

Editor's Notes

I welcome you to the second issue of the LSAA newsletter "Lightweight Talk".

The hard work of re-establishing the newsletter is behind us. The task now before us is to make the newsletter a regular and vital piece of the literature you receive.

Since the first issue, I have moved from Connell Wagner to Spacetech. This has brought me closer to the design, documentation and construction of lightweight structures. It is enlightening to see the activity in the field of tensioned membrane and other space structures both within Australia and NZ, and in the neighbouring countries of South-East Asia. This makes me feel more strongly that it is in the interest of all in the lightweight structures industry, to have a strong, vibrant and active and Association.

M Barr – Editor

LSAA Conference Auckland – Feb 2000

The dates for the next LSAA Conference, to be held in Auckland, NZ have been confirmed - the 21st and 22nd February 2000.

The conference is titled "The Lightweight Challenge". At the Conference it is intended that the challenges for the lightweight industry in areas of efficiency, economy, materials and the development of markets will be explored. It will be an opportunity to reflect on the achievements of the industry and to look forward into the next millennium.

The conference will be held at the Novotel Auckland, on the Auckland waterfront, just minutes away from the America's

Cup village and boat harbour.

Auckland is the venue of the Americas Cup, with the best of the nine race final scheduled to begin on Saturday 19th February 2000.

There will be opportunities to go out on the water to view the yacht racing before and after the conference.

Auckland is a great city at any time and it will clearly be offering something extra during this event. Remember Fremantle in 1987!

So, put the dates in your diary.

The registration flyer and the call for papers will be issued in August.

TEXTILE ROOFS WORKSHOP

The Fourth International Workshop on the Design and Practical Realisation of Architectural Membrane Structures was held at the Technical University Berlin (Institute of Geodesy and Geoinformatics - Professor Lothar Gründig) from June 17-19th 1999.

This very successful event attracted more than 80 participants from 20 countries including 2 from Australia and 1 from New Zealand. Being the only dedicated workshop event of its kind worldwide participants came from a wide range of backgrounds, ranging from established experts (including a cross-section of major players in

industry and education) to complete novices. Key Sponsors were Ferrari and Technet.

The workshop objectives were to provide fundamental practical information as well as presenting the state-of-the-art in textile roof engineering know-how.

Textile Roofs 99 was co-sponsored by the Lightweight Structures Research Unit of the University of New South Wales represented by Vinzenz Sedlak, who also gave an introductory overview of the state and development of membrane structures and their design.

Other key lectures on design techniques were presented by

BERLIN 1999

Marijke Mollaert (Free University of Brussels) on structural form, Rainer Hempel (Cologne Polytechnic) on physical modelling, and Lothar Gründig and Erik Moncrieff (TU Berlin/Technet) on computational modelling. Paul Westbury (Buro Happold, UK) gave an enlightening talk on project management and the design process featuring case study examples including the Millennium Dome. Hans-Joachim Schock (Author of "Soft Shells") reported on detailing and connection design, Rosemarie Wagner (Munich Polytechnic) on innovative pneumatic structures including an airship, and Sergio Pellegrino (University

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HONORARY MEMBERSHIP: DAVID McCREADY

David McCready, Co-founder of Geodome Space Frames Pty Ltd and Spacetech Pty Ltd of Melbourne, was awarded the Honorary Membership of the Association at the Annual General Meeting held during the LSA'98 Congress in Sydney in October 1998.

He joins the select group of Honorary Members of the LSAA (formerly MSAA): Bert Bilborough - Australian pioneer of membrane structures (1982), Walter Bird - founder of Birdair USA (1986), Ryotaro Nohmura - Chairman of Taiyo Kogyo Japan (1986), Frei Otto - eminent innovator of lightweight structures Germany (1986) and Vinzenz Sedlak founding President of MSAA and LSAA (1990).

He entered the field of lightweight structures in the early seventies in partnership with Bob Barrow, initially focussing on geodesic and space frame structures but rapidly expanding

into the then new field of tension membrane structures. Assisted by Peter Kneen as consulting engineer, Geodome was responsible for several early but significant structures such as the Townsville Sound Stage and Euroa Amphitheatre.

During the seventies the technological base for membrane structures was developed in Australia with Geodome being at the forefront of development through a consistently professional approach to design and high quality standards of fabrication and execution. Affiliation with leading overseas designers Buro Happold led to licensing of "Tensyl", a design and analysis software package for membrane structures.

Today Spacetech are a leading Australian company in the field who have been responsible for such outstanding projects as the Australian Bicentennial Exhibition Structures (Daryl Jackson

Architects), Australia on Collins Atrium (Kenzo Tange Architect), and the high profile Eureka Museum tensile structure (Philip Cox Architects) - one of many award winning structures. On an international level the company has been exporting structures and expertise into South East Asia and recently the Middle East.

David McCready was a founding member of the Membrane Structures Association of Australasia (1981) and, as its last President (1990-1994), and was instrumental for subsequent establishment of the LSAA.

He has also been contributing to education by lecturing widely at leading Australian Universities and has published several papers on lightweight structures.

By awarding Honorary Membership, the LSAA has bestowed its highest honour onto David for his significant contribution to the lightweight structures industry over the past 25 years, as well as for his long term dedicated service to the Association. We all wish him continuing success and fulfilment in his chosen vocation: lightweight structures.

A Striking Port Cochere - Royal Botanic Gardens, Melbourne

The Royal Botanic Gardens in Melbourne are among the finest formal gardens in Australia, and as such the new main entrance building, the Observatory Gate Visitors Centre, had to make an appropriate impression.

The architect, Peter Elliott Architects, achieved this with a design of a stainless steel Port Cochere. The structure is a complex tensioned network of stainless steel cables supporting formed stainless steel mesh panels. The connections and fittings were made with shackles, swivels, turnbuckles and swages fittings.

The result, as can be seen in the adjacent photo, is a shining example of contemporary architecture. It is sure to continue to make a statement for many years to come.



Credits:

Architect:

Structural Engineer:

Main Contractor:

Specialist Contractor:

Cable & Fittings:

Peter Elliott Architects

Ove Arup and Partners

L.U. Simon Builders

Sailon Engineering

Ronstan Architectural Rigging Systems

America's Cup Flexidoor

Security is a high priority for all the syndicates involved in challenging for the America's Cup. It is of course equally important for New Zealand, the defenders.

One important requirement for all syndicates is a boat shed large enough to house at least one America's Cup yacht at a time for maintenance and modification work. It is a comparatively easy job to build a boat shed, however, providing a large enough access door at least 10m x 10m was a greater challenge.

Structurflex was engaged to design a fold up door (Roman blind style), fully electric operated. The design had to allow for the door to be opened or closed in winds of up to 40 knots.

One of the problems with conventional slat roller doors was their tendency to be prone to the "joint popping" problems in high wind situations.

The design also had to be fully automatic, weatherproof, and complete the opening or closing of the door in minutes.

The design of Structurflex fully met these requirements and has now been fitted to the sheds of six of the America's Cup challengers, including Prada Italy, America One, Nippon Challenge and America True.



The door in operation



Credit:

Flexidoors: Structurflex (NZ) Ltd

The door offering full protection to the elements

LSAA AGM and Annual Dinner

The committee has announced that the Annual General Meeting of the Association for 1999 will be held at 4pm on Thursday 14th October 1999.

The meeting will be organised to have a single meeting point in each state, with a telephone hook-up between each location. It is anticipated that a dinner will be held in state after the meeting.

This is a chance to have a social evening as well as support the work of the Association.

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of Cambridge) gave an introduction into the principles of deployable structures.

In addition to the morning lecture programme, opportunity was provided for the study and hands-on development of practical case-studies during the afternoon. Advanced computational modelling based on Technet's "EASY" lightweight structure design system was conducted complementing conceptual modelling exercises with physical models and the "CADISI" computational formfinder. For the first time LSRU's Conceptual Structural

Design Aid "SDA" (an integrated database system of case studies) was introduced to the workshop and was available to participants for demo use.

An interesting evening lecture by Robert Nijssse from ABT consulting engineers on innovative engineering projects with Dutch architect Rem Koolhaas, a superb dinner at a remote Berlin lakeside restaurant, and finally a site visit to the new Sony Centre membrane structure (Architect Renzo Piano, Engineers Ove Arup) rounded off an action packed 3 day event with many

worthwhile contacts established. The able organisers at the Institute of Geodesy and Geoinformatics of TU Berlin are to be complimented for their splendid effort. No doubt Textile Roofs 2000 will be bigger and better yet!

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RECENT/CURRENT PROJECTS

The Sydney Olympic Velodrome

The Sydney Olympic Velodrome is an indoor venue at Bass Hill, Sydney, approximately 130m long by 100m wide in an elliptical shape on plan. The architectural concept is for a low-rise facility covered by a shell-form metal deck roof. Approximately 3000 permanent seats are to be provided, with a provision for 3000 temporary seats for the Olympics and other large events.

By far the most striking feature of the new velodrome is the roof. It is a single layer steel grid shell structure, which was chosen to support the roof for reasons of economy, aesthetics and buildability. The geometry



View of Completed Skeleton of Dome - Richard Drew - OAP

is described by cutting an elliptical plan shape from the surface of a torus or donut. The components of the roof structure include fabricated tapered box-section arches spanning across the hall, with large diameter circular hollow sections laced diagonally between.

The building is currently under construction. Ove Arup & Partners are responsible for structural, civil, hydraulics, acoustic, traffic and fire design on the Velodrome.

Multi-Use Arena – Homebush.

The construction of the cable stayed roof for the 20,000 seat arena, to be used for gymnastic and basketball at the 2000 Olympics, is nearing completion. The stay cables are 76mm diameter Macalloy 460 bars, supplied by Austress Freyssinet, which support the 600 tonne main roof.

Northern Territory University – Walkway Canopy

Some 105m length of conical shaped walkway canopies has recently been added at the University by Tensile Canopy Systems. This followed the successful completion of the installation of an original 200m of walkway canopies in 1996.

Ansett Domestic Terminal, Sydney

The glazed wall surrounding the Ansett terminal arrival and departure lounges has been completed.

The walls are over 11m high and some 168m in total length, with cable truss strong backs using stainless steel Macalloy 460 bars ranging from 20 to 30mm in diameter.

The system was selected for its aesthetic appeal and low maintenance requirements.

Upcoming Events:

14th October 1999	LSAA AGM & Dinner - Sydney, Melbourne, Brisbane, Perth & Auckland
21-22 February 2000	LSAA Conference, Auckland, NZ
29/4-2/5/2001	Australian Structural Engineering Conference (LSAA Co-Sponsor)

This newsletter is produced by the Lightweight Structures Association of Australasia.

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