Life Begins at 25

LSAA 2006 Sydney
November 16 2006

Celebrating 25 years of the MSAA / LSAA

LSAA 2006 Program

- 12.00 LSAA AGM
- 12.30 Lunch & Registration
- 1.30 Welcome (Dr Kourosh Kayvani)
- 1.40 Keynote Address (Croz Crosling)
- 2.25 Cable Structures (Nico Willman)
- 2.50 Grand Pavilion (Peter Lim)
- 3.15 Afternoon tea
- 3.45 The New LSAA (Peter Kneen)
- 3.55 Khalifa Stadium (Peter Macdonald)
- 4.20 Recent Projects (David McCready)
- 4.40 Fabrics – The Issues (Panel)
- 5.00 Close

Welcome and Introduction

Dr Kourosh Kayvani
President LSAA

Southern Cross Station
and other recent Grimshaw Projects

Croz Crosling
Associate, Nicholas Grimshaw & Partners

Challenges and Solutions
for Lightweight Cable Structures

Nico Willman
Pfeifer

Grand Pavilion
Royal Melbourne Showgrounds

Peter Lim
Tensys Engineers

Afternoon Tea

Restart at 3.40 please

The New LSAA
and 2006/07 Agenda

Peter Kneen
Exec Officer, LSAA

Khalifa Stadium

Peter Macdonald
ARUP

Recent Projects

David McCready
LSAA Life Member

Fabrics – The Issues

Panel – Peter Lim Chair
Ian Knox, Brian O'Flaherty

Closure

Dr Kourosh Kayvani

GRIMSHAW
Nicholas Grimshaw & Partners
LSAA SYMPOSIUM
15th November 2006
GRIMSHAW

New York Office
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NY 10013
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+44 (0)20 7291 4194 F
Melbourne Office
494 LaTrobe Street
Melbourne
VIC 3000
Australia
+61 (0)3 9321 2600 T
+61 (0)3 9321 2611 F
73° 58' W
0° 0' W
144° 58' E
GRIMSHAW

THE GRIMSHAW BOARD
GRIMSHAW

GRIMSHAW

WORKING FROM FIRST PRINCIPLES

GRIMSHAW

IGUS HEADQUARTERS & FACTORY

Cologne, Germany

GRIMSHAW

Zurich International Airport
Zurich, Switzerland

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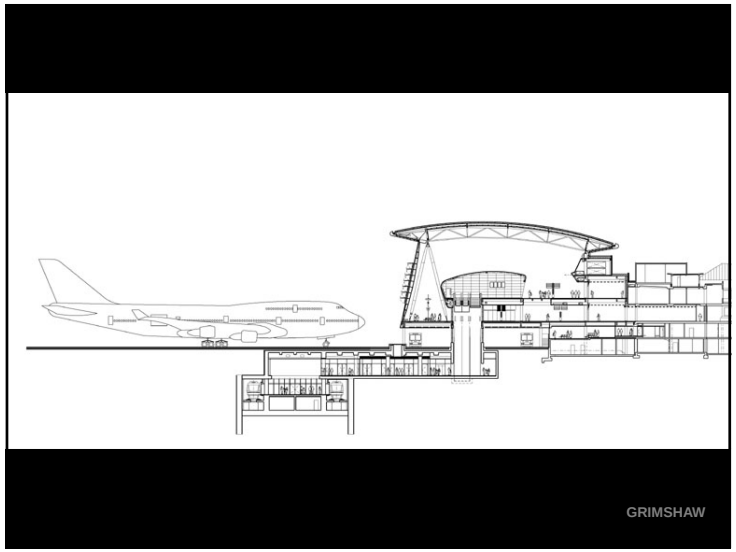
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Flughafen Zürich
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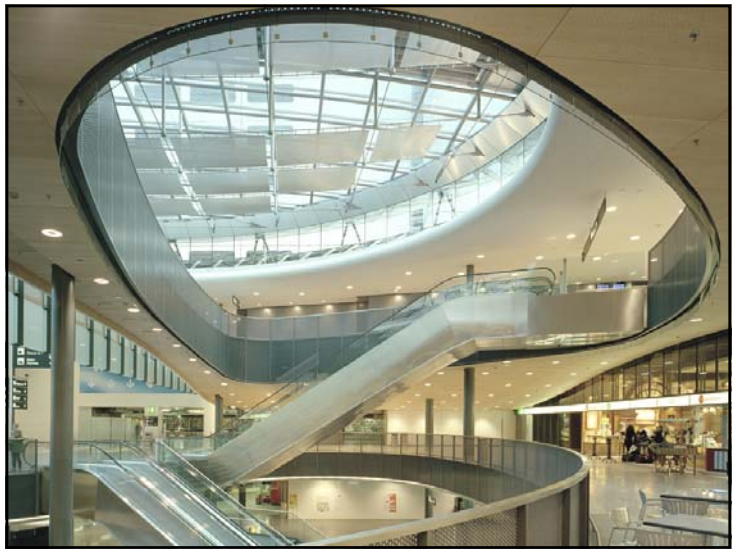

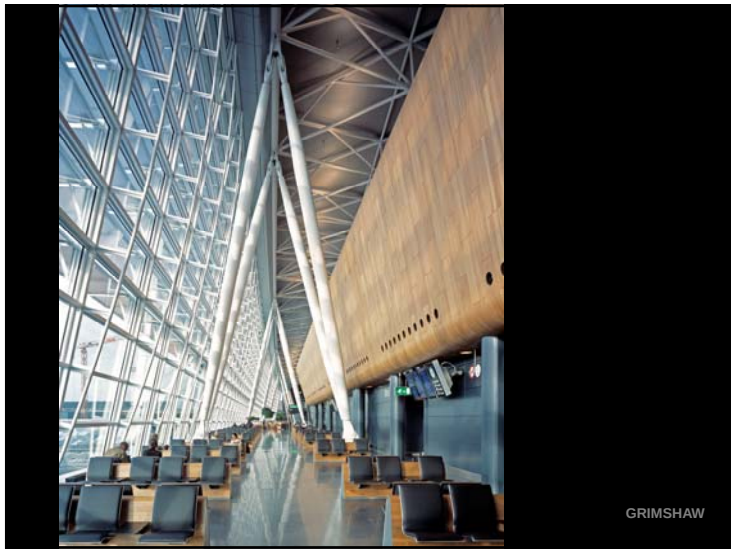
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THE EDEN PROJECT
Cornwall, UK
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FUNDACION CAIXA GALICIA

a Coruna, Spain

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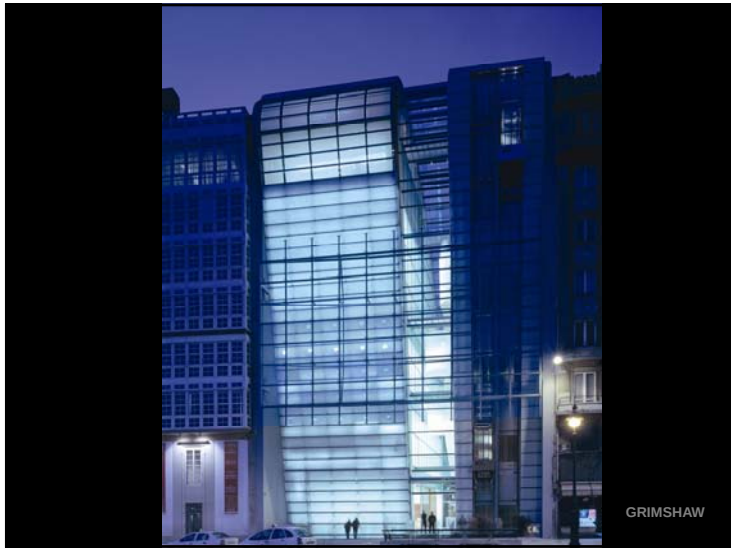

NATIONAL SPACE CENTRE
Leicester, UK

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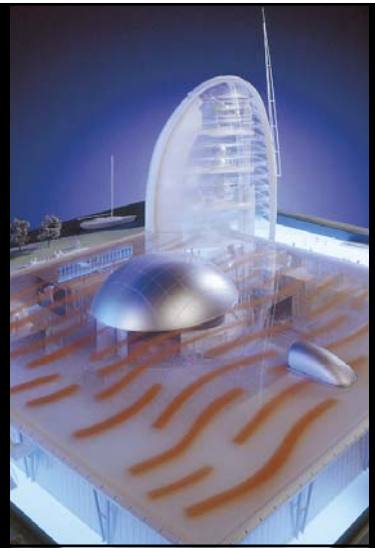

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BATH SPA
Bath, UK
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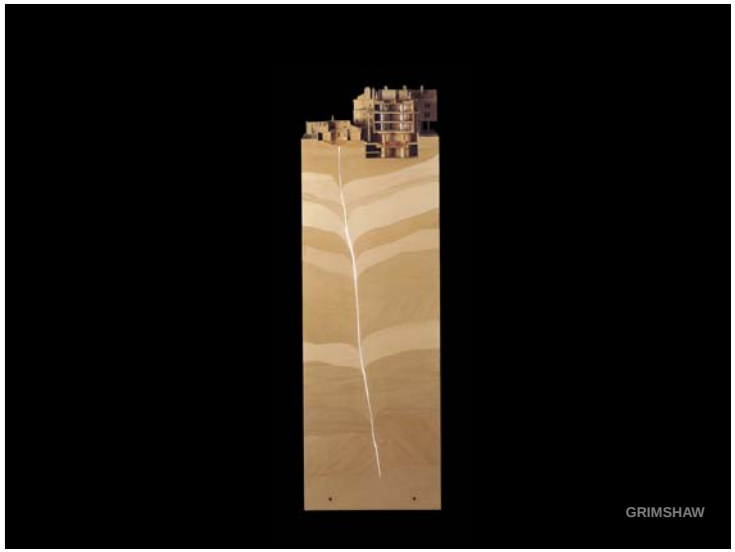
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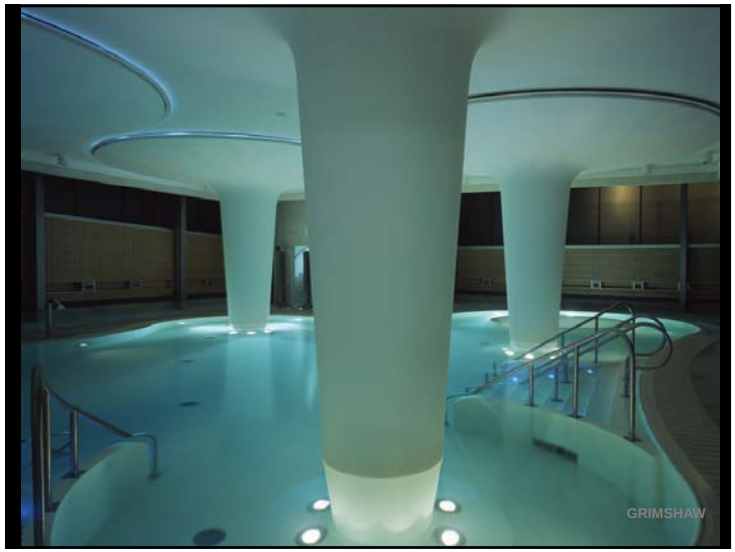
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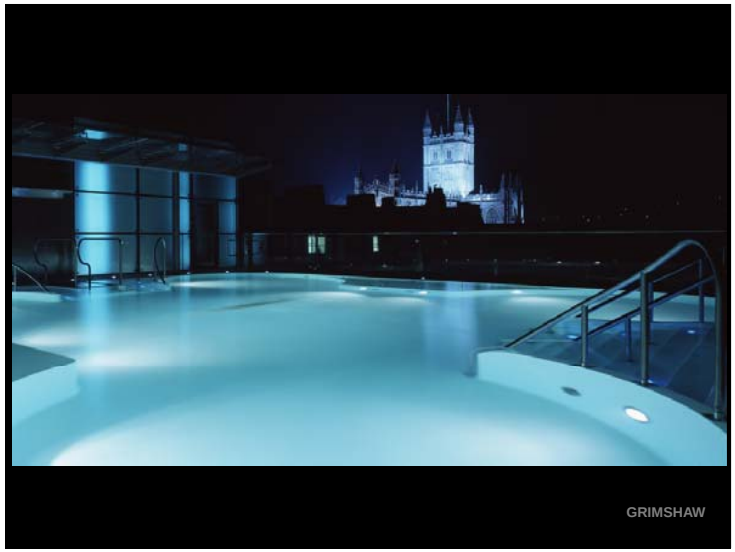
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FULTON STREET TRANSIT CENTER
New York, USA
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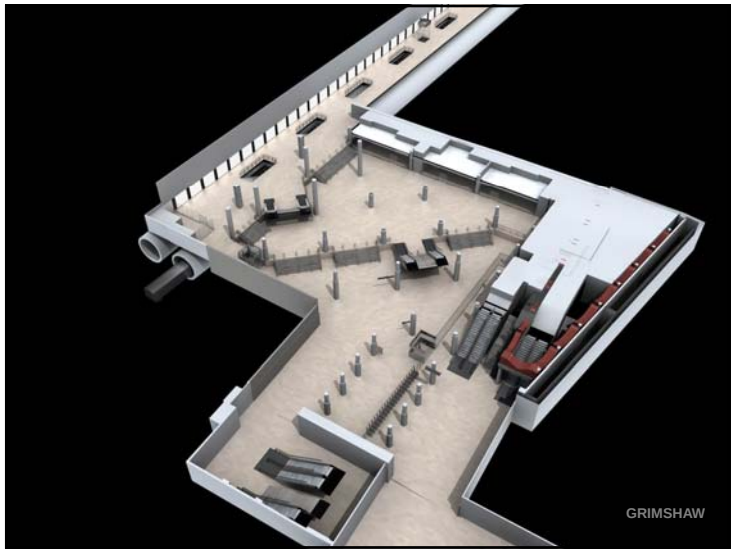
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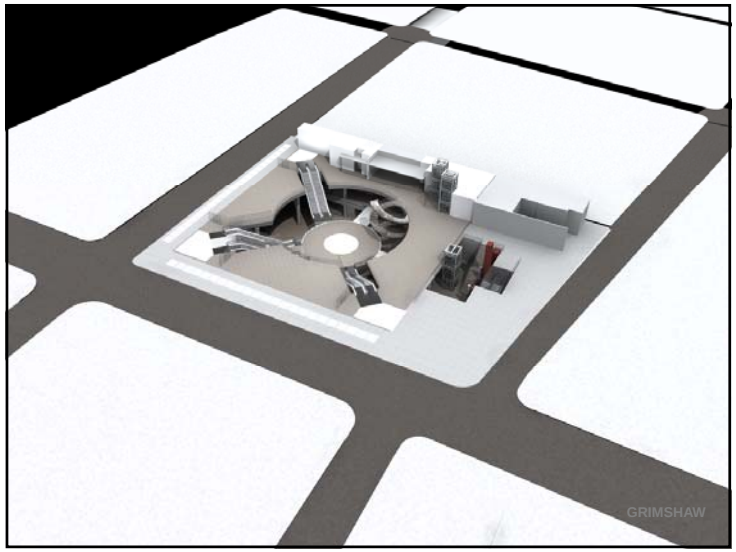
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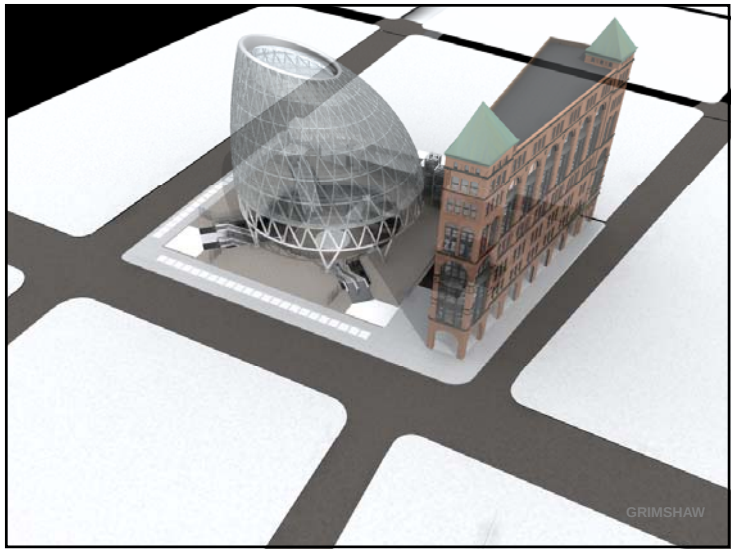
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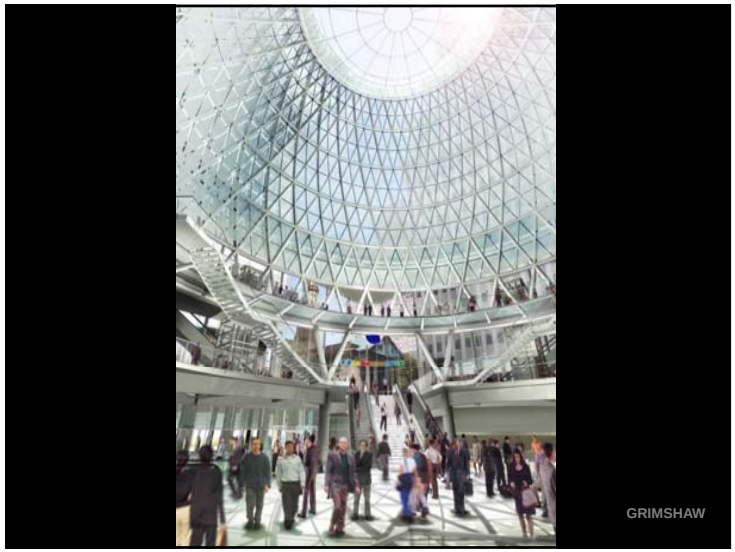
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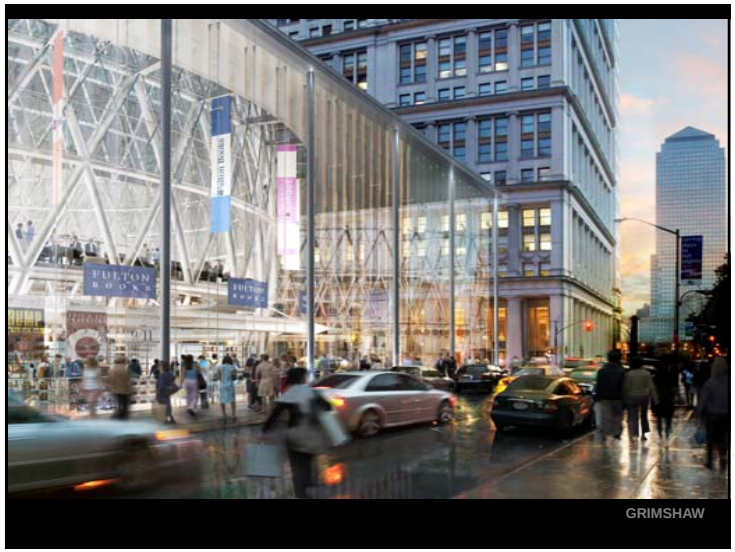
FULTON
BOOKS
GRIMSHAW

FRANKFURT TRADE FAIR HALL
Frankfurt, Germany
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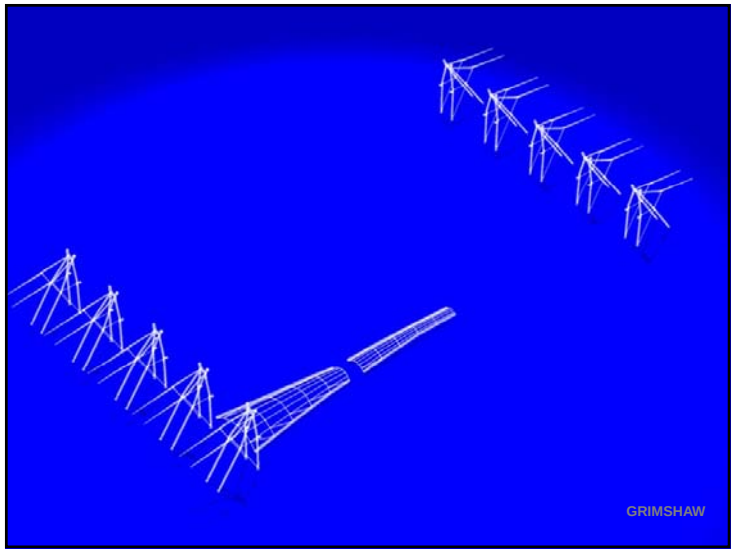
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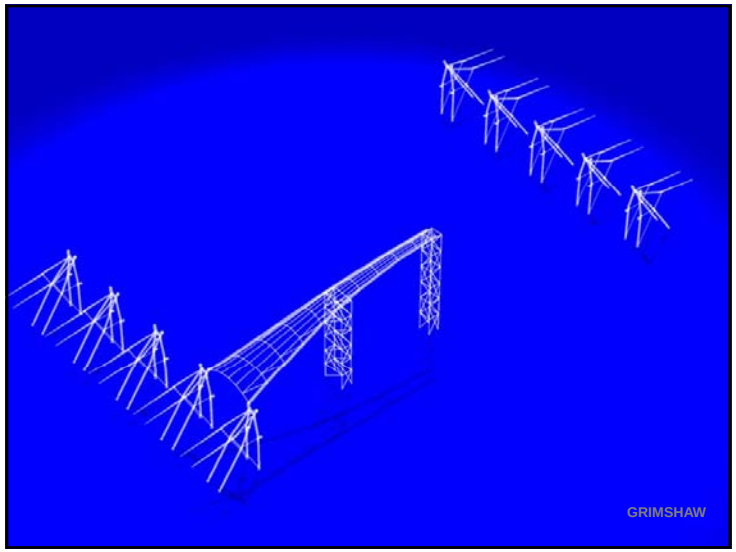
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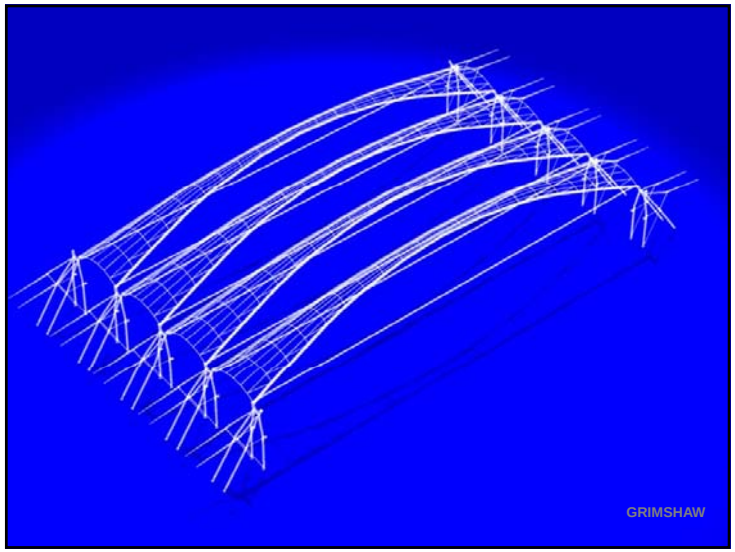
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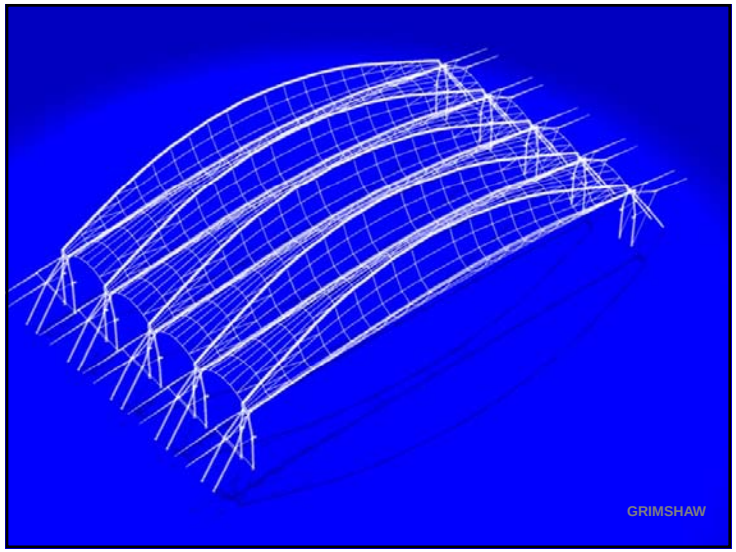
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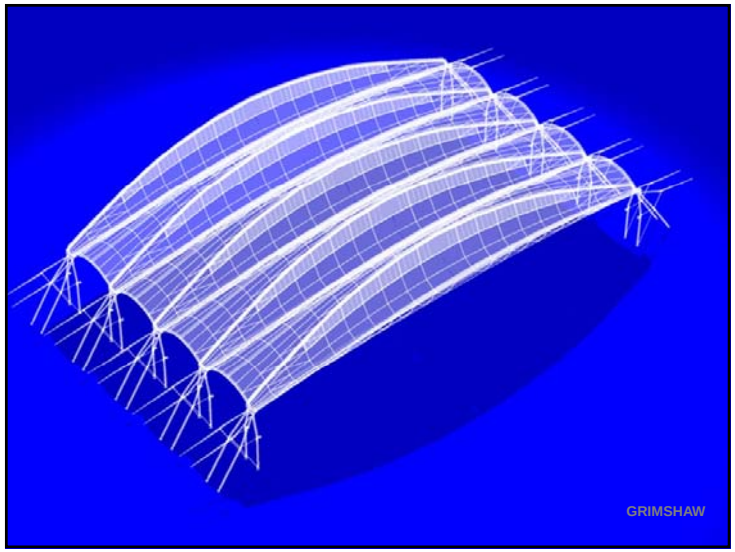
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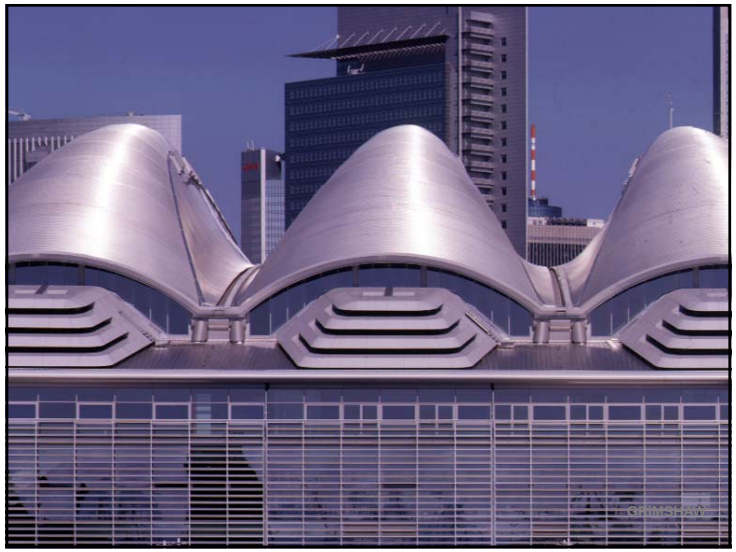

BRITISH PAVILION EXPO 1992
Seville, Spain
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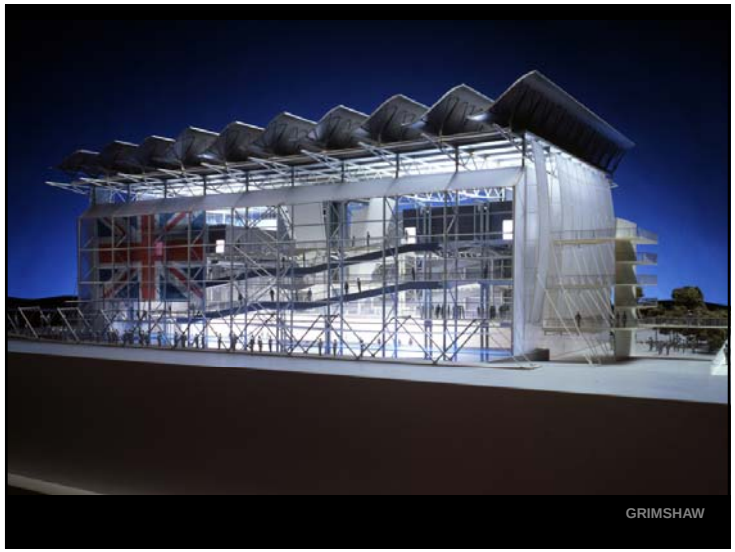
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LUDWIG ERHARD HAUS
(Berlin Stock Exchange & Chamber of Commerce)
Berlin, Germany

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THOMEN
THOMEN HAMBURG
GRIMSHAW

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INTERNATIONAL TERMINAL WATERLOO
London, UK

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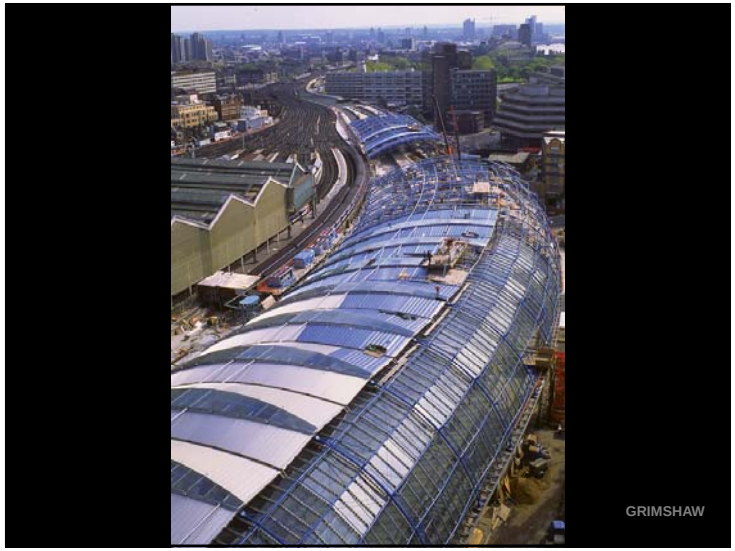

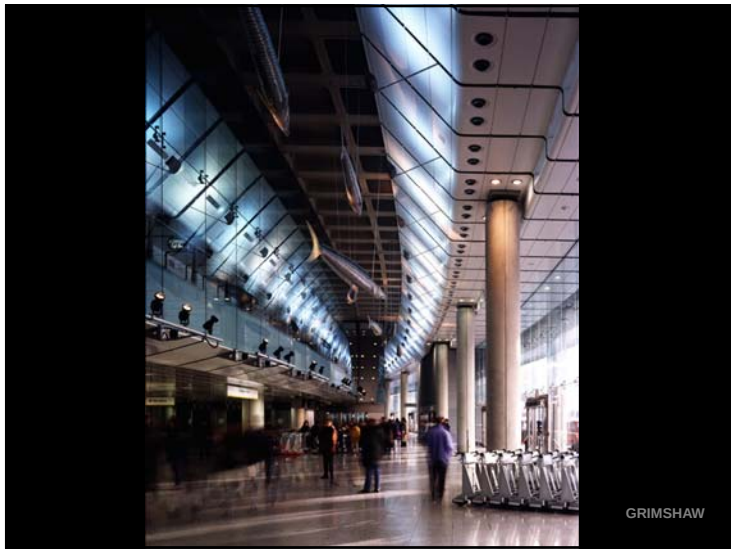

LORDS GRANDSTAND

London, UK

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IJBURG BRIDGES

Amsterdam, The Netherlands

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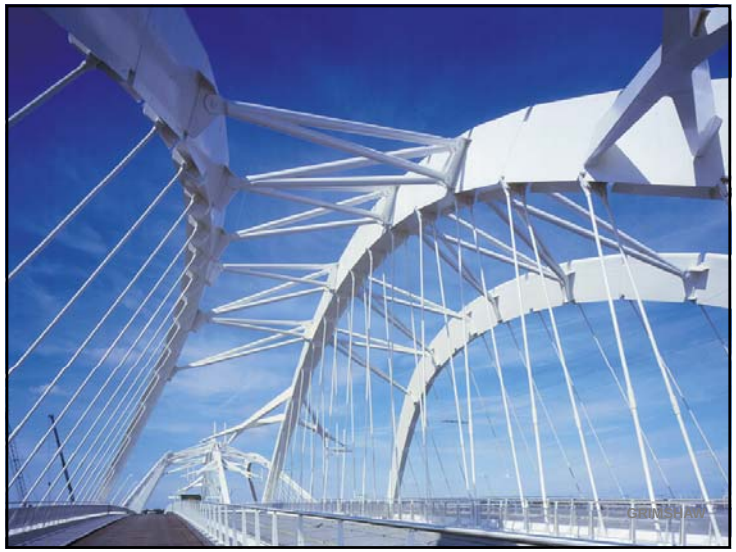

CURRENT AUSTRALIAN PROJECTS

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664 COLLINS STREET
Melbourne

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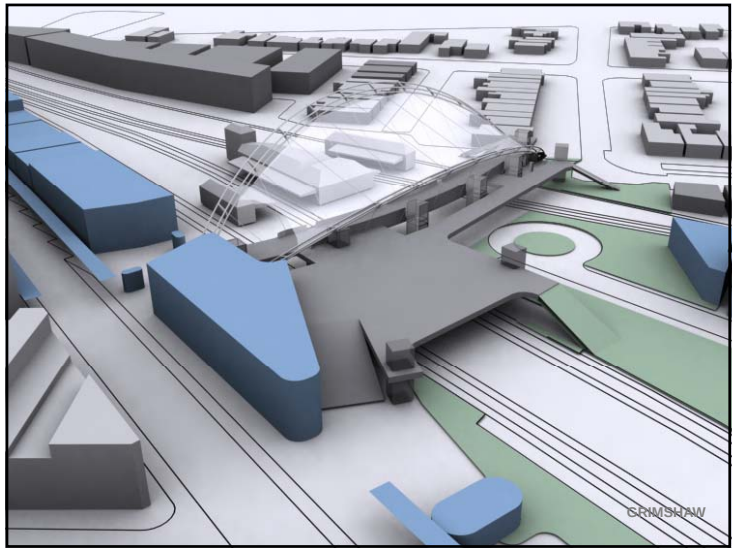
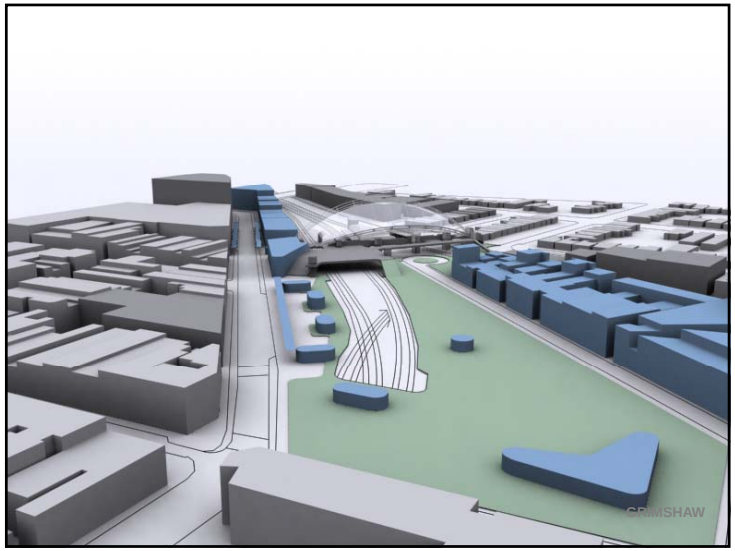
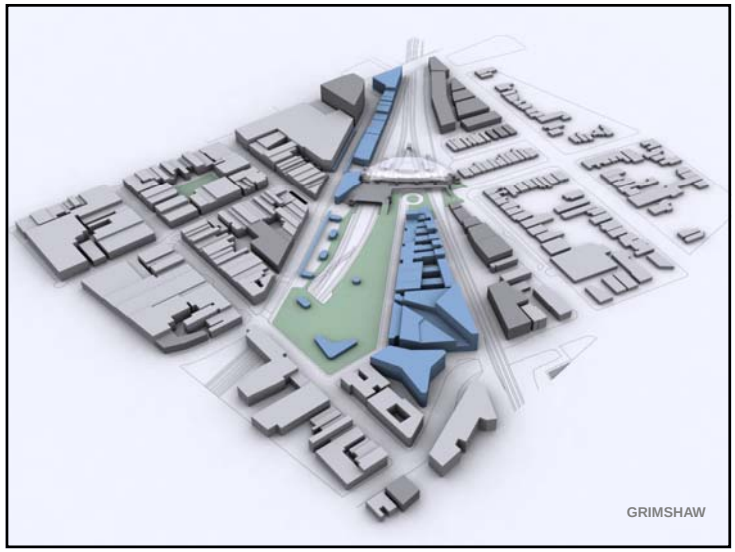
FOOTSCRAY STATION MASTERPLAN
GRIMSHAW







MELBOURNE CONVENTION CENTRE – YARRA BRIDGE

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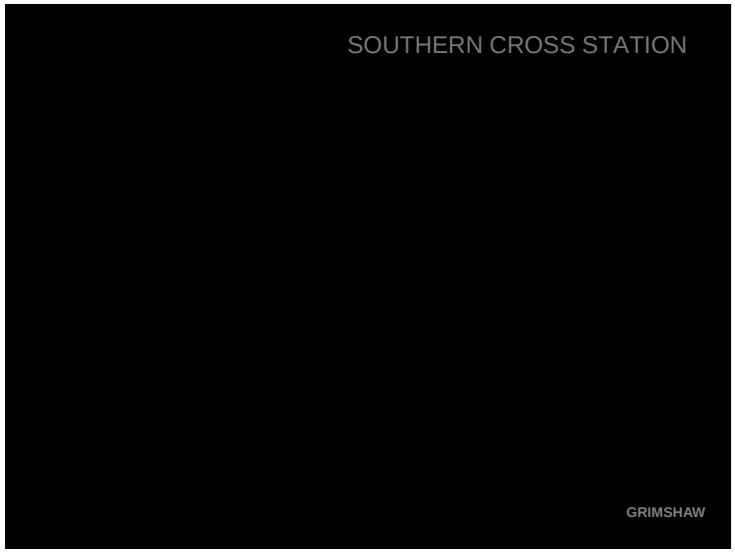
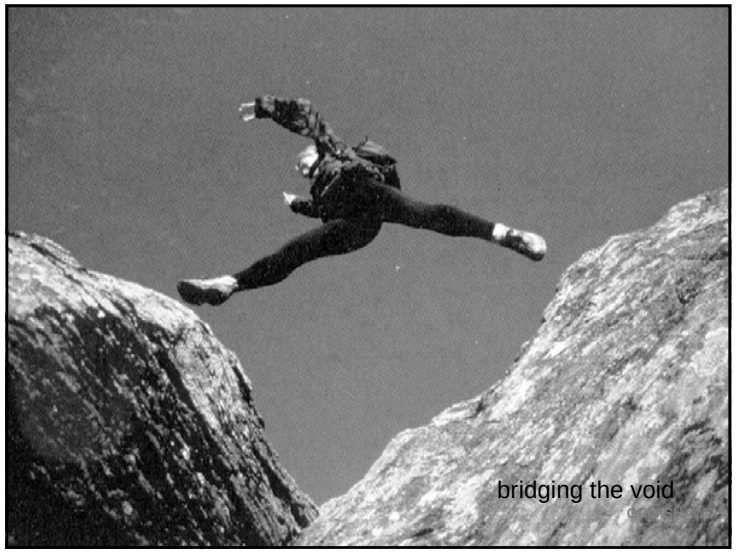
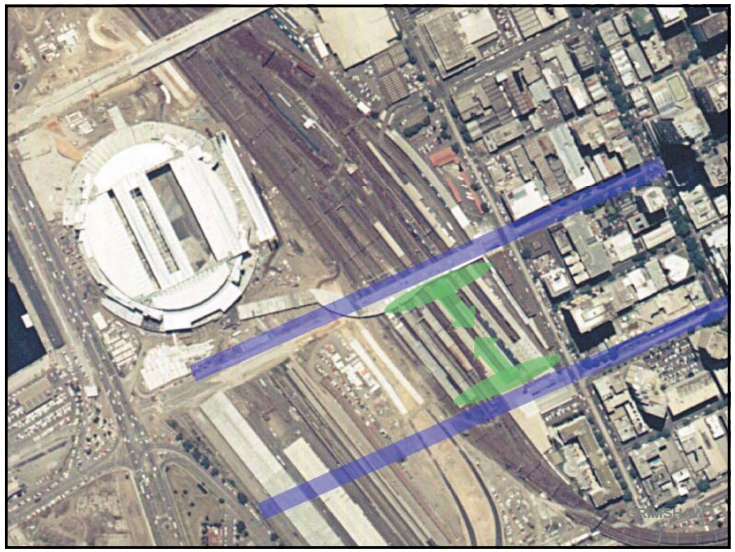
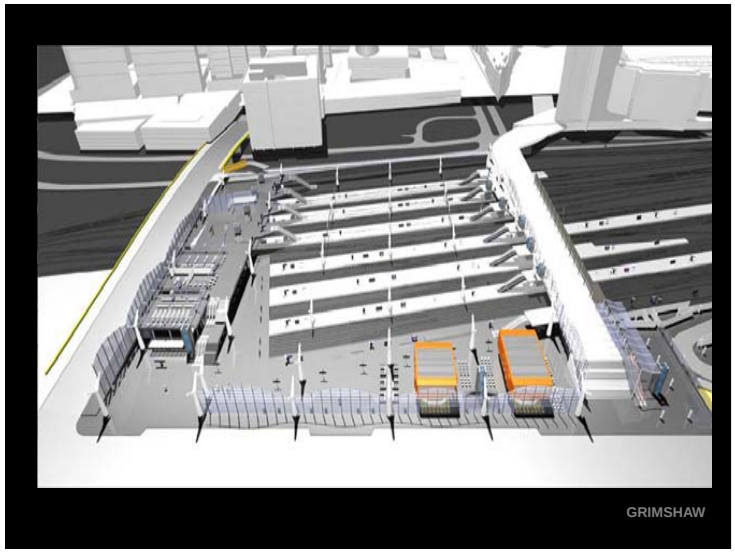

SOUTHERN CROSS STATION
GRIMSHAW

GRIMSHAW


bridging the void

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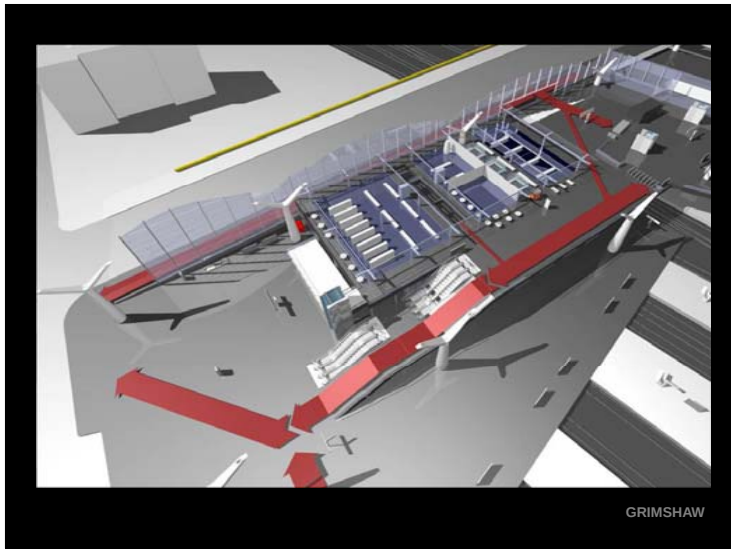
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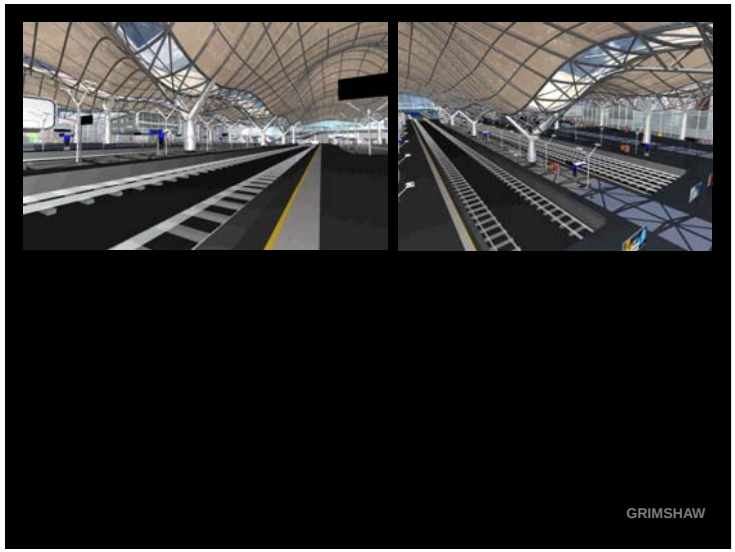
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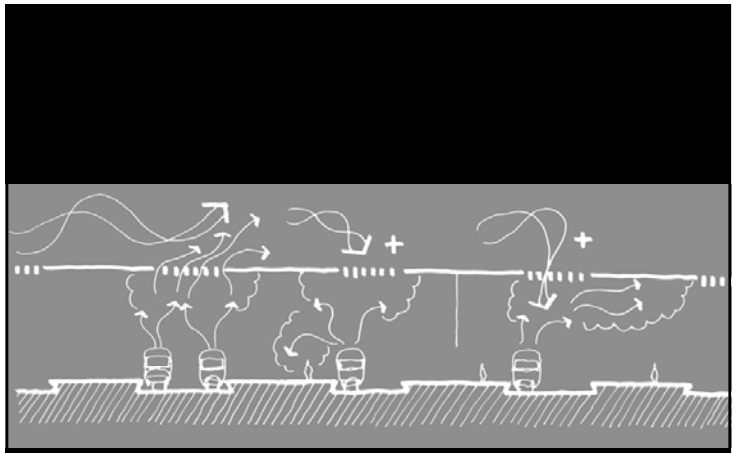

A flat roof would not naturally ventilate the space

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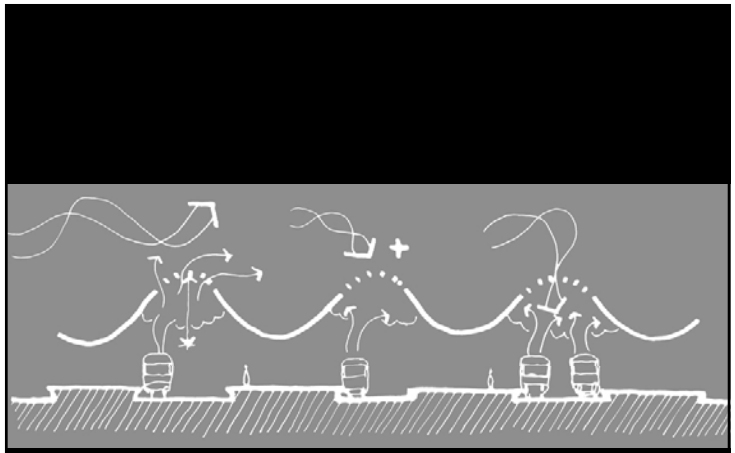
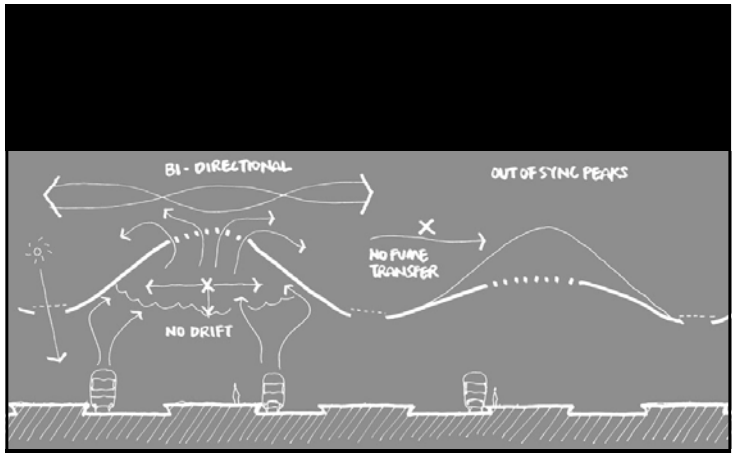


A curved profile provides a reservoir preventing fume drift

GRIMSHAW



Placing the peaks out of sync prevents fume transfer

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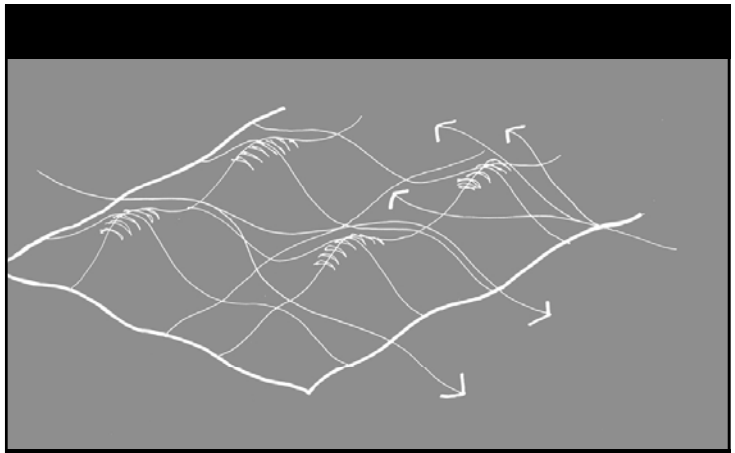
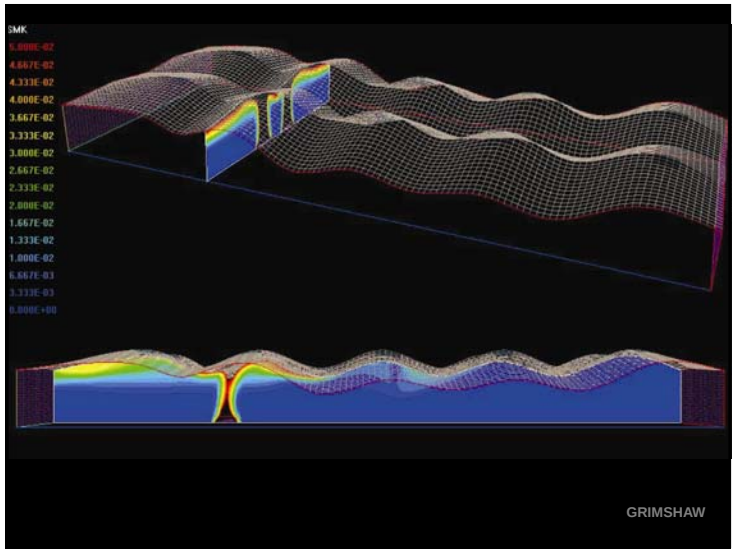
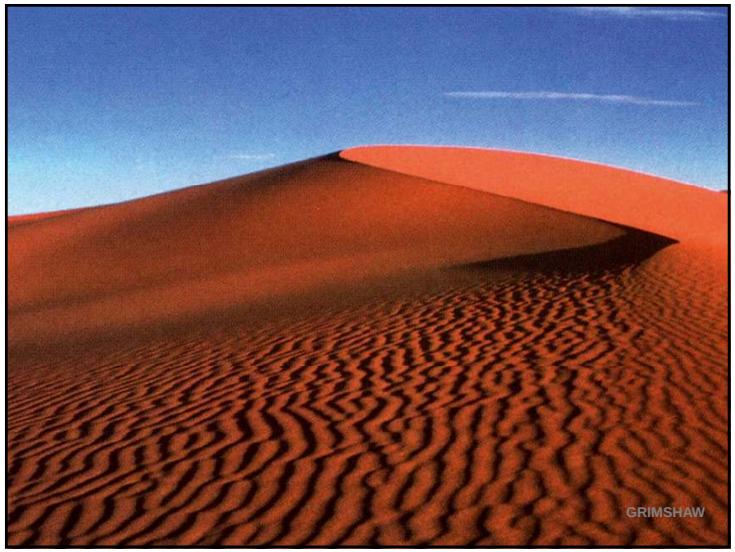


The roof landscape

GRIMSHAW


SMK
GRIMSHAW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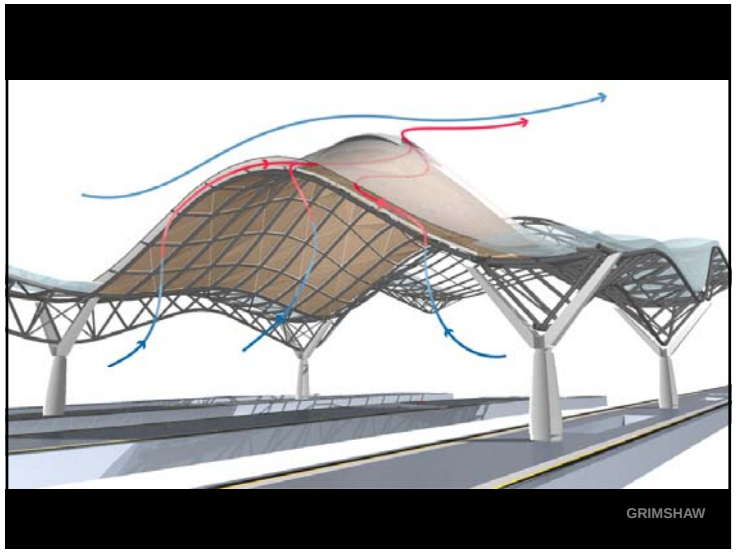
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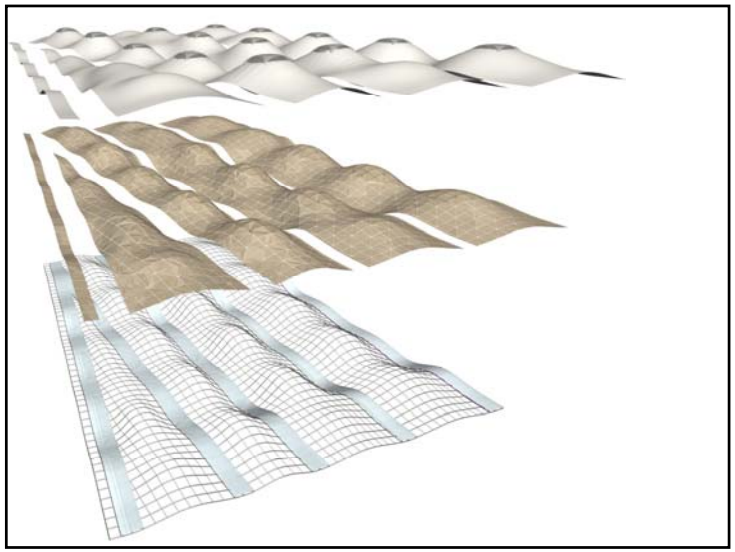

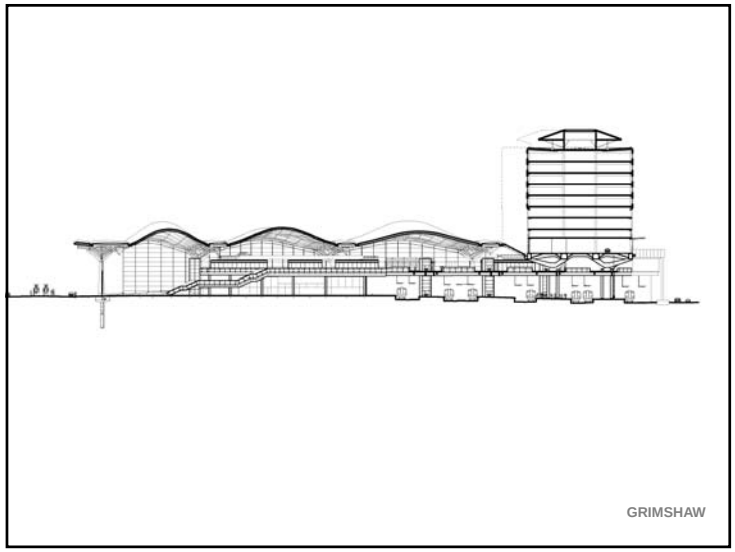
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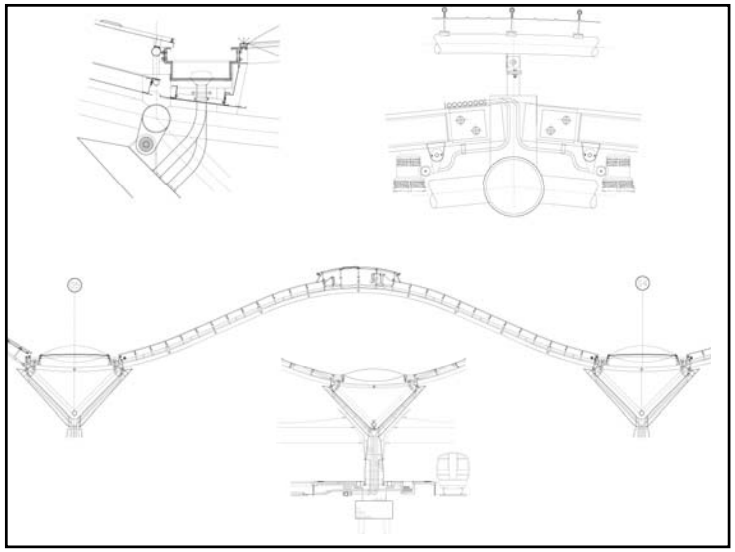

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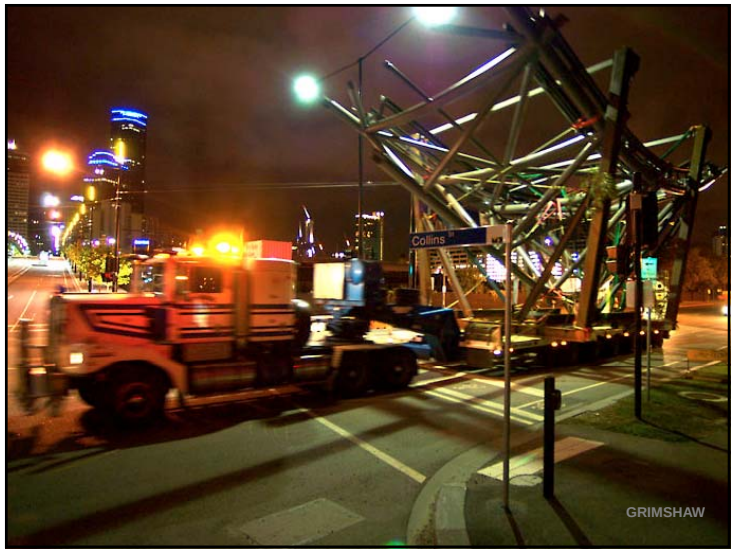
Collins
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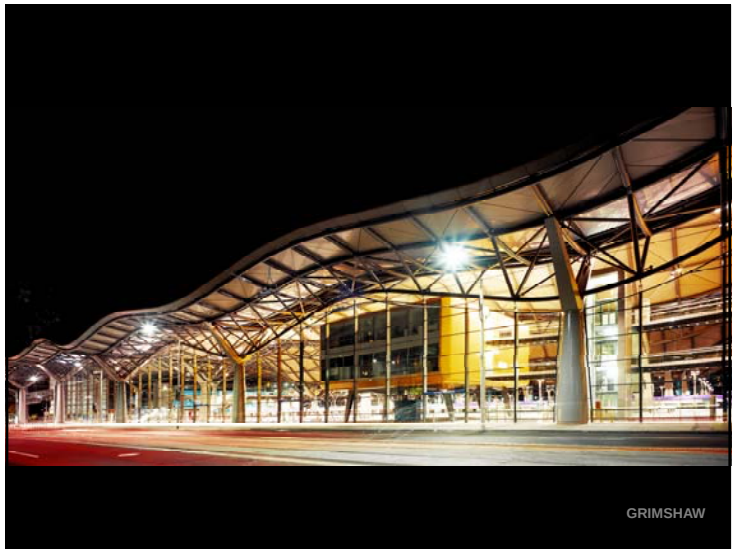
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LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA

Challenges and Solutions
for Lightweight Cable Structures

Nico William
Pfeifer

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA

LSAA 2006 Symposium
16th November 2006

RAS Showgrounds Grand Pavilion

Peter Lim - Tensys

www.tensys.com

1

Showgrounds Plan

www.tensys.com

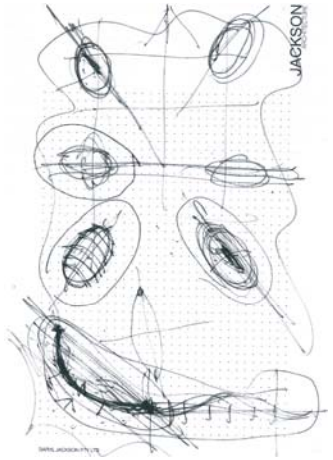
2

Showgrounds Plan

www.tensys.com

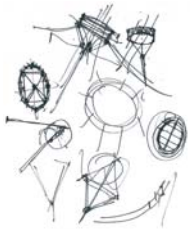
3

Humble beginnings



Concept

- A large plan area approx 98m x 84m to be covered
- Overlaying fabric over the area required some form of support
- A multi conical fabric form was decided as a lightweight solution
- Development and focus on 6 mast conic type structure



www.tensys.com

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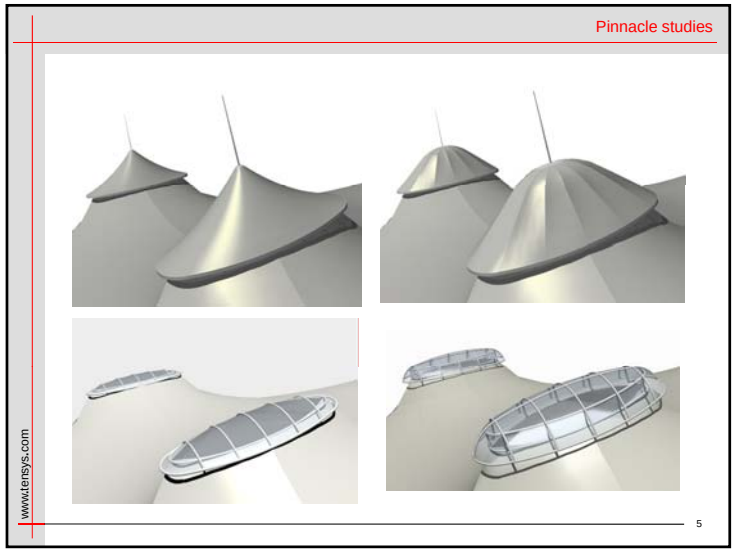
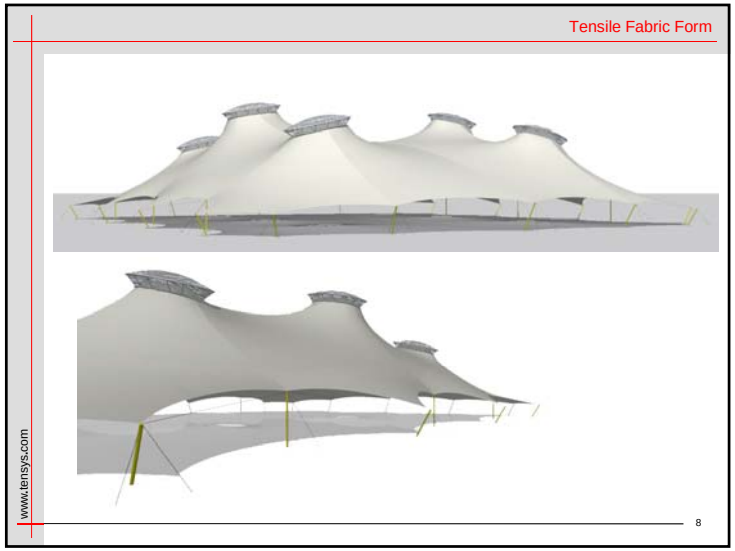
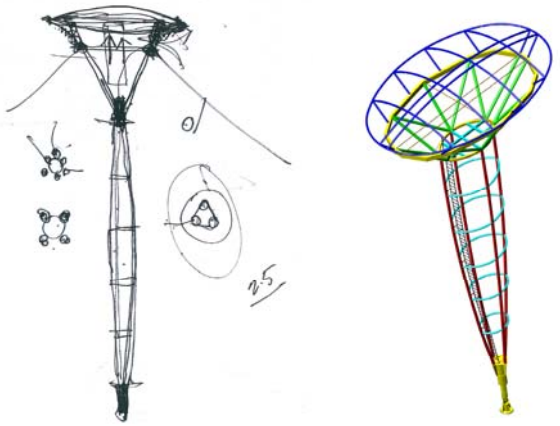

Pinnacle studies
www.tensys.com
5

Pinnacle system
www.tensys.com
6

Tensile Fabric Form
www.tensys.com
7


Tensile Fabric Form
www.tensys.com
8

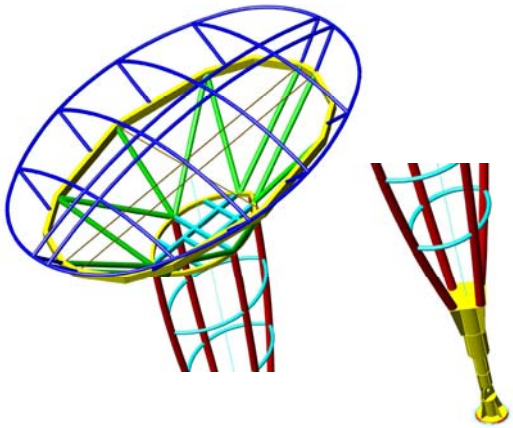
Central mast



www.tensys.com

9

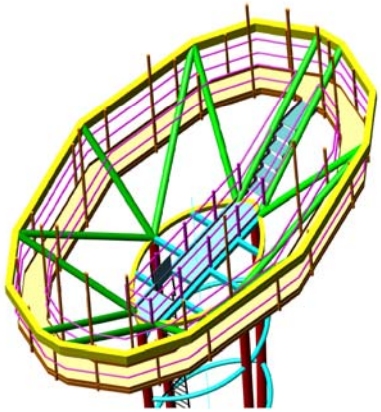
Central mast



www.tensys.com

10

Central mast (with access system)



www.tensys.com

11

Perimeter mast

www.tensys.com

12

Perimeter mast

www.tensys.com

13

Construction

www.tensys.com

14

Construction

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15

Construction

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16

Construction

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Construction

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Construction

www.tensys.com

19

Construction

www.tensys.com

20

Grand Pavilion

www.tensys.com

21

Grand Pavilion

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22

Grand Pavilion

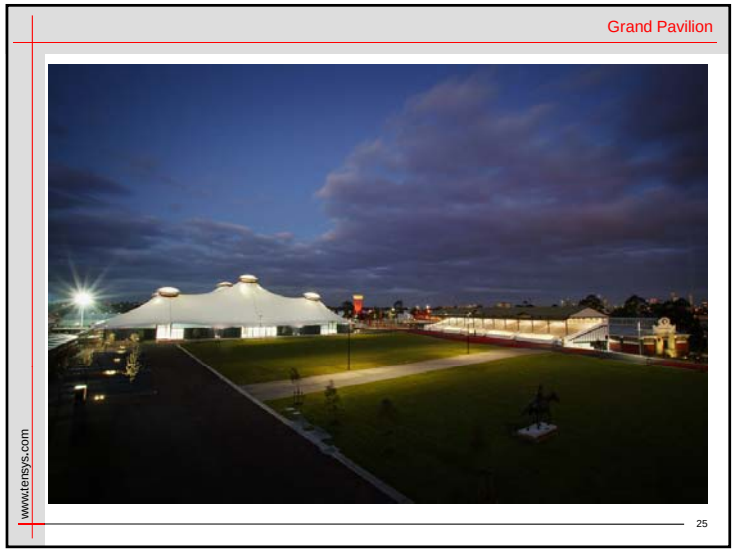
www.tensys.com

23

Grand Pavilion

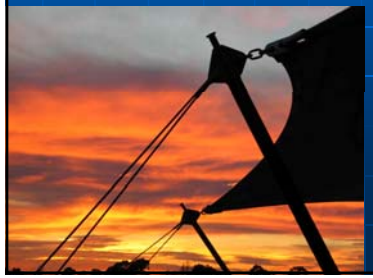
www.tensys.com

24


Grand Pavilion
www.tensys.com
25

Engineering + Analysis
www.tensys.com

The New LSAA
and 2006/07 Agenda



Peter Kneen
Exec Officer, LSAA

About me….

- A founding member of the MSAA / LSAA
- Structural Engineer / A Prof UNSW
- Specialized in lightweight structures
  - Spaceframes (from 1965: Domes, VAC Spire, Sao Paulo)
  - Fabric structures (from mid 1970s)
  - Shade structures (from early 1980s)
- Semi retired …
- Then along came a tired LSAA

The Early Days ….

- Fabric structures were “new” in Australia
- Structures often designed with scaled models
- Few jobs lead to under-priced projects & “cheap” detailing
- Great need to share experiences
- MSAA formed 1981 & held annual conferences and bi-annual Design Awards
- Vinzenz Sedlak (UNSW) was the driving force
- MSAA known Internationally esp LSA86

Adolescence ….

- Increased number of projects, costs become more realistic enabled good detailing
- Most structures designed with the aid of computer software
- Many founding members now busy running their own businesses
- Less need to share hard earned expertise

A Quieter Period ….

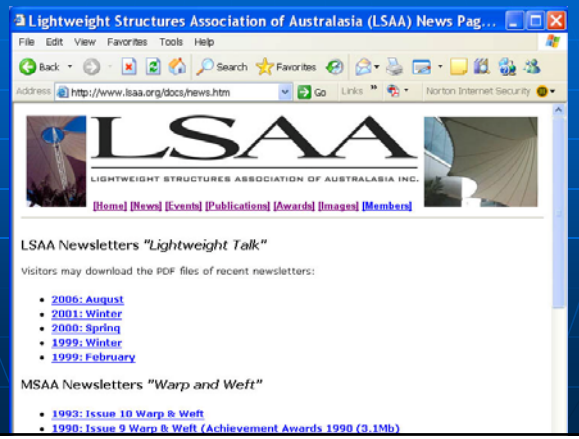
- MSAA becomes LSAA
- 2nd Major International Conference 1998
- Some key members move on
- Conferences, Awards continue until 2002
- Committee commits to revitalizing LSAA in 2006

LSAA Resurfaces …..

- Committee identifies members needs
- Appoints P/T Exec Officer to commence work on website
- May 2006 – www.lsaa.org comes online
- July – September 2006 saw most of the earlier publications scanned and converted to PDF files
- Efforts made to update contacts database – ongoing
- Move to use email as preferred contact method
- LSAA nearly completed outstanding governance requirements
- LSAA organizes this event to relaunch activities
- Next Major Conference planned for Melbourne in Sept 2007

www.lsaa.org (home page)

www.lsaa.org (News)



www.lsaa.org (Events)

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA INC.
[Home] [News] [Events] [Publications] [Awards] [Images] [Members]

Upcoming LSAA Events

To be placed on our contact list for further events and e-Newsletters please send us an Email
Please include your contact details (Name, Company, phone number(s), email address and postal address)

LSAA 2006 Symposium
Life Begins at 25

A half day seminar to celebrate the 25 years of the MSAA / LSAA

Afternoon of Thursday 16th November 2006
Star Room Function Centre, IMAX Theatre
Darling Harbour, Sydney

Brochure and Registration (PDF)
Getting there ... (PDF)

It is planned to have presentations covering some recent significant projects in Australia and overseas. An opportunity will be given to present steps taken by the committee to see the LSAA into its new "era".

The Keynote speaker is Croc Crosling
Associate from Nicholas Grimshaw & Partners who will speak about the spectacular Southern Cross Station at Spencer Street, Melbourne and other recent Grimshaw

Program

12 noon	LSAA AGM
12:30pm	Luncheon
1:00pm	Registration
1:30pm	Welcome and Introduction LSAA President: Kourosh Kayvani
1:35pm	Luncheon Sponsors - Welcome
1:40pm	Keynote Address: Croc Crosling Associate, Nicholas Grimshaw & Partners. Southern Cross Station (Melb) & other recent Grimshaw projects
2:25pm	Challenges and Solutions for Lightweight Cable Structures Nico Willman, Pfeifer
2:50pm	Grand Pavilion Royal Melbourne Showgrounds Peter Lim, Tenyyz Engineers
3:15pm	Afternoon Tea
3:45pm	Presentation on New LSAA organisational structure and 2006/07 agenda Peter Kneen - LSAA Exec Officer
3:55pm	Khalifa Stadium Peter Macdonald, Arup
4:20pm	Summary of Recent Projects

www.lsaa.org (Publications)

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA INC.
[Home] [News] [Events] [Publications] [Awards] [Images] [Members]

LSAA Publications

Interim List of MSAA/LSAA Conference Proceedings:

Non-Members

- Conference Summary List (last updated June 14 2006).
- Conference Cover Sheets (PDF 471Kb) (incomplete).

LSAA Financial Members

Please use the [Members] button on the top menu to access the available publications.

There is only one copy of some of the earlier MSAA / LSAA Conference documents and we would expect to have these scanned as the demand arises. Non-members will need to pay a fee for this service.

www.lsaa.org (Conf. summary)

LSAA
MSAA / LSAA Conferences

This list prepared May 12 2006
proceedings not yet available electronically except where links are provided.

- **2002:** LSAA Conference 31st October - 1st November 2002, Melbourne
  "Lightweight Architecture -The Structure Exposed"
  - List of Papers
- **2001:** LSAA 20th Anniversary Dinner, AGM and Symposium
  Thursday 8th November 2001, Pier 1, Sydney
  "Programme and Proceedings"
  - List of Papers (limited papers only)
- **2000:** LSAA 2000 Conference, Auckland February 2000.
  "The Lightweight Challenge"
  - List of Papers *(Scanned papers available June 2006).*
- **1997:** LSAA 1997 Symposium of the Lightweight Structures Association of Australasia
  August 1 1997, Melbourne.
  - List of Papers (scanned proceedings only)
- **1996:** LSAA 1996 Conference of the Lightweight Structures Association of Australasia
  12th & 13th September 1996, Brisbane.
  "Lightweight Structures - Creating Space"
  - List of Papers
- **1994:** LSAA 1994 Conference of the Membrane Structures Association of Australasia
  17-18 July 1994, Sydney.
  "Lightweight Structures in Australasian Architecture"

www.lsaa.org (Design Awards)

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA INC.
[Home] [News] [Events] [Publications] [Awards] [Images] [Members]

LSAA Design Awards

The LSAA generally holds a major conference every few years and Design Awards are a special feature of these events.

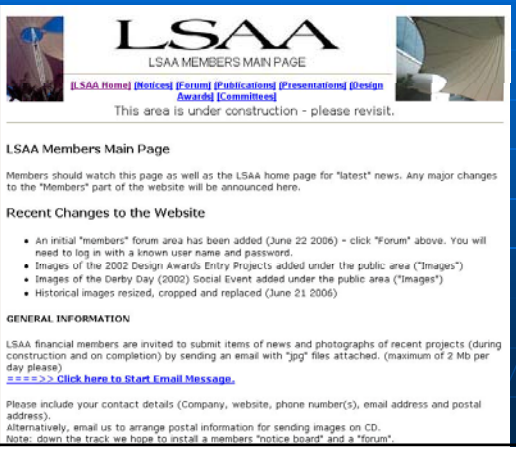
Planning is underway for a conference in 2007 which will have the LSAA 2007 Awards. Further details should be available in early 2007.

Past LSAA and MSAA Design Awards (incomplete)

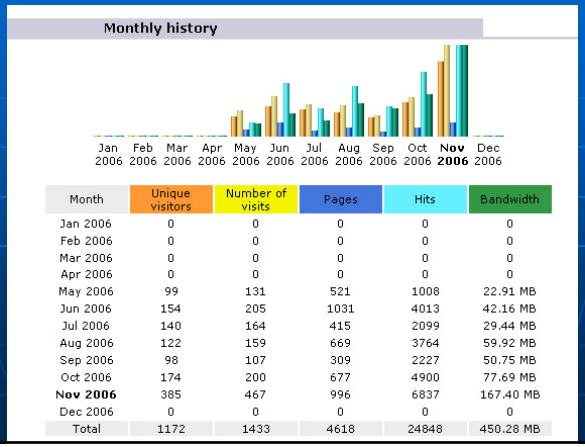
- LSAA 2002 Design Awards (htm)
  LSAA 2002 Design Awards (PDF 3.1Mb)
- LSAA 2000 Design Awards (PDF 1.8Mb)
- LSAA 1998 Design Awards (PDF 2.3Mb)

www.lsaa.org (Members area)

www.lsaa.org (Members area)



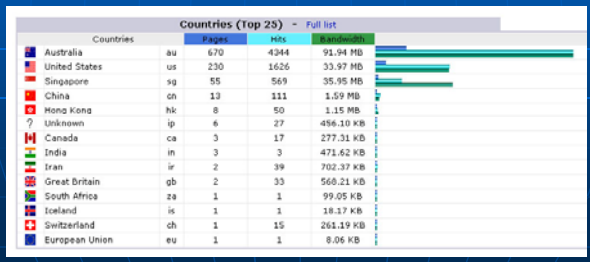
Website Traffic



Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2006	0	0	0	0	0
Feb 2006	0	0	0	0	0
Mar 2006	0	0	0	0	0
Apr 2006	0	0	0	0	0
May 2006	99	131	521	1008	22.91 MB
Jun 2006	154	205	1031	4013	42.16 MB
Jul 2006	140	164	415	2099	29.44 MB
Aug 2006	122	159	669	3764	59.92 MB
Sep 2006	98	107	309	2227	50.75 MB
Oct 2006	174	200	677	4900	77.69 MB
Nov 2006	385	467	996	6837	167.40 MB
Dec 2006	0	0	0	0	0
Total	1172	1433	4618	24848	450.28 MB

Website - reach

- More needs to be done with search engines, adding links, ftp areas etc.



LSAA Agenda 2007

- Organize LSAA 2007 Conference and Design Awards – Melbourne Sept.
- Develop “Members” Area of the website with company profiles, links
- Assemble material for educational use
- Offer lectures to Universities on Lightweight Structures
- Continue e-Newsletters
- Other items as resources permit.

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA

Khalifa Stadium

Peter Macdonald
ARUP

November 16 2006

Presentation not available

Recent Projects

David McCready
Life Member LSAA

STRUCTURFLEX NZ

STRUCTUREFLEX NZ

STRUCTURFLEX NZ

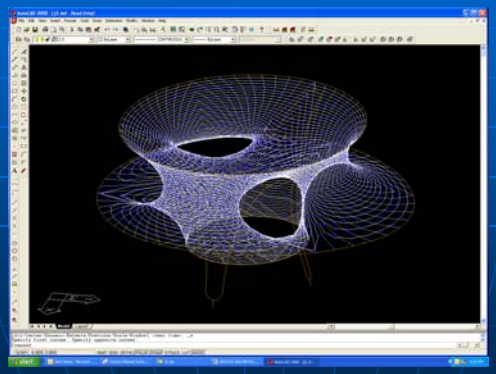
STRUCTURFLEX NZ

STRUCTURFLEX NZ

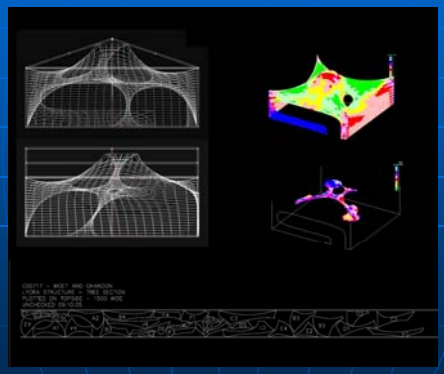
STRUCTURFLEX NZ

MAK MAX

MAK MAX



MAK MAX



MAK MAX

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

SPACE STRUCTURES

I'D RATHER BE….

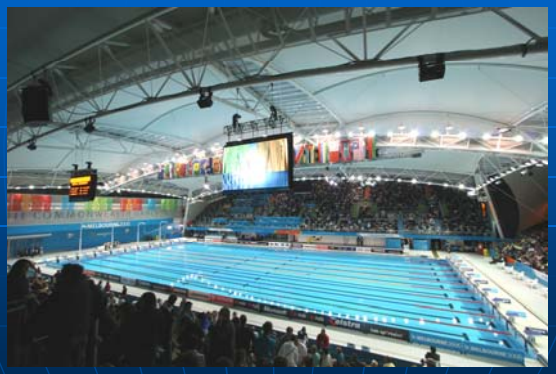
MAK MAX – CONNELL WAGNER

MAK MAX – CONNELL WAGNER

MAK MAX – CONNELL WAGNER

MAK MAX – CONNELL WAGNER

MAK MAX - CONNELL WAGNER



TENSYS ENGINEERS P/L

TENSYS ENGINEERS P/L

TENSYS ENGINEERS P/L

TENSYS ENGINEERS P/L

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TENSYS ENGINEERS P/L

OASIS TENSION STRUCTURES

OASIS TENSION STRUCTURES

OASIS TENSION STRUCTURES

OASIS TENSION STRUCTURES

OASIS TENSION STRUCTURES

OASIS TENSION STRUCTURES

VECTOR FOILTEC

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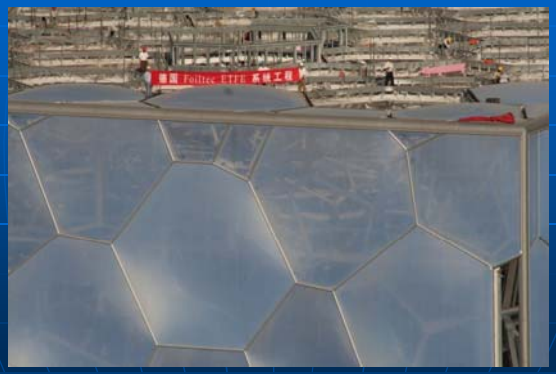

VECTOR FOILTEC

VECTOR FOILTEC

VECTCOR FOILTEC

OASIS TENSION STRUCTURES

LSAA
LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA

LSAA 2006 Symposium
16th November 2006

Fabrics
The Issues

Peter Lim / Brian O'Flaherty / Ian Knox

www.tensys.com

1

Issue 1

Fire

In the past BCA requirements have been loosely based on the following:-

AS1530.2 1993 Flammability Index no greater 5

AS1530.3 1999 Smoke Developed Index no greater than 8

There has been changes and the current BCA permits overseas standards to be utilised where there are limited details within Australian Standards.

AS1530.4 has been updated in 2005 to fire resistant tests to elements of construction. What is the impact on the fabric industry?

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2

Issue 1

Fire

Permanent Structures

- **BS7157:1989** – Method of test for ignitability of fabrics used in the construction of large tented structures
- **BS7837** – Specification for flammability performance for textiles used in the construction of marquees and similar textile structures which calls up **BS5438** – Method of test for flammability of textile fabrics when subjected to a small igniting flame applied to the face or bottom edge of vertically orientated specimens

Temporary Structures

- **BCA NSW H102.8**
  - Fabric that is used in the construction of a *temporary structure* must have—
    - (a) a *Flammability Index* of not more than 6 where used—
      - (i) within a height of 4 m of the base of the *temporary structure*; or
      - (ii) in an air-supported *temporary structure* without other supporting framework; and
    - (b) a *Flammability Index* of not more than 25 in every other case.

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3

Issue 2

Sustainability

Discussion on the role of fabrics in sustainable and ecological green designs

In the US, Leadership in Energy and Environmental Design (LEED) Green Building Rating System is the nationally accepted benchmark for the design, construction and operation of high performance green buildings (www.

US Architects and Engineers are taking up LEED Professional Accreditation and implementing LEED System to new buildings and projects

A lot of work is being carried out by the steel, timber and concrete industries to provide information for LEED ratings. Presumably fabric suppliers are also looking at this issue?

Is there information and data that could be beneficial in the Australian market?

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4

> Lords Cricket Club: original membrane installed in 1987

- Architect: Michael HOPKINS
- Engineer: OVE ARUP
- 1200 sqm of Type II membrane
- After 19 years in service the original membrane looked dirty as the surface treatments in those days were basic acrylics. Since the Chelsea/Marlyborne area are very exclusive boroughs, there was no possibility to obtain a new building permit, the original structure had therefore to be rebuilt strictly identical to the original one.
  - > Dismantled in Dec. 2005 in ONE DAY
  - > Re installed in Dec. 2005 in SEVEN DAYS
- PRECONTRAINT 1002 T2
- The original membrane is recycled with the TEXYLOOP TECHNOLOGY

www.tensys.com 5

- **Lords Cricket Club:**

Lords Cricket Club
Précontraint 1002 T2

www.tensys.com 6

- **Lords Cricket Club:**

Lords Cricket Club
Précontraint 1002 T2

www.tensys.com 7

- **Lords Cricket Club:**

Lords Cricket Club
Précontraint 1002 T2

www.tensys.com 8

Issue 3

Fabrics – New directions and developments

Over the last decade we have been dealing with

(a) PVC coated polyester woven fabrics with a variety of colours, top coats and lacquers

(b) PTFE coated glass fibre woven fabrics

(c) Fluorpolymer coated PTFE woven fabrics

(d) Silicon coated glass woven fabrics

(e) ETFE thermoplastic films and foils

Over the past few years, there has been discussions of titanium oxide (TiO^2)coatings, low E coatings in the R&D departments of various fabric suppliers. What are the new developments that we can see be coming out from the fabric suppliers?

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LSAA

LIGHTWEIGHT STRUCTURES ASSOCIATION OF AUSTRALASIA

LSAA 2006 Symposium
16th November 2006

Fabrics
The Issues

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