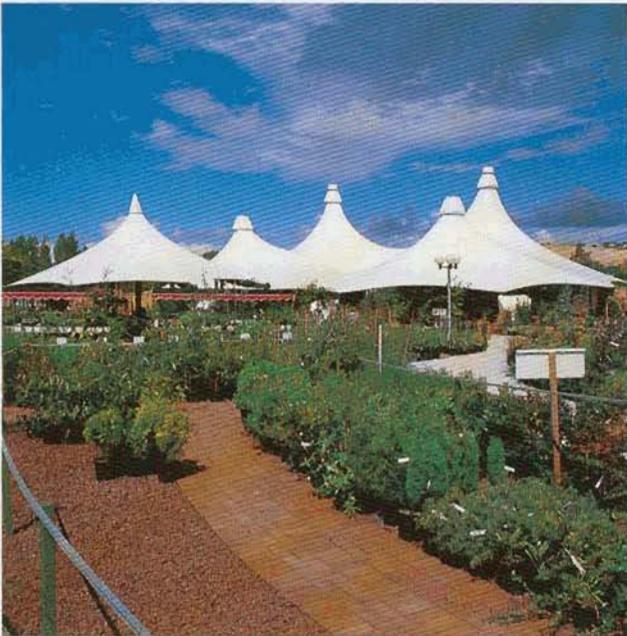


WARP & WEFT

MEMBRANE STRUCTURES ASSOCIATION OF AUSTRALASIA NEWSLETTER



Excellence by New Zealand Team...

This issue of 'Warp & Weft' features some fine examples of contemporary Membrane Technology from New Zealand's Structurflex Ltd., of Auckland.

Membranes are recognised for their unique ability to provide complex geometric shapes and graceful curves, as permanent structures. Sunhill Garden World's tension membrane structures in Auckland represent a 'coming of age' in the New Zealand building industry.

Comprised of three membranes, an entrance canopy, an octagonal shadehouse and the 900m² main structure's dramatic roof line plunging from four peaks to a central low point is an eyecatcher. Inside, the shopper experiences a unique atmosphere being surrounded with plants in natural light and ample space. It's the outdoors brought inside for customer's convenience.

It was imperative that Sunhill Garden World have a strikingly unique building for their site on a major highway through one of Auckland's more affluent suburbs. They also wanted to create an atmosphere of indoor-outdoor living, a place that customers would enjoy.

On the practical side, car parking space was to be maximised, a securable interior with offices to be included and a design life of 15 years against New Zealand's harsh ultra violet and wind environment had to be expected.

Architects Murray North Ltd came up with the form. Structurflex, in conjunction with McWilliam and Partners, advised on design, materials, support structure and construction techniques. A Grade III white 'tropicalized' PVC was selected to withstand wind loads and ultra violet degradation. Parking space was maximised by using purpose built concrete buttresses which elevated the anchor points above ground level. Internal partitioning cut to length on site to the roof line forms the retail and office areas. With the foundations and support structure in place only a few hours were needed to erect the main structure.

Plan areas of each structure were:

Main Structure	922m ²
Shadehouse	113m ²
Entry Structure	16m ²

The fabric chosen was Polymar 6601 Grade III 'tropicalized' white — acrylic coated both sides. 1050 gsm square metre. Light transmission 7%.

Not Your Everyday Airhouse...

Papakura City, south of Auckland, is now the proud owner of the largest air supported membrane structure in New Zealand. At 1700 m² it covers both the Olympic and Toddler's pools enabling year round utilization of their facility. This air structure features 5 emergency exits, 2 revolving airlock doors, and a unique 'L' shaped configuration finished in Papakura City colours, cream and green. It is proof of the suitability of this form of building for applications requiring large uninterrupted spans such as swimming pools and sports halls.

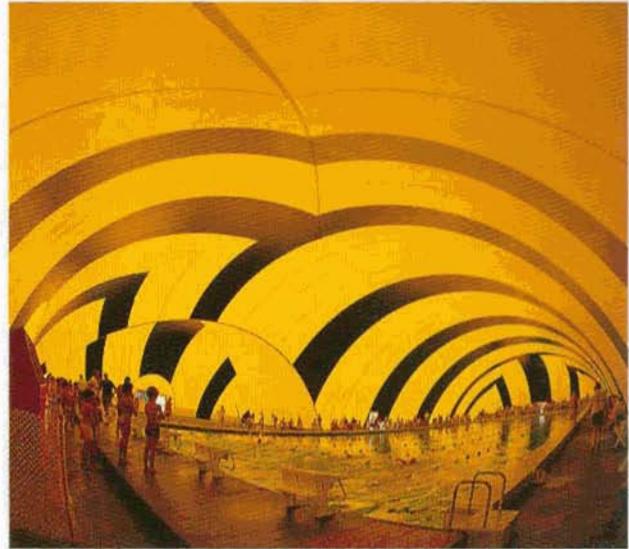
When it was decided to make the city pool an all year facility an air structure became the obvious choice due to its economy, ease of transport, speed of installation and demountability in the summer months. A number of building regulations had to be satisfied. These included; no more than 18m from an exit inside, exit frames constructed of non combustible material, back-up fan and power supply available, and all fabric to exhibit non-combustibility characteristics to approved standards. The main advantage of an air structure was seen to be its ability to be removed for the summer months.

Structurflex were able to satisfy these requirements easily. Five steel framed emergency exits and two fibreglass revolving doors were supplied. The structure itself was built in two halves which were spliced together on site and the side pool incorporated using a cable restrained side 'bubble'.

Anchorage was achieved using a simple base pipe bolted to concrete footings and a Grade II fire rated architectural fabric was used throughout. Construction was completed in less than two months and erection took less than 1 week. Total inflation time was only 20 minutes.

The total internal volume was 10,600m³ and the Nominal Operating Pressure was 0.25 kPa. A Polymar 6506 Grade II fabric, cream and green, acrylic coated at 900 gsm was chosen for the job.

Consultants working in association with Structurflex Ltd., were Connell Barrow McCready Pty. Ltd. of Melbourne.



And Something Different Again...

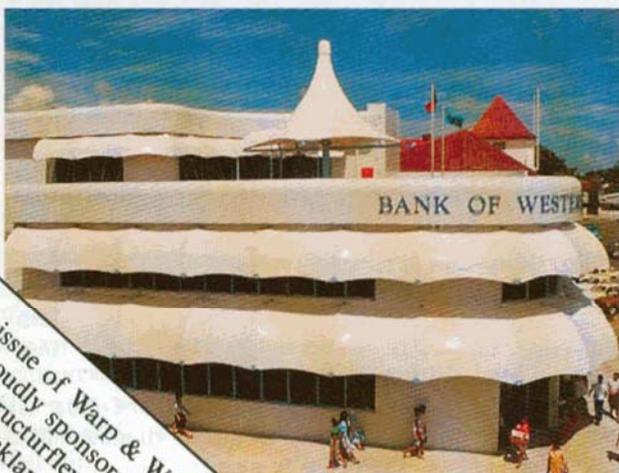
In January of this year, Structurflex showed their versatility by bringing contemporary architecture to Polynesia in the form of a new building, the Bank of Western Samoa. A series of doubly curved canopies and two tension structures have transformed this building into an attractive mixture of old and new. The canopies which run along the front faces at two levels provide shade and shelter for those outside, while also reducing the heat load on the building. On the third level, more canopies adorn the staff cafeteria and a square pyramid tension structure provides outdoor shade on the verandah roof area. The main entrance is marked by an elegant membrane attached to the building top and sides, and tensioned out onto cantilevered steel supports.

The challenge for architects G.M. Meredith & Associates was to design a practical building reflecting the traditional architecture of the area, while employing modern building elements. Main contractor, Fletcher Construction, made history in Apia by finishing ahead of schedule!

Structurflex rose to the challenge of designing and fabricating the membranes in a short time frame, then operating in a remote location during installation. The canopy units were all built and installed in pairs, and patterned to produce continuous double curved surfaces around the building. The entrance and pyramid tension structures had computer generated patterns by McWilliam Consulting Engineers, Brisbane, to provide their subtle double curvature.

Fabrics were both architectural grade with high gloss acrylic lacquer finishes necessitated by Apia's hot dusty environment. Construction was completed using high frequency welding and stainless steel rigging throughout.

The high standard of these three projects augers well for the further success of membrane structures in this part of the world.



This issue of Warp & Weft was proudly sponsored by Structurflex Ltd. Auckland N.Z.

Editorial... B. O'Flaherty, President M.S.A.A.

It is very pleasing to learn that most member architects, engineers and fabricators report that they are extremely busy at this time. The industry appears to be gaining in momentum with an unprecedented level of enquiry from people wishing to consider this 'new' form of architecture in their designs.

Plans are well advanced for this year's annual convention in Surfers Paradise which promises to be an outstanding event with the awards being presented for structures erected over the last 2 years.

I am sure that most people will be surprised by the number, and the world class quality of many of these entries. Application forms are available and we urge you to enter all of your structures to gain the exposure and marketing potential from this event.

If you have not booked for the convention I recommend that you make a reservation now as space is filling up fast and accommodation is limited due to Expo 88. This is an ideal opportunity to combine both the Conference and a visit to Expo, Bring the family.

There has been a steady flow of new members as the value of membership is becoming more recognised. We do however need to increase our membership level even further and we would ask you to make an effort over the months leading up to the convention to sign up relevant companies that you deal with and get them to help make this convention the best yet.

Modular Structures Proving Popular

A significant growth market in USA is the high-tech hire tent business. In Australia we are seeing a slight variation on this theme in the form of modular tension membrane structures.

Two firms successfully serving a strong demand are Tensile Structures, of Perth, and Brisbane's Shade Structures Pty. Ltd.

Tensile Structures' Chris Heyring has developed the framed hypar unit to a high level of sophistication as seen in the Sorrento Marina Project. These units offer the facility to stand alone or to be repeated many times to cover large areas. Many sizes as small as 3m and as large as 8m can be offered with equal ease, solving that ever-present problem of placing a free form roof over an uncompromising rectangular plan.

Peter Kamols' Shade Structures team has taken a different tack with numerous designs for large umbrella and hypar units on single centre supports and radiating arms. His elegant structures are finding ready acceptance in all manner of public and private developments where simple uncluttered shade is needed.



The dozens of such structures now scattered throughout Australia show yet again the versatility of tension fabric as a construction medium, and prove that success is assured where thoughtful design and careful detailing are combined with a keen knowledge of what the market demands.

New Name on the Scene

Recently announced was the transfer of the Queensland operations of Covertex Pty. Ltd. to a new firm 'STRUCTUREFLEX Australia'.

Don Ransome, well known in the fabric industry, has been joined by steel man Mike Moore as joint directors of the company, with Mal Ridley as Australian Sales Manager.

This highly experienced team has promised us some interesting projects in the coming months, and we wish them well.



Technical Notes from M.S.A.A.

by David McCready
Chairman Technical Sub Committee
Contact: Spacetech Pty Ltd, P.O. Box 434,
Moorabbin, Vic. 3189

The contemporary field of prestressed fabric structure design and construction developed from the craft base of the tent industry.

While they are beguilingly simple in their final form, the structures present hidden challenges to the designer.

Difficulties experienced locally and internationally with structures in the last few years emphasise the need for the industry to commit time and energy to research projects to further the understanding of these complex forms which are lately experiencing much popularity with building designers.

The Technical Subcommittee has put in train a research project involving co-operation with the Civil Engineering School of the University of Melbourne. The project seeks to find the common denominator, if any, from the results of all wind tunnel tests carried out to date on structures in Australia. To this end the M.S.A.A. has requested the provision of technical data from all design engineers who have carried out such works.

The University of Melbourne's Civil Engineering School has nominated a fourth year student to the task of collating the information into a common form whereupon broad design concepts might be developed from patterns which should emerge from the data. This work will be carried out under the auspices of Dr. John Howell, a renowned engineer in the field of wind engineering.

The project is ongoing and aims in the short run to produce data for membrane structure designers throughout Australia and hopefully become an adjunct to the wind code if the information proves to be of sufficient merit.

Small Welder Available

Pfaff 8305. Hot **wedge/hot air pvc**, polythene plastic welding machine — looks like a very large sewing machine. Suitable for making rainwear, sportswear, tarps for cars and boats and all lightweight applications.

New Price approx: **\$23,000**
Hardly used: \$14,000 O.N.O. ex Perth
Tel: (097) 55 3537

Any readers who may have relevant information which could be of use to this Association effort should contact the writer ASAP.

And Finally a Word of Caution—

It is disappointing to see the growing use by architects of flat 3-point 'sails' on the face and roofs of buildings. These are not legitimate tension membranes and will, in time, stretch, crease and flap about in the slightest breeze leading to an untidy and cheap result.

Just a little bit of extra thought is needed to design a proper **4-point** saddle form with adjustable edge tensions giving a permanent bi-axial fabric stress and a great deal more visual appeal.

Reference Specification. . .

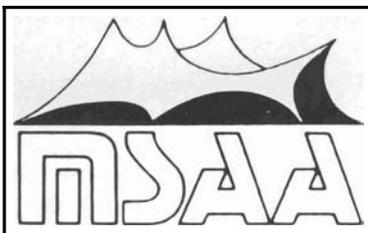
The Technical Subcommittee has produced a sample specification for tendering membrane structures and their associated components which is an amalgam of many of the specifications used throughout the world to date.

This specification is a broad base spec. and omits specific clauses which may relate to individual projects. It will be issued at the forthcoming convention on the Gold Coast and will be subject to upgrade upon submission from members and others.

"High Quality Membrane Structures
fabricated and/or installed when
and where you want them."



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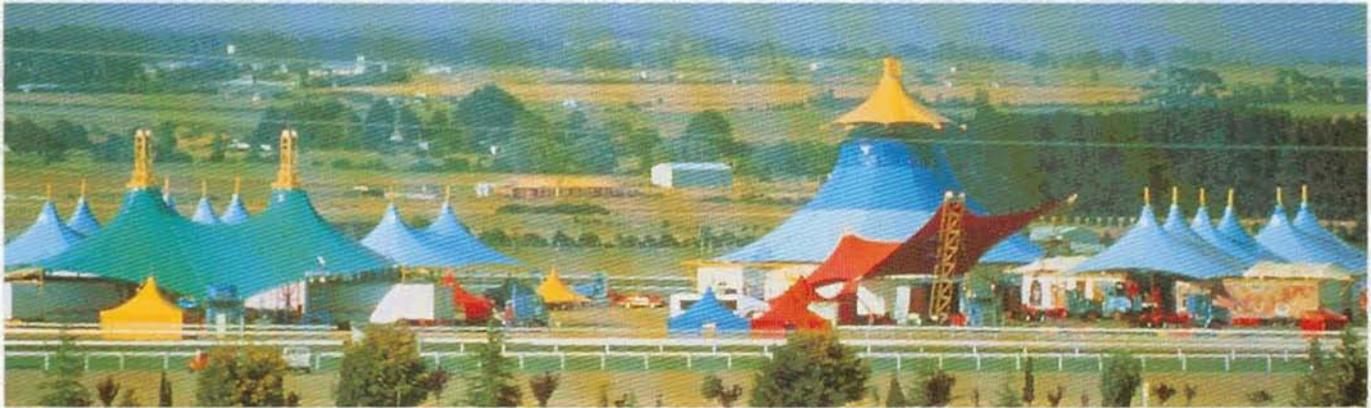


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Bicentennial Travelling Exhibition



In this year of Bicentennial "events", one stands out as a proud tribute to the work of the project team and to the Australian membrane structures industry. The Bicentennial Travelling Exhibition realizes that which remained the dream of designers throughout the world and the international applause has been significant.

The travelling structures will be described in a paper at the forthcoming convention by which time they will be half way through their odyssey, travelling to 34 sites around Australia.

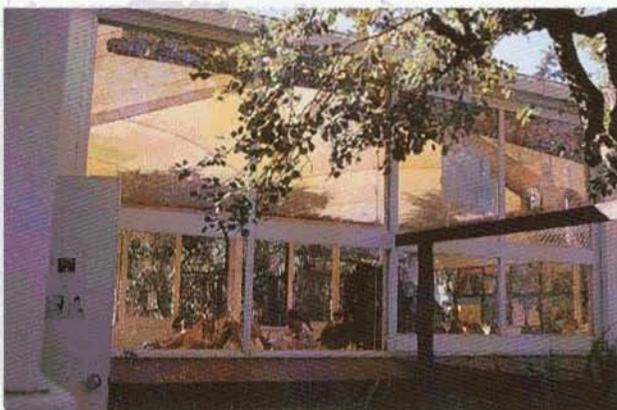
Australia's Oldest Fabric Structure

In a recent issue we sought the answer to this question. Well, it seems that the Ivanhoe Girls School in Melbourne may hold the crown.

Designed in PVC/Polyester by Brian Dowling and Geodome in early 1978 it was reported after a recent inspection to have a few more years left in it yet,

About a year later the Dean Park and Willows Structures were erected in Townsville, both of which have repulsed a number of full cyclones and presently showing no signs of calling it a day.

And to think that in those days we would worry ourselves sick about offering a 2 year warranty!

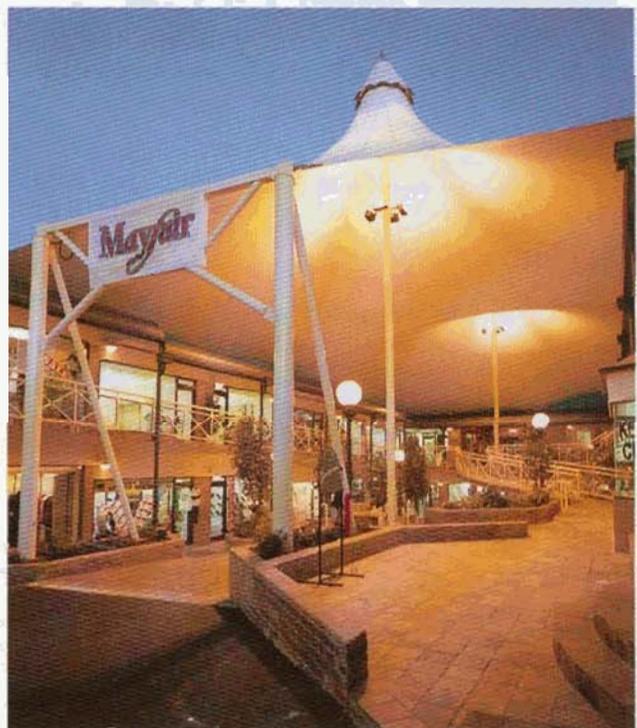


The picture shows the first full scale trial at Ballarat.

Architect for the exhibition was Darryl Jackson with detailed design by John Connell and Geodome Space Frames. The Australian Bicentennial Authority is to be congratulated on its initiative which will do as much for Australia's history as it will for placing contemporary membrane structures before the Nation's people.

Hobart Classic

This brilliant little shopping centre in Hobart with membrane roof by Covertex (Qld) Pty. Ltd., speaks for itself...



Convention '88 Surfers Paradise

The M.S.A.A's annual Convention and Design Awards for 1988 are set down for July 14-16. Notable speakers on the Conventions' theme of 'Membrane Structures — Architecture For Leisure and Recreation' include Queensland's Director of Tourism, Sir Frank Moore and Moto Nohmura whose work through Helios Structures in U.S.A. is known internationally.

With numerous significant membrane structures in the Gold Coast/Brisbane area, not to mention Expo '88, the Convention promises to be one of our best yet. Interest throughout Australia is already running high.

Make sure you don't miss out on these three pleasurable and rewarding days.

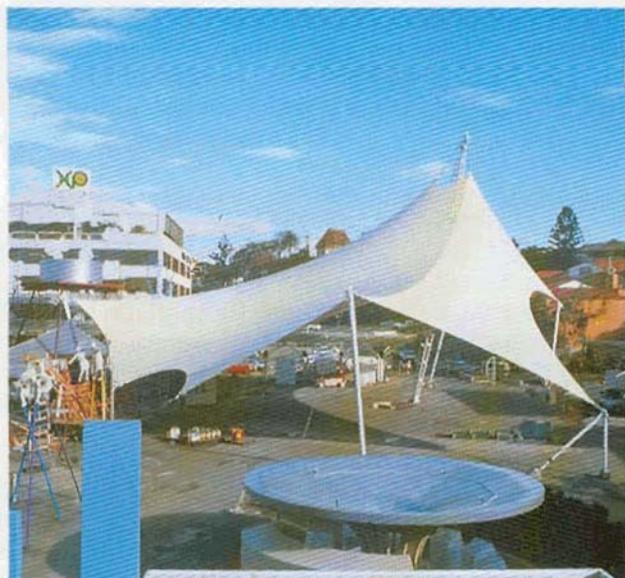
Welcome to Expo

The recently completed Expo Gateway structure at Vulture Street takes design, fabrication and detailing of fabric structures in Australia to a higher plane and appropriately illustrates the capacity of the Australian industry to produce structures of excellence.

Architect Jim MacCormick named it the best fabric structure on the site and had high praise for its aesthetics and detailing. A novel feature was the fabric colour — obtained by painting it both sides after erection! Design and construction was by John Connell & Associates and Spacetech Pty. Ltd., of Melbourne.

While this is the largest of the Australian produced structures there are many smaller but equally interesting uses of stressed fabric to be appreciated on the site.

At night time the fascinating interplay of lighting and translucent fabric should not be missed.



Canberra Stage 88

Canberra's Bicentennial Sound Shell in Commonwealth Park has recently been completed by local firm, Space Structures (Australia) Pty. Ltd.

Overall design was by Architects Phillip Cox, Taylor and Partners, with Ove Arup Engineers.

The fabric membrane of approximately 950 sq.m is made of a PVDF coated PVC/Polyester.

Interesting details developed by Space Structures were doubly articulated junctions at the perimeter mast heads connecting the cable tie backs and catenary cable edge, and adjustable mushroom heads to the internal masts. Cutting patterns for the membrane radiate from the centre of the two internal mast heads to the perimeter reinforced by a continuous webbing. Features such as these, as well as being very functional add aesthetic appeal and show the Company's commitment to careful detailing.

