TensiNews

Newsletter Nr. 23
September 2012
Published twice a year
Price €15 (post incl)
www.tensinet.com

Newsletter of the European based Network for the Design and Realisation of Tensile Structures

RESEARCH

LIFE CYCLE ASSESSMENT ENVIRONMENTAL IMPACT OF MEMBRANE MATERIALS AND STRUCTURES

PROJECTS

Up at The O2!

GROUND BREAKING ROOF WALK PROJECT
GREENWICH, LONDON, UK

A unique PTFE coated fiberglass

TURIN UNIVERSITY, ITALY

© 7t

TensiNet partners 2012

Buro Happold
www.burohappold.com

Canobbio S.p.A.
www.canobbio.com

CENO Membrane Technology GmbH
www.ceno-tec.de

Dyneon
www.dyneon.com

FabricArt Membrane Structures
www.fabricart.com.tr/

Form TL
www.Form-tl.de

Hightex GmbH
www.hightexworld.com

Mehler Texnologies
www.mehler-texnologies.com

Messe Frankfurt Techtextil
www.techtextil.com

Naizil S.P.A.
www.naizil.com

Saint-Gobain
www.sheerfill.com

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Sioen Industries
www.sioen.com

technet GmbH
www.technet-gmbh.com

Verseidag
www.vsindutex.de

TensiNewsINFO

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ISSN 1784-5688
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Price €15
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n°23

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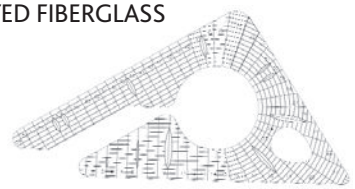
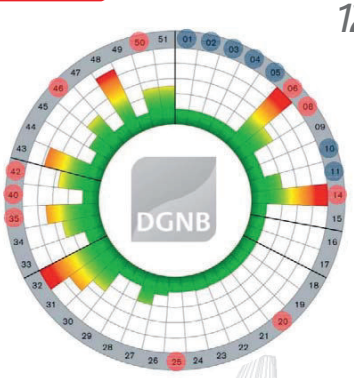
PROJECTS



RESEARCH



MISC

Edito

*One of the main TensiNet events in the near future is the **TensiNet Symposium 2013** (Istanbul, May 8-10). As during the previous Symposia, the TensiNet Association brings together researchers, practicing architects, engineers, membrane or foil producers, manufacturers and installers of tensile surface structures. The multidisciplinary approach, considering the process from concept to set-up, from material design to architectural realization gives this event an inspiring and enriching character. Abstracts can be uploaded at the website www.tensinet.com until the 8th of October.*

*Another important TensiNet event will be the kick-off workshop of the new TensiNet Working Group on **Life Cycle Assessment for Membranes** (Stuttgart, October 11-12). An ambitious project will be launched, which is crucial for the whole sector as we want to contribute to a 'sustainable' future.*

*Within our association we are confident that 'structural textile' is a fifth building material. The design and analysis of Membrane Structures should be performed by an integrated model and hence, consistent with the respective Eurocodes for constructions in steel, aluminium and wood. To strengthen this opinion, we repeat the invitation launched in the last TensiNews FLASH: 'Three years ago CEN TC 250 has identified the need for a new EN Eurocode for Membrane Structures. From a recent discussion however we understood that the Commission is not considering Membrane Structures as a priority to support the establishment of a specific Eurocode. So we ask our members to write a letter to Mr. Vicente Leoz, Head of Unit Construction, DG Enterprise, European Commission in which the **importance of a Eurocode** for Membrane Structures is argued… We will collect all letters and send them as a package to Mr. Vicente Leoz.' We thank in advance all members for helping us in this action.*

Looking to the broader list of upcoming events, we see a growing interest in Textile Architecture, Transformable Structures, Membrane structures and/or Structural Membranes. We are happy to be able to contribute to several events. A special issue of the International Association for Shell and Spatial Structures-journal will be devoted to Membrane Structures and will contain the best papers of TensiNet 2013, IASS 2013 and Structural Membranes 2013. With this concerted action we hope to exchange valuable research results, to stimulate young engineers to apply for a research grant and to trigger new research initiatives.

Forthcoming Meetings

WG Workshop in Stuttgart, Germany
WORKSHOP "Goal & Scope" WG LCA
Thursday 11 & Friday 12/10/2012
Location: PE INTERNATIONAL, Stuttgart, Germ.

TensiNet Meetings in Vienna, Austria
Thursday 22/11/2012
13:00 Working Group Meetings
17:00 Partner Meeting
18:00 Annual General Meeting
19:00 Lecture
in collaboration with Vienna University of Technology - Master Membrane Lightweight Structures
Location: OIAV, Vienna, Austria

WG Meeting in Paris, France
Core group meeting CEN/TC250 WG5
Wednesday 5/12/2012 10:00 - 16:00
Location: Groupe AFNOR,
11 Rue Francis de Pressensé,
La Plaine Saint-Denis cedex, France

Forthcoming Events

Essener Membranbau Symposium 2012
Universität Duisburg-Essen, Germany
www.uni-due.de/iml *28/09/2012*

International Textile Conference
Dresden, Germany *29 -30/11/2012*
www.aachen-dresden-itc.de

TensiNet Symposium 2013
[RE]THINKING lightweight structures
IST▲BUL2013 Mimar Sinan Fine-Art University, Istanbul, Turkey
www.tensinet2013.org *8-10/05/2013*

Techtextil 2013
Messe Frankfurt, Germany *11-13/06/2013*
http://techtextil.messefrankfurt.com/frankfurt/en/aussteller/willkommen.html

2nd International Conference on Structures and Architecture **ICSA 2013**
Guimarães, Portugal *24-26/07/2013*
www.icsa2013.com

Transformables 2013
Seville, Spain *18-20/09/2013*
www.transformables2013.com

2013 IASS
Annual Symposium: Beyond the Limit of Man
Wroclaw, Poland *23-27/09/2013*
http://www.iass-structures.org

Structural Membranes 2013 *VI Int. Conference on Textile Composites and Inflatable structures*
Munich, Germany *9-11/10/2013*
http://congress.cimne.com/membranes2013

TensiNet SYMPOSIUM 2013, Istanbul

Wednesday 8, Thursday 9 and Friday 10 May

[RE]THINKING lightweight structures

MIMAR SINAN FINE-ART UNIVERSITY, ISTANBUL, TURKEY

A three-day symposium where the Plenary sessions will refer on the one hand to the Tensinet Working groups with [RE]THINKING Analysis & Materials (Peter Gosling); ETFE (Rogier Houtman); PNEUMATIC STRUCTURES (Matthew Birchall) and [CLOSING THE LOOP] Life Cycle Assessment for Membrane Materials and Structures (Jan Cremers).
On the other hand interesting projects will be presented.
Prominent experts in the membrane architecture and engineering world will introduce each plenary session. The keynote speakers Horst Berger,Markus Balz & Christoph Paech (sbp), Matthew Birchall (Buro Happold), Shajay Bhooshan (Zaha Hadid Office), Jan Cremers (Hightex), Ken' ichi Kawaguchi, Alar Ruutopold (Saint-Gobain) and Werner Sobek (Werner Sobek Stuttgart GmbH & Co. KG) have already confirmed.
More information and updates on the keynote lectures & program, venue, hotels, social event, sponsoring, etc. on www.tensinet2013.org

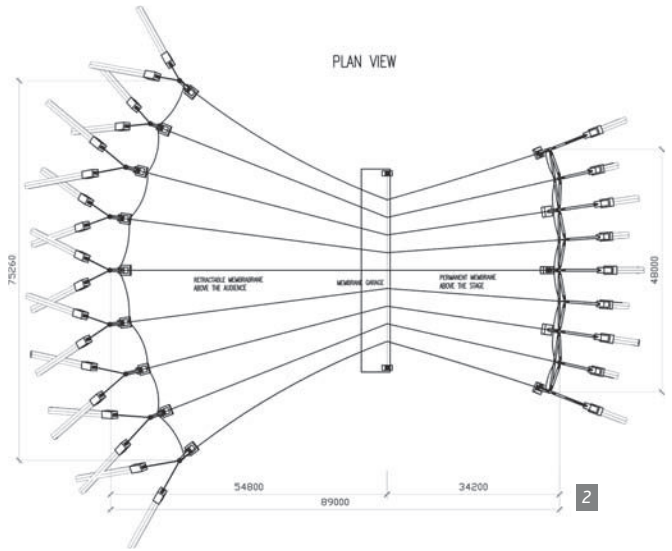
Call for ABSTRACT Abstracts should not be longer than 300 words and should indicate the topic(s). Papers should not be longer than 2500 words and 10 pages figures included.

Abstracts and papers will be reviewed by the scientific committee.

Topics
- [RE]THINKING Analysis & Materials
- ETFE
- PNEUMATIC STRUCTURES
- [CLOSING THE LOOP] Life Cycle Assessment for Membrane Materials and Structures
- RECENT PROJECTS

Upload your abstract on www.tensinet.com

Timing - deadlines updated
- **abstract submission - 8th October 2012**
- abstract acceptance - 12th November 2012
- paper submission - 21th December 2012
- paper acceptance - 4th February 2013



K2 ENGINEERING

Kielce, Poland

A COMBINATION OF RETRACTABLE AND PERMANENT COVERING

Kadzielnia Amphitheatre

Context

In the historic place called Kadzielnia, located in the Polish city Kielce, the new amphitheatre with a membrane roof over the audience and the stage has been erected. The structure consist of a permanent roof over the scene and a retractable roof over the audience (Fig. 1 to 4).

Project

The area of the retractable membrane roof is about 2700m² and of the permanent membrane roof 1500m². The membrane roof over the audience is used only in the summer. The permanent roof over the scene must withstand a 1.8kN/m² snowload. The span of the main cable over the scene is 35m and over the audience 55m. The rigid structure consists of two sets of columns (one behind the stage and one behind the audience), and a pendulum frame in the middle. The pendulum frame, with a span of 35m is stabilized by main cables.


1


3


4


3


4

Name of the project:		Kadzielnia Amphitheatre
Location addres:		Kielce, Poland
Client (investor):		Geopark Kielce
Function of building:		Amphitheatre
Type of application of the membrane:		Rain and snow protection
Year of construction:		2010
Architects:		IMB Asymetria, Kraków
Structural engineers:		k2 engineering, Andrzej Kowal
Consulting engineer for the membrane:		k2 engineering, Andrzej Kowal
Engineering of the controlling mechanism:		CadMech Wroclaw
Main contractor:		Anna-Bud from Bilczy and SportHalls, Poland
Contractor for the membrane (Tensile membrane contractor):		SportHalls
Supplier of the membrane material:		Mehler Texnologies, Germany
Manufacture and installation:		Sport Halls Wroclaw
Material:	retractable roof:	VALMEX® FR 1400 MEHATOP F type II
	permanent roof:	type III
Covered surface (roofed area):	retractable roof:	2700m²
	permanent roof:	1400m²


4


4

The pendulum frame is foreseen as a garage for the folded membrane, which is stored during the winter. The technical solutions of the retractable roof were inspired by the retractable roofs at Fortress Kufstein designed by Alfred Rein Ingenieure and by these of the Frankfurt Stadium and Warsaw National Stadium designed by Schlaich Bergermann und Partner. Unique in the Kadzielnia amphitheatre structure is that the retractable roof is not built on a closed system. The edge cable of the retractable membrane deflects inwards during the process of folding and tensioning of the membrane. In order to enable large horizontal deflections of the edge cable, a special double hinge rotary head, connecting the cable to the column, was introduced (Fig. 5)

Technical aspects - driving system

The mechanism of the roof tensioning consists of three main assemblies:

- cable winches
- hydraulic system
- automatic and calibration systems

The cable winch is installed on a column, where the main roof cables are installed as well. The winch frame is mounted on the rotary head of the column, therefore the position of the winch is adjusted to the changing direction (during tensioning of the roof) of the main cable.

The unit of the servomotors is located on the winch frame and is responsible for: tensioning the cable unfolding the membrane (1), gripping the first membrane pulling trolley (2), final membrane tensioning (3) and locking the membrane in a final