REPORT

TEXTILE ROOFS 2014

STUDENT’S PROJECT WEEK

RESEARCH

FROM MEMBRANE FORM TO RIGID SHELL

PROJECTS

KING FAHAD NATIONAL LIBRARY

FIFA WORLD CUP BRASIL

INNOVATIVE MEMBRANE ARCHITECTURE FOR CARPORT

Tensioned white membrane ceiling for the interior © Christian Richters - SEFAR
Textile roof World Cup Stadium Brasil © Michael Bredt, Germany /Ceno Membrane Technology GmbH
The Nineteenth International Workshop on the Design and Practical Realisation of Architectural Membranes, took place on 26–28 May at the Deutsches Technikmuseum Berlin. It was attended by 90 participants from 27 countries from four continents.

**PROJECTS**

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A PLACE OF WORSHIP FOR THREE RELIGIONS

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FOR RESIDENTIAL APPLICATION

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**REPORT**

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14 FROM MEMBRANE FORM TO RIGID SHELL
APPLIED RESEARCH ON MATERIAL AND PROCESS TECHNOLOGY TO APPLY AND STIFFEN MEMBRANE STRUCTURES WITH SHOTCRETE
Dear Reader,

Years with important sport events lead to many new or renovated sports facilities. Large span together with translucency are the main advantages of structural membranes, that’s why many new membrane projects are built for these events. This year for the FIFA world cup 2014 most of the 12 stadiums have been realised with structural membranes. For one of them you find a project article in this new issue of TensiNews.

Since the last TensiNews many activities were going on within the Eurocode working group and in the COST Action on 'Novel structural skins'. The Eurocode working group is preparing the scientific and policy (SaP) report “Guideline for a European Structural Design of Tensile Membrane Structures made from Fabrics and Foils”. This report is summarizing the actual code of practice in different European countries, and gives an outlook for a future Eurocode. It will be finished and submitted by the end of this year. It is supposed to be published by the joint research center (JRC) as background information to the future technical specification and Eurocode. The ETFE working group has contributed to the Eurocode working group a chapter on the limit states for ETFE foil, and is supposed to contribute also further general information based on the ETFE Design Guide.

After a first meeting in March, the COST Action on 'Novel structural skins - Improving sustainability and efficiency through new structural textile materials and designs' is meeting this September in Brussels. TensiNet members are involved in the different working groups.

TensiNet was present at Textile Roofs 2014 in Berlin, with many interesting lectures about projects, research and student work. Josep Llorens has prepared a report about this nineteenth international workshop held in Berlin this May.

Actual research on rigid shells, photovoltaic integrated in ETFE cushions and natural ventilation to avoid air-conditioning are beside many interesting projects subjects of this issue. Please enjoy it. I hope to meet you at our activities and events.

Yours sincerely,
Bernd Stimpfle

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**Forthcoming Meetings**

**TensiNet Meetings**

10.00 - 16.00  CEN/TC250 WG5 core group meeting

VUB, Building D, Pleinlaan 2, 1050 Brussels, Belgium | 30/09/2014
13:30 - 14:00  Annual General TensiNet meeting - welcome
14:00 - 15:00  Annual General TensiNet meeting - Presentation and summary of the activities WGs of both TensiNet and the COST action TU1303 - Novel structural skins
15:00 - 16.00  Partner meeting

**COST Action TU1303 Meetings**

TensiNet members can also attend the COST Action TU1303 meetings

VUB, Brussels, Belgium | 29-30/09/2014
29/09  morning plenary session, afternoon parallel Working Group sessions
30/09  morning parallel Working Group sessions, afternoon joined COST TU1303 + TensiNet meeting

Additional information can be found at http://www.novelstructuralskins.eu/events/meetings/

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**Forthcoming Events**

**CLADDING and FIXINGS for humanitarian sheltering**
Luxemburg, Luxembourg | 3-4/09/2014
lfrc-sru@croix-rouge.lu

**IASS-SLTE 2014 symposium**
Brasilia, Brazil | 15-19/09/2014
www.iass2014.org

**Essener Membranbau Symposium 2014**
Essen, Germany | 26/09/2014
www.uni-due.de/iml

**Aachen - Dresden International Textil Conference**
Dresden, Germany | 27-28/11/2014
http://www.aachen-dresden-itc.de/

**TECHTEXTIL 2015**
Frankfurt, Germany | 4-7/05/2015
www.techtextil.messefrankfurt.com

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**Invitation and conditions for participation in the 13thTechtextil Competition**

**TEXTILE STRUCTURES FOR NEW BUILDING 2015**

**Areas of textile building**

- Structural engineering – from construction using textile-reinforced concrete or plastics to construction using membranes for permanent and temporary, adaptable and mobile buildings;
- Interior construction – including such developments as the use of polymer fibre-optic cables for light transmission, textile air-channel systems for draught-free air conditioning in rooms, movable sound-insulation walls in production facilities, etc.;
- Product design for architecture;
- An additional focal theme has also been included: 'Suitability for re-use and recycling';
- Civil and industrial engineering.

The subject of the project submitted is a free choice. Work will be accepted, which has been produced either under a supervisor or without a supervisor. The deadline for uploading your summary and your contact data online at www.techtextil-student.com is 27 February 2015.

The award winning projects will be exhibited and win one of the cash prizes from the total pay-out of € 8.000.

**Organised by Techtextil / Sponsored by TensiNet**
The project had a lifetime of about six months, from 26 April 2012 to 7 October 2012. The diameter of the base plate was about 10m, the usable floor area was 60m² and the total height of the structure was about 6,10m. A dome of three, in the same direction curved, printed surfaces embodies the three monotheistic religions that revolve around a common center. The supporting structure of the dome is divided into a main structure and three shell structures, which supports on the base plate, and the high point of the main structure.

The structure covers a surface of 68mx34m. The bearing frame consists of 4 calendred hot dipped galvanised arches, placed in a longitudinal way, having a width of 34m supported by 2 hot dipped galvanised steel pillars. The height is 6,70m, reaching a height of 3,70m at the perimeter (Fig. 1).

Each arch is braced by means of cables anchored to the top of the pillars and the membrane is stretched on the perimeter on top of 3,70m high stands.

The shape of the single layer membrane has a double negative curvature, which is stabilized by pre-stressing (Fig. 2).

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Name of the project: Passengers Terminal cover
Location address: Patrasso Port, Greece
Client (investor): Mekaterattiki Diodos SA
Function of building: Passengers Terminal cover
Year of construction: 2004
Architects: PM Engineering SRL
Consulting engineer for the membrane: Eng. Dario Ravasi, Varese Italy
Main contractor: Arka Synthesis LTD
Supplier of the membrane material: Ferrari SA
Manufacture and installation: PM Engineering SRL - Plasteco Milano – Arka Synthesis LTD
Material: PRECONTRAINT 1002 FLUOTOP T
Covered surface (roofed area): 2312m²