

Artist's Impression of World Expo-88, Brisbane

Australia's Largest Tension Membrane Project

It is pleasing to see that the Designers of the World International Expo to be held in Brisbane in 1988 have included large areas of tension membrane roofs and shade areas in their plans.

A 40 hectare site on the south bank of the Brisbane River has been cleared of dozens of old buildings to make way for specially designed pavilions, promenades, lakes, feature squares and all the other trappings of such an event.

Rather than being merely 'occasional features' these membrane roofs have been consciously planned to visually dominate the relative uniformity of the modular pavilions.

Tenders for design and construction were called worldwide in May '85 by Thiess Watkins Pty Ltd. Project Managers for the Expo site, and a scheme by West German Designer Harald Muhlberger was selected from six final contenders for detailed development.

The successful tenderer for the work was the Brisbane firm Thiess Contractors Pty. Ltd. Design co-ordination and foundation design are the responsibility of Maunsell and Partners Pty. Ltd. of Brisbane.

Generally, an undulating fan form radiating from a high mast point has been adopted as the basic module for the \$6m project. This is repeated through the site with clear spans of 60m and mast heights in excess of 50m.

About 55,000 square metres of Type IV PVC/polyester fabric will be supplied, seamed and detailed by Carl Nolte GMBH & Co. West Germany.

The Expo Authority and its planners are to be commended on choosing the contemporary technology of tension membrane structures, and it is hoped that our local industry may yet have the opportunity to make a positive contribution to this once in a lifetime event.

Expo '88's tension roof project is a very significant one both on the Australian and world scenes, and will unquestionably arouse intense interest from within and outside the membrane structures industry.

Since man first developed a formal language, the written word has been an indispensable part of this everyday contact with his fellows. At some later time was coined the catch phrase 'one picture is worth a thousand words'.

The marked surge of interest in membrane structures has established a need for regular and more widely distributed 'words and pictures' about this exciting construction medium than has hitherto been available.

The Membrane Structures Association of Australasia, representing as it does Designers, Suppliers, Contractors and others in the field, not only was the first such group of its type in the world, but

building on the experience of its earlier limited circulation **Newsletter** has now launched **Warp & Weft**, another World first.

While its purpose is unashamedly to promote more vitality in our built environment through proper use of membrane structures, it is planned to develop the format and content of **Warp & Weft** as a continuing source of industry news and practical information from both this country and abroad.

So much of our technical activity has an international flavour and this is equally so in the field of membrane structures. From a handful of local pioneers barely a decade ago, has grown a significant

industry attracting participation by Australian and overseas groups, an industry demanding ever higher technological standards in supplying novel solutions to new building needs and architectural forms.

It is the aim of **Warp & Weft** to provide a service to both the buyers and sellers, the doers and the observers so that all may benefit from an industry based on measured growth in scale and standards.

The Association membership is to be commended on its awareness of a need within the Australian construction scene, and on its initiative in setting about satisfying that need.

History in the Baking ...

No small amount of historic building is to be found in our regional centres.

The old and the new have been successfully brought together in this little project in Ipswich. Once a bakery, now rejuvenated as a restaurant the **Bakehouse Steakhouse** courtyard springs to life at weekends to the heat of jazz groups performing under a bright membrane canopy recently installed by Pickers (Brisbane) Pty. Ltd.

Obviously pleased with the addition, Restaurateur Gary Parcell hinted that the tent paid for itself in the first few months of operation.



The Bakehouse Steakhouse at Ipswich.

Sydney Domain Stage Wins Award

The canopy over the Mobile Stage in the Sydney Domain, erected each year for the Festival of Sydney concerts has been awarded the 1985 Engineering Excellence Award in the Building and Civil Engineering category in the Sydney Division. This

is a boost for membrane structures and for consulting engineers George H. Clark & Associates.

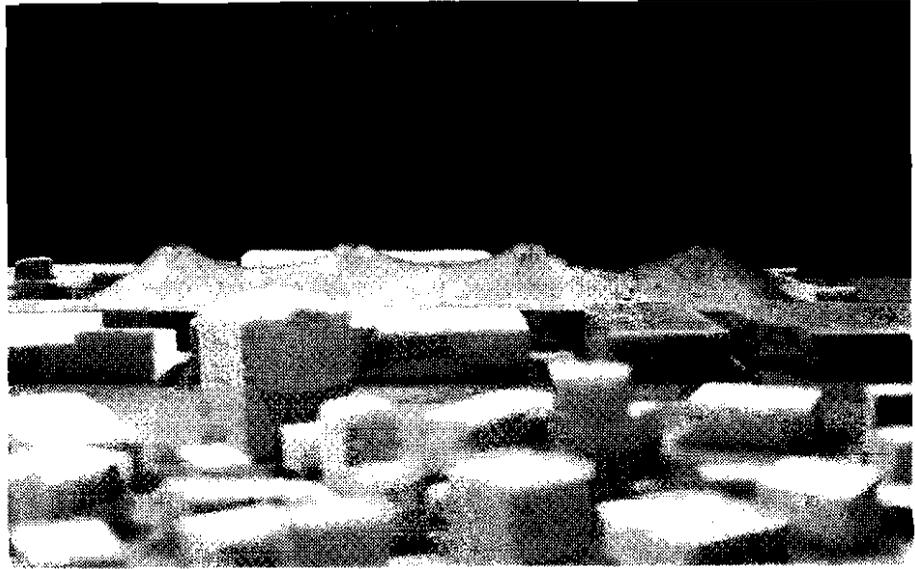
The NSW Mobile Stage was supplied by Brakell Products Pty. Limited to the Premiers Department.

The project managers were the NSW Public Works Department, the designer of the canopy was Vinzenz Sedlak and the fabricator was B. W. Bilsborough & Sons. Computer shape generation and patterning was produced by Dr Peter Kneen.

Maroochydore Mall

Wind Tunnel test for a major fabric structure in Maroochydore leads to significant economies in construction.

Using a technique pioneered in Canada. Australian Wind Engineering consultants. Vipac Pty. Ltd. have successfully defined the effective distributed wind loads on a large fabric roof being constructed at the Maroochydore Shopping Mall. This is the first time that this technique has been used here to predict the wind loads on a fabric roof structure. The conventional wind tunnel technique of measuring local peak pressures leads to over estimation of the structural or "patch" loads experienced by the cladding. This new method of pneumatic averaging provides a much more reliable and generally lower estimate of the true patch loads acting on the roof.



Wind tunnel model of Maroochydore Mall showing pressure lap locations used for patch load measurement.

Shopping with a Difference

At Moranbah in Queensland's "Mineral Valley" — a new town centre whose crowning feature is a large tension membrane roof over a central public square. 42m square in plan with a 20m high mast in the centre. the four edges of the tent roof spring from the roof lines of two-storey supermarket and arcade buildings.

The membrane used was a Tedlar-coated PVC/polyester fabric from the *Shelterite* range. Welded seams were made after careful removal of the Tedlar coating on one side. The choice of this surface finish was made after consideration of the high temperatures and dusty conditions found here.

Visitors have commented on the excellent lighting levels achieved by combining the white fabric roof with tinted glass clerestoreys on two sides and the pleasant cool environment created by natural venting at the top.

Architect for the work was Noel Edser. structural designer McWilliam & Partners Pty. Ltd., while fabrication and installation was handled by Geo Pickers (Brisbane) Pty Ltd.



Tension membrane roof in Moranbah's Town Centre.

Research & Development

- Further work continues in the field of computer shape generation, analysis and graphics. Much of this work is being done by Dr. Peter Kneen on an enlarged SUN machine owned by Unigroup Pty Ltd at Milsons Point (02) 923 1488.
- Wind tunnel tests have been completed for drag forces of flags and loosely hung membranes at Sydney University. The work is for the Festival of Sydney and is being conducted by George Clark.

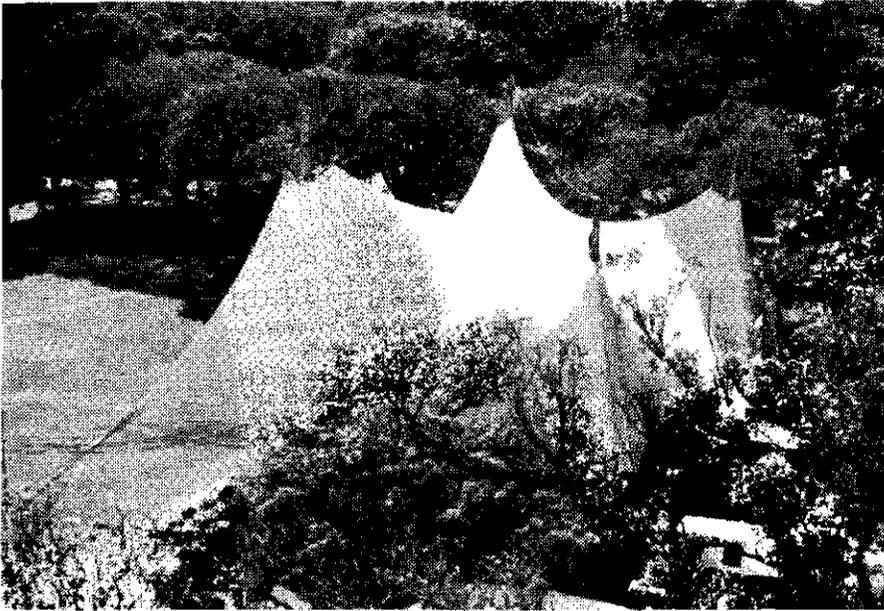
Fabric Yarns

Coming Events

- Entries close for MSAA Design Awards **June 28, 1986**
- MSAA Annual General Meeting, August 26, 1986, Sydney
- **LSA86: First International Conference on Lightweight Structures - August 24-29, Sydney.**

Project News

- A study has commenced of the potential use of a tensioned fabric structure to cover the track and surrounds of a Canberra athletic field.
- Light membrane structures are **being** considered by the Sydney City Council for the proposed Pitt Street Mall. These will be in the **form of colourful flags, banners and small hypars attached to tall tapered masts.**
- **Tenders for the design and construction of the new Homebush Bay Aquatic Centre are closing at the time of going to print. The preferred option for the main roof is a Teflon coated fibreglass fabric supported by a series of cable trusses and covering approximately 7,500 square metres. Other options would use more conventional construction.**
- **An interesting shade structure is nearing completion at Dural, NSW. Measuring some 102m long and 37m wide it will have 9 internal masts varying in height from 16m to 25m.**



The award-winning Domain Stage in Sydney.

Major International Conference LSA86

LSA '86, the First International Conference on Lightweight Structures in Architecture, will be held in Sydney at the University of NSW from August 24-29 1986. The Convenor is Vinzenz Sedlak. Past President of the MSAA and Director of the Lightweight Research Unit at the University of New South Wales. It is being sponsored by Unisearch Ltd.

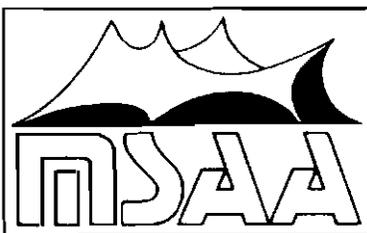
The Conference will review the state-of-the-art of lightweight

structures, progress made in their architectural application, integration of these buildings within their environment and their future role in architecture and building engineering. Papers on membrane structures form a majority of the publication.

Experts from all over the world, including Walter Bird, Edmond Happold, Frei Otto and

Philip Cox, have been invited to speak at LSA '86 and the MSAA urges you to support this unique opportunity by attending and helping to sponsor the keynote speakers.

Donations and further enquiries can be made through the MSAA, or with the conference organizers, Unisearch Ltd, PO Box 1, Kensington 2033 Aust Tel (02) 697 5401 or (02) 399 0352



This Newsletter is produced by the Membrane Structures Association of Australasia
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