Museum roof similarly of two piece construction covers 2,500m<sup>2</sup>. Both buildings are fitted out with FABRASORB Teflon coated fibreglass thermal/acoustical liners.

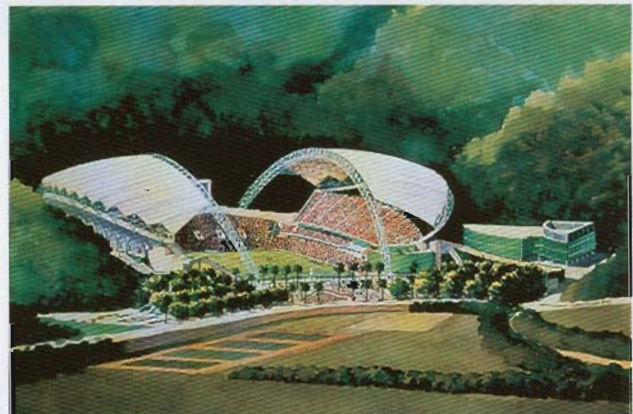
Design of the membranes and the supporting steel structures was completed in Sydney by Consulting Engineer Bond James Norrie Marsden in association with Permafab Pty Limited who fabricated the membrane and supervised installation at the site by L & M. Architect for the project is S.A.A. Partnership of Singapore.



## Hong Kong Stadium Under Way

Fabrication of the 15,500m<sup>2</sup> SHEERFILL Teflon (PTFE) coated fibreglass membranes for the Grandstand roofs started in early October. The French construction giant, Dragages et Travaux Publics (HK), started demolition of the old stadium within days after the 1992 Hong Kong Rugby 7s competition in March. Construction of the precast seating tiers is now well advanced and will be completed in time for the next series in April 1993.

Steel erection will commence immediately after the 1993 event, followed in August by the tensioned fabric roof. Permafab Pty Limited are responsible for the design, manufacture and installation of the roofs in association with Structural Consultant Bond James Norrie Marsden. Fabrication is by Structureflex Australia Pty Ltd under contract to Permafab. Wind tunnel analysis of the roofs which will be subject to severe typhoon wind conditions in the region was completed by R.W.D.I. of Ontario, Canada. Architect for the project is H & OK Sports of Kansas City, USA.



## Waterfront Place Canopies



A series of six separate canopies has been installed around the entry of the prestige Waterfront Place Centre in Brisbane. Designed to provide protection to pedestrians from the weather and elements, they were fabricated and installed by Structurflex Australia and engineered by McLean Wade and Partners. Architects for the canopies were Cameron Chisholm Nicol (Qld) Pty Ltd who were also the architects for the tower block.

Fabric for the project was Tedlar coated Naizil polyester/vinyl.

## The New with the Old



Structurflex, New Zealand's leading proponent of tension membrane structures recently combined with architects Sinclair Group to solve the recurring problem of adding a 'new' roof to an 'old' building.

The integration of framed fabric roofing into a setting of older heritage buildings was the design

challenge at St Cuthbert's School in Auckland which requires year round use of its swimming pool.

The high translucence PVC fabric roof system provides an interesting and appropriate internal space yet avoids visual disruption of the heritage qualities externally.

## Over Design — No Way!

In an interesting experiment recently a proposed membrane structure was subjected to independent engineering analysis by three Brisbane design teams.

The highly irregular conic form, while of modest size, offered an excellent opportunity for the engineers, who usually work in isolation, to compare their shape-finding and load analysis procedures in a fully cooperative way.

It is significant that each of the computer systems has some unique features of its own, and all software

packages had been sourced from widely differing origins.

While all three engineers emerged from the gladiatorial pit with some minor abrasions, it was pleasing to see broad grins of satisfaction all round.

This very successful activity has added a hearty measure of confidence to the Industry's already keen desire for sustained high standards.



# S P A C E T E C H

DESIGN ANALYSIS AND CONSTRUCTION OF SPACE STRUCTURES



*Dusk view of newly completed Signal Processing Research Centre Entry by Spacetech.*

Architects, **Walter Brook Pty Ltd** on the Signal Processing Research Centre (Adelaide) at the Multi Function Polis site sought a suitably high tech entry structure to grace the building front and symbolise all that the centre embodies.

Designer/Fabricator, **Spacetech**, who won the project at tender, transformed the design in post-tender stage to contain the tensegrity, flying mast elements, used to stress the fundamentally planar PTFE/glass surfaces.

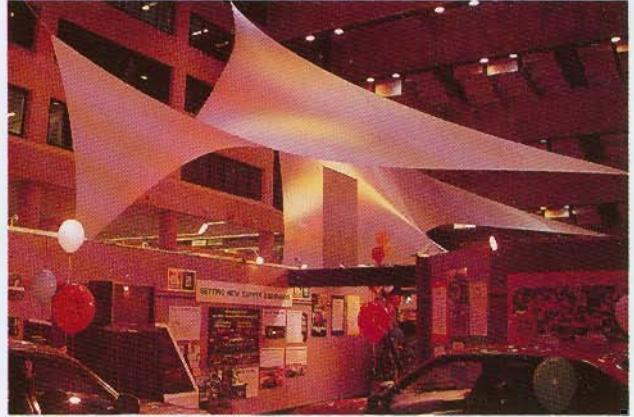
The effect is apparent and a successful project proved satisfying to architect, contractor, engineer and principal.

## Cost Information

To assist with preliminary project budgeting, Cordell's Construction Cost Guide now includes general unit rates for complete tension membrane structures based on covered plan area, PVC/Polyester and PTFE/Glass fabrics, and freeform or air-supported systems.

## Standard Reference Specification

Continuing work by the Association's Technical Committee has resulted in an up-to-date 'Reference Specification' to assist Designers and Specifiers in preparation of construction contract documents.



*Spacetech's Pair of Interior Membrane Structures for the Recent DAS Expo.*

The Federal Government organisation, **DAS** (Dep't Admin. Services) has of late entered into competitive bidding for widely varied project works, as part of government initiatives aimed at making divisions self funding and providing a good measure of competition driven efficiency.

Many potential clients are unaware of the broad range of services offered so **DAS** turned on a technology EXPO at the World Trade Centre (Melbourne) to show its wares and services.

In-house (DAS) architects and designers handled planning and management and **Spacetech** was brought in to design and construct an interior structure for the huge Galleria space which dwarfed human scale with its 20m height internally.

The two structures were built from a stretch fabric and construction was efficiently carried out in a matter of hours. This was a great example of short term interiors structures for event use.

The Specification is available in both hard copy and computer disc, copies of which are available from the Association's Secretary.

## New MSAA Brochure

After two years of work the Association's Promotions Committee has published an excellent brochure outlining information on both the Association and Membrane Structures in general.

Already the demand by all sectors of interest has been encouraging including members, designers, universities and public authorities.

In two parts — a full colour folder and a three colour booklet — the brochure presents a background to the Industry while providing answers to a lot of

the basic questions put by intending designers and clients.

Much of the effort in producing this brochure was carried by Mike Lester as Chairman of the Committee, and by Thiess Contractors Pty Ltd who gave considerable time to its setting up and printing.

The brochure — single or multiple copies — is available free on request from the Association's Secretary.

## First Release Test Results of Immediate Benefit To Construction Industry

A significant advance in the technology of tension membrane structures is being made by the Membrane Structures Association of Australasia.

Just released is a report on the first stage of an extensive wind tunnel test program with the results presented in an easy to use format which will be of immediate value to designers, suppliers and authorities working with these structural forms.

Specifically, this first stage targets design wind pressures on free-form conical shapes with various

height/width parameters, blocking and other characteristics.

The report, available only from the Association, will soon be followed by a second on free-form hyper shapes.

This is the first time that such in-depth data has been presented for universal use rather than being project-specific, and is a direct response by the Association to continual requests for information on the many facets of this ever-growing industry.

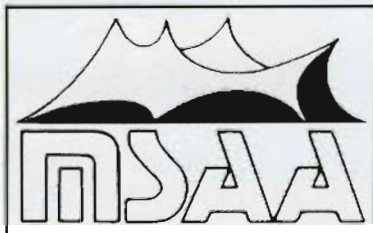
## Shade, Shade, Shade ...

Daily we are reminded, rightly or wrongly, that, as our environment gets more harsh, humankind gets more frail.

Conscious of this, authorities responsible for schools, kindergartens, public pools and the like are

placing no little priority on the provision of shade in playgrounds, over the entry to buildings, and so on.

Tension membrane and net structures have found ready acceptance here, and this can be expected to increase significantly in the coming years.



This Newsletter is produced by the Membrane Structures Association of Australasia.  
Address all enquiries and articles to:

The Membrane Structures Association of Australasia,  
c/- Index Australia  
1/8 Kembla Street, Cheltenham 3192  
Phone (03) 585 1730 Fax (03) 585 1737