

## President's Message

This is the first newsletter for some time and we are planning to reinstate these on a more regular basis.

The past 12-18 months have seen your whole committee fully occupied in the organisation of LSA'98. Now that this is over, we will be able to concentrate more on our core activities. LSA'98 was a great success with delegates from all over the world attending to hear four days of very high quality papers presented.

Our activities over the coming months will include amongst other things, preparation of a one day AGM in Melbourne 1999 and then the full conference in Auckland in 2000, a regular newsletter, the return of a Technical Committee, and more work in the educational area.

Brian O'Flaherty  
President - LSAA

## LSA'98 Congress: International Focus on Lightweight Structure

The lightweight structure fraternity gathered together in Sydney in early October to attend LSA'98 International Congress, jointly organised and hosted by the Lightweight Structures Association of Australasia (LSAA), the International Association for Shell and Spatial Structures (IASS), and the Institution of Engineers, Australia (IEAust).

It was a marvellous gathering of eminent professionals and the industry's experts, who shared with delegates, the latest work and research in the lightweight structures field from both Australia and overseas. Delegates came from some 32 different countries.

Over the four days of the Congress a varied and diverse range



of presentations and papers were delivered. These ranged from topics such as structural systems, tension and membrane structures and numerical methods to discussions on innovation, holistic design of lightweight structures, and the consideration of ecologically sustainable design and lightweight structures.

The session featuring the many facilities which have been constructed for the Olympic Games at Sydney 2000 gave delegates a detailed insight into the innovative structures that will be on show to the world next year.

The Congress was the Association's bi-annual conference. During the Congress the annual general meeting of the LSAA and the LSAA 1998 Design Awards were both held.

One of the major benefits to the Australian delegates was the opportunity to establish new contacts, get inspiration for future projects, and learn new techniques. The Congress also helped us recognise that the Australian industry is capable of producing world class lightweight structures.



RAS Temporary Entry Structure, Sydney Showgrounds  
(Award of Excellence - Small Structures Category, LSAA Design Awards)

## EDITOR'S NOTES

Welcome to the inaugural LSAA newsletter called "Lightweight Talk".

The Association plans to issue the newsletter some 4 times a year to inform members on recent events and news in the lightweight industry, and to help encourage the expanded use of lightweight structures within Australasia. We hope you find the newsletter both instructive and informative.

For those of you that have not heard of the LSAA, the Association was created from the well established Membrane Structures Association of Australasia (MSAA) in 1994. The Association is an autonomous, inter-disciplinary group of interested parties involved in the field of lightweight structures with the aim of promoting the proper application of lightweight structures, their design, fabrication, construction and materials, and the development of these and other aspects particular to lightweight structures.

To make this newsletter as relevant to what our membership want, and to improve and expand the content, we appreciate any suggestion, articles or news for future issues.

## LSAA 1998 Design Awards Wrap-Up

The Association conducted their second bi-annual LSAA Design Awards earlier this year. The awards were presented by Daryl Jackson at the Congress Dinner of the LSA'98 International Congress (jointly organised by IASS, IEAust and LSAA) held in Sydney in October 1998.

Entries were received in four categories: small, medium, large and special applications. In addition, first time awards were given for environmentally sustainable design and for student design. We were pleased to be able to have the assistance of Vinzenz Sedlak (Immediate Past-President of LSAA), Daryl Jackson and Bill Irwin to judge the awards.

The recipients of the Awards of Excellence and Citations of Merit were:

### Awards of Excellence

RAS Temporary Entry Structure, Sydney Showgrounds,	Entered by:	Shade Structures Pacific P/L
Wanneroo International Netball Stadium, Lansdale, Perth.	Entered by:	Connell Wagner P/L
RAS Exhibition Halls, Sydney Showgrounds, Sydney.	Entered by:	Ove Arups & Partners P/L

### Award of Excellence - Environmentally Sustainable Design

RAS Exhibition Halls, Sydney Showgrounds, Sydney.	Entered by:	Ove Arups & Partners P/L
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### Citations of Merit

Eureka Museum Banner, Ballarat. Vic	Entered by:	Spacetech P/L
RAS Exhibition Hall Canopy, Sydney Showground, Sydney.	Entered by:	Permafab P/L
Waroona Aquatic Centre, Waroona, WA	Entered by:	Hoecker Structures Australia
Solar Dish, Ben Gurion University, Israel.	Entered by:	Spacetech P/L

### Innovative Concept and Conceptual Design by Students

#### Award of Excellence

Pole Supported Structure, Boral Masonry Display.	Entered by:	Ben Alison, Uni of Qld
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#### Citation of Merit

Cantilevered Truss Frame, Boral Masonry Display.	Entered by:	Eugene Nemesis, Uni of Qld
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The projects were assessed against five main criteria: design, construction/execution, appearance/aesthetics, function and overall effectiveness as well as for environmental consideration. The final verdict was obtained by a unanimous vote. This year's LSAA Design Awards constituted an imaginative exploration of lightweight structures: fabric membranes and steel masts, steel strut and cables, timber and steel gridshells, and curved steel spatial frames for a wide variety of applications.

The jury commended all entries for their quality of expert execution.

# Stainless Steel Structure Supports New Beach Restaurant

by David McCready

At the restored Palais bathing pavilion in Adelaide, Australia, a restaurant of considerable gastronomic quality has added measurably to the living standard of local inhabitants. That has been further enhanced with the completion of a new translucent roofed, beach side restaurant, set on a timber deck among the dunes, with the address, *Sunset over St. Vincents' Gulf*.

This addition by Spacotech, comprises a highly sculptural, tensioned membrane structure utilising high strength membrane materials to resist high wind forces which sweep in from southern ocean squalls. The owner wisely specified "**nothing but**" stainless steel for all the metalwork in the supporting structure. Salt spray corrosion is a serious maintenance matter in this interface between sand and sea.

Grade 316L is the dominant stainless steel material selected with tube sections to 168mm diameter used for the masts which were hydraulically telescoped to achieve design pre-stress across the membrane surface.

Timber piles comprise the perimeter support structure, these having stainless steel fin plates slotted in for fixing the membrane and the stay cables. The form of the structure is soft, undulating and dune like to fit its beachside environment. Three stainless steel masts line up along the centre of the deck while the perimeter catenaries are tensioned with Ronstan equipment and beautifully detailed fittings to the timber posts, finally down to driven piles.

The interplay of soft curves and gleaming stainless steel offset traditional organic materials and compliment the heritage building

adjacent to create a venue for great lunches accompanied by world's best wines from South Australia.

Credits:

Architect: Matthews Architect  
Structure: Spacotech P/L  
Engineer: Connell Wagner P/L



*Across the gentle undulations of the new tent structure, the blue waters of St. Vincent's Gulf.*

# LSAA-IASS Workshop on Tension and Membrane Structures

During LSA'98 a first formal meeting between members of IASS Working Group 7 "Tension and Membrane Structures" and Association members took place.

The aim of the meeting was to inform about LSAA and individual member's activities as well as IASS members activities and to discuss general priorities and strategies for future research, development and documentation work on TMS with a view to possible future cooperation. Presenters were Masao Saito and Julius Natterer (IASS) and Joseph Dean, Mike Lester, Malcolm Ridley and Vinzenz Sedlak (LSAA).

Masao Saitoh, Professor at Nihon University Tokyo and Ulrich Hangleiter of IAGB University of Stuttgart co-chair IASS Working Group 7 and presented a range of topics.

Within a timeframe of 2-3 years IASS WG7 will be working towards a printed document containing recommendations for design and execution including a documentation of exemplary TMS projects.

The issue of Standards for Design and Execution vs Recommendations was extensively



*LSAA/IASS Workshop on Tension and Membrane Structures at LSA'98 Audience*

aired with the meeting leaning towards general recommendations and performance criteria rather than towards more closely specified standards. Ron Shaeffer (University of Florida) mentioned published US recommendations for Tension Membrane Structures.

The need for documentation of known failures and faults in executed projects was highlighted. The application of TMS for smaller (domestic) scale use as well as cladding subsystems was mentioned. LSAA members felt

that they would be able to contribute on practical and commercial aspects of TMS in particular. LSAA also offered a collection of its past Conference proceedings, Convention papers and Technical Notes as a resource.

No formal resolutions were made but interest was expressed to continue with an informal information exchange and to target future IASS (and LSAA) meet-



*LSAA/IASS Workshop on Tension and Membrans Structures at LSA'98. (Joseph Dean, Mike Lester, Masao Saitoh, Ulrich Hangleiter)*

## **PEOPLE NEWS**

### **David McCready - LSAA Honary Member**

At the LSA'98 Congress David McCready was awarded Honary Membership of the LSAA. Full details in the next issue.

### **Mike Lester Returns**

Shade Structures Pacific recently announced the return of their Director for Engineering, Mike Lester to their Brisbane office after nine months in the company's USA office in Kansas City.

Mike has returned to further direct the engineering efforts on several of the companies larger projects, including the Sydney Olympic 2000 Games structures.

# LSA'98 INTERNATIONAL CONGRESS

## National Student Design Competition

### "Heart of the Games"

A national design competition was organised in the lead up to LSA'98 concentrating on an innercity focal point for the Sydney 2000 Olympic Games, the "Heart of the Games". The site chosen was the former Woolworth site opposite Sydney Town Hall.

Thirty-three entries were received from eight institutions from Australia and New Zealand. Awards were allocated in accordance with the competition rules. One project from each Architecture school was selected as the Best Entry. The judging panel also awarded a Commendation prize. The overall winner, Andrea Simone Bell from UNITEC Institute of Technology in Auckland, received the First Prize of \$ 1000 and a day pass to the Wednesday session of the Congress at the Congress Dinner.

The judging panel was convened by Professor Paul Reid, UNSW and consisted of: Chris Johnson, NSW Government Architect (moderator), Graham Jahn, Architect and Councillor, City of Sydney Council, David Churches, SOCOG/OCA Director of Games Planning and Ken McBryde, Architect Renzo Piano Building Workshop

Andrea Simone Bell	UNITEC Institute of Technology, Auckland	First Prize	\$1,000
Jane Elizabeth Sayers	University of Canberra	Commendation	\$200
Nicholas Benjamin Moss	University of Adelaide	Best Entry	\$200
William Fung	University of NSW	Best Entry	\$200
Nicholas Glen Childs	University of Canberra	Best Entry	\$200
Susan Lynette Collins	University of South Australia	Best Entry	\$200
Weng Hoe Wong	University of Newcastle	Best Entry	\$200
David Lee Reginato	Deakin University	Best Entry	\$200
Nicholas James Goodall	Victoria University of Wellington	Best Entry	\$200

A selection of entries was also exhibited at the LSA'98 Congress but unfortunately received little attention from delegates due to the hidden location of the display.

Post production of an exhibition catalogue sponsored by the UNSW Architecture Program is planned.

## New Committee Listing

The Annual General Meeting was held in Sydney on 8<sup>th</sup> October 1998, during the LSA'98 Congress. Vinzenz Sedlak, President of the Association for the last 4 Years relinquished the position, as he is in Austria on sabbatical for most of this coming year. The outgoing committee thanked Vinzenz for his contribution over the past few years, and that we look forward to hearing from him on the latest developments in Europe.

The new committee of the LSAA, as elected at the AGM are:

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<b>Brian O'Flaherty</b>	President	(03) 9585-1730	(03) 9585-1737	indtex@ozemail.com.au
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<b>Rowan Murray</b>	Secretary	(03) 9598-9588	(03) 9597-0283	rowanmur@ronstan.com.au
<b>Peter Lim</b>	Treasurer	(03) 9555-5711	(03) 9555-1541	spacetch@netspace.net.au
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<b>Richard Hough</b>	Committee	(02) 9320-9320	(02) 9320-9321	richard.hough@ARUP.com.au
<b>Richard Mac-</b>	Committee	(02) 9419-8255	(02) 9419-8251	richardm@tensiledesign.com

The committee is here to work for the advancement of the goals of the LSAA, and to serve its members. If you are able or interested in assisting in any of the LSAA activities, please contact any of the committee.

## LSRU 20th ANNIVERSARY SEMINAR (1978-1998)

Amidst ongoing significant University restructuring the Lightweight Structures Research Unit (LSRU) of the Faculty of the Built Environment outgrew its teens and entered its twenties: LSRU is now 20 years young. To celebrate the event a one-day Anniversary Seminar was held on 9 October 1998 at the University of New South Wales with international leaders in lightweight construction contributing to the event.

While general attendance was down due to an unfortunate general power black out on Campus -yielding the lecture theatre inoperable for two hours- Phillippe Samyn of Samyn & Assoc Belgium, Julius Natterer of EPFL Lausanne Switzerland, Berndt Baier of University of Essen Ger-

many, Brian Forster of Arup UK and Mick Eekhout of Otkatube Netherlands presented outstanding recent work with extensive lively discussion following which was continued into the evening over dinner.

In the Red Centre Foyer of the Faculty of the Built Environment the Exhibition of the LSA'98 sponsored National Student Design Competition "Heart of the Games" was on display. This competition had been organised by Professor Paul Reid and Michael Tawa from the UNSW Architecture Program with input from Richard Hough of Ove Arup Sydney upon an LSRU initiative.

LSRU was founded at UNSW in 1978 with Vinzenz Sedlak as its director and has since provided leadership in the field of lightweight structures to Australasian industry and academia through R&D, publication of technical information and through organisation of key events:

The First Australian Membrane Structures Seminar in 1981 which resulted in the creation of



LSRU 20th Anniversary Seminar: (Brian Forster, Phillippe Samyn)

MSAA - the Membrane Structures Association of Australasia, predecessor of LSAA- LSA'86 The First International Conference Lightweight Structures in Architecture, in Sydney 1986 and LSAA'94, the MSAA/LSRU Conference on Lightweight Structures in Australasian Architecture in 1994 leading to the creation of LSAA. Together with Philip Cox LSRU initiated LSA'98 and, jointly with LSAA and IASS, laid the groundwork for its subsequent organisation by IASS/ IEAust/LSAA and Tourhosts.

For further information on LSRU's activities, services and publications consult the Web-Pages:

<http://fbe.unsw.edu.au/units/LSRU>



LSRU 20th Anniversary Seminar: (Mieke Eekhout, Waldo Granwal, Julius Natterer)

## New Look for Challenge Service Stations

A series of low key but distinctive design features mark the latest group of service stations opened around the North Island, NZ by Challenge Petroleum.

The largest structure at each of the Challenge stations is the white fabric canopy over the pump islands. Each canopy is supported by a lightweight tubular steel frame which has tensioned fabric attached to a perimeter truss. This forms four clearly recognizable conical peaks.

Architect and design company, Alex Ross and Associates was asked to come up with a design for Challenge's new service station that was low key, modern, would stand the test of time and still be distinctive.

With minimal signage and little colour the canopies ensure the new-look stations are easy to find. They also provide shelter from the weather. The canopy is in white tedlar coated polyester reinforced PVC fabric, which allows transmission of about 15 per cent of sunlight to produce a

soft, even light below it during the day. With concealed lights projected upwards to reflect off the fabric, a similar quality of light creates a recognisable glow and keeps the forecourt bright during the night.

The canopy is completely free of signage, but because of its shape and light transmission it is very distinctive. It also serves as a focal point and works as effective self advertising in the surrounding area.

The detailed design and con-

*(Continued on page 7)*



# LSCE'98 Lightweight Structures in Civil Engineering International Symposium Warsaw December 1998

Organised by the Polish Chapter of IASS, a very active group chaired by Ian Obrebski, Professor at Warsaw Technological University, the Symposium drew a modest but enthusiastic audience with a very high standard of technical papers.

Exemplary are the published proceedings, both in content and presentation.

63 papers by authors from 15 different countries are featured on 409 pages.

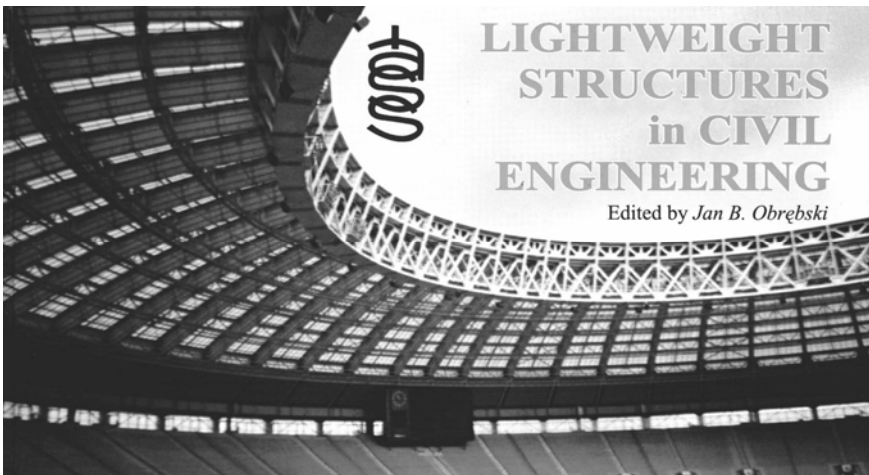
All presentations were plenary with Vinzenz Sedlak contributing with an overview of "Lightweight

Structures in Australia: historical development and future tend".

The event has shown that the best meetings are those where an inspired individual coordinates all aspects of organisation with support from unpaid enthusiastic helpers.

With the primary emphasis on high quality technical exchange venue, accommodation and food fade into the background and assume much less importance.

Similar to LSA'98 the symposium was dedicated to the memory of Yasuhiko Hangai, who passed suddenly away in August 1998.



LSCE'98 Proceedings (partial view)

## PRODUCT NEWS

### "Second Generation" Weldable PVDF

Indtex Australia is pleased to advise that Mehler Haku new fabric surface finish "Second Generation" weldable PVDF has been fully tested in the field with several Australian projects and is performing extremely well. The clients that have used it so far have been very pleased with its performance.

The surface system nominated "AM/2", specially developed for this climatic region from 100% PVDF has the advantage that there is no need to grind off the PVDF in order to weld the seams. The material can be overlap welded in the normal manner. This is a great advantage, not only in time and labour savings, but it also eliminates the great inherent danger in grinding too far into the base fabric and significantly effecting the fabric strength.

Laboratory testing, confirmed by the in field experience indicates that this specially developed "Second Generation" weldable PVDF in fact performs better than the old generation 1 "100% PVDF" systems (which are not weldable), giving better UV protection as well as cleanability to the fabric.

For more information contact Indtex Australia direct on  
Ph. (03) 9585-1730  
Fax (03) 9585-1737

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struction of the stations was carried out by Fletcher Constructions, who with careful programming have been able to achieve a short construction period of approximately eight weeks per site.

Credits:

Architect:

Alex Ross & Associates

Design/BuildContractor:

Fletcher Construction

Fabric Canopies: Structurflex (NZ) Ltd



Night view of the Challenge Service Station canopy

## TEXTILE ROOFS '99

The Fourth International Workshop on the Design and Practical Realisation of Architectural Membrane Structures will be held at the Technical University Berlin from June 17-19th 1999.

The event will be co-hosted by the Technical University Berlin and the Lightweight Structures Research Unit (LSRU) of the University of New South Wales.

In 1995, 1997 and 1998 workshops on the Design and Realisation of Textile Roofs were held in Berlin. Due to the practical emphasis and unique format, these events have proven increasingly popular. With the continuing success of the 1995 and 1997 events it was decided to make Textile Roofs an annual event. This decision proved appropriate in that the 1998 workshop was oversubscribed and attracted around eighty participants from 25 countries. The series will continue in 1999 with further developments and enhancements to the programme.

The workshop objectives are to provide fundamental practical information, as well as presenting the state-of-the-art in textile roof engineering know-how. In addition to a comprehensive programme of presentations in English by key figures from the membrane structure industry, a unique opportunity for the study

and hands-on development of practical case-studies in an informal tutorial environment will be provided. Above all, the workshop aims to provide practical answers to real-world questions.

### Programme

- Introduction and Subject Overview
- Physical Modelling
- Computational Modelling
- Good Structural Forms
- Project Management and Design Process
- Economic Factors
- Detailing and Connection Design
- Future Developments

Emphasis will be given to advanced Computational Modelling so as to complement the conceptual modelling exercises conducted with physical models and the CADISI formfinder. The Technet Easy lightweight structure design system as well as LSRU's Conceptual Structural Design Aid (SDA) will be featured.

Lecturers have been selected to cover specific programme topics on the basis of their experience, either in the lightweight structure industry, or in academia.

### Cost

DM 800 before 1st June  
DM 850 after 1st June

### Further Information and Registration

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WebPage: <http://www.survey.tu-berlin.de/~tr99>

**Sponsored by:** Technet-gmbh and Ferrari

## LSAA 2000 Conference

The LSAA 2000 Conference is planned for Auckland, New Zealand, the home of the Americas Cup. Auckland from October 1999 will be the venue of six months of Americas Cup yacht racing. Firstly, to find the challenger from between 12 to 16 completing syndicates. This, in itself, will take a minimum of 243 match races. And then, the best of the seven race final against New Zealand which will be held in late February/early March 2000.

The tentative dates planned for the Conference are 28th February to 1st March 2000. This will be confirmed in the next newsletter.

Auckland is a great city at any time and clearly in the year 2000 it offers something extra, and the city will have a real international flavour.

Do not miss this one - start sav-

## Upcoming Events:

13-15 April	Techtextil - Frankfurt
17-19 June 1999	Tech Berlin - Textile Roofs '99 Seminar
Aug-Sept 1999	LSAA AGM & 1-Day Seminar, Melbourne
Feb/March 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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