

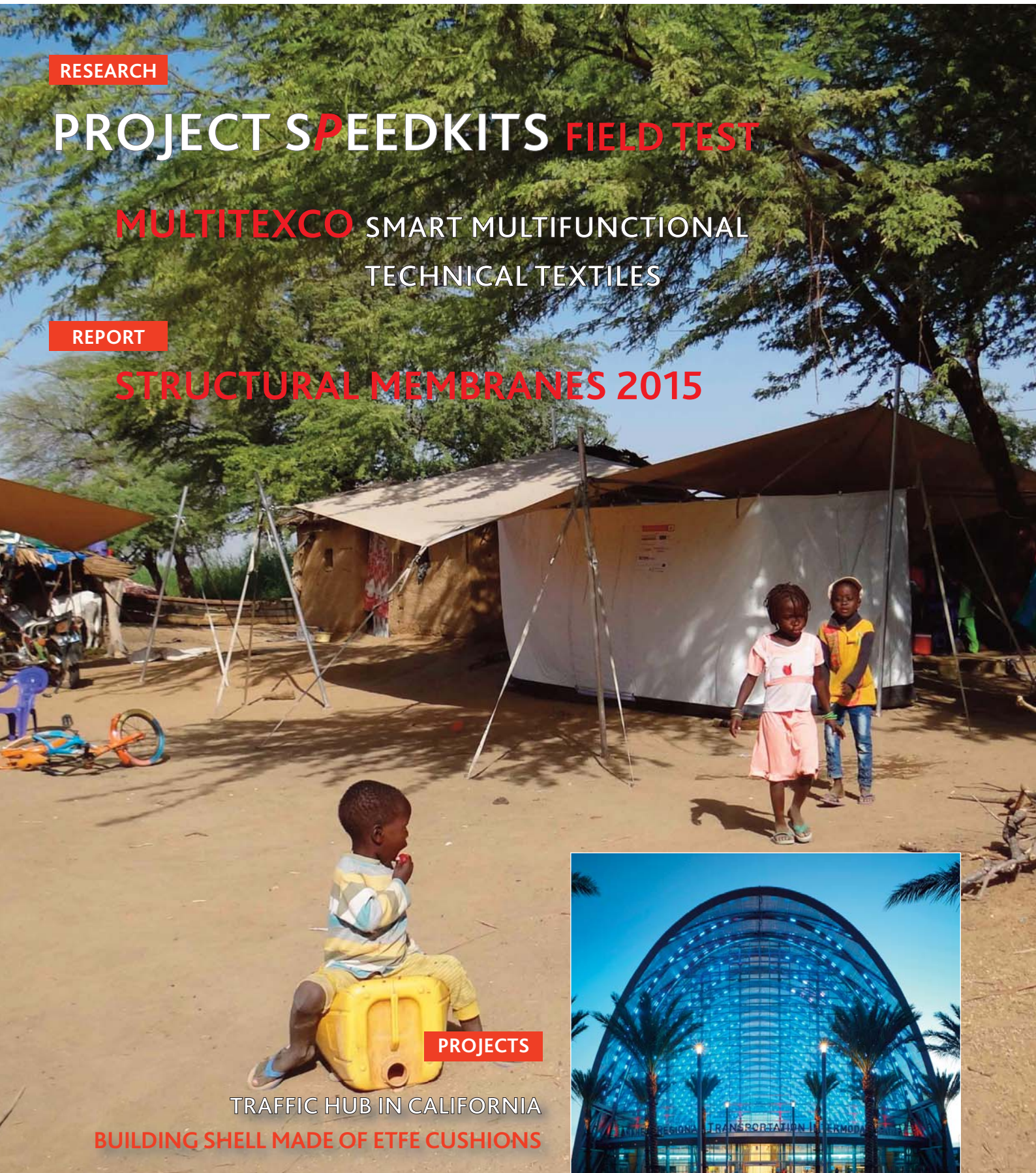
RESEARCH

PROJECT **S**PEEDKITS **F**IELD TEST

MULTITEXCO SMART MULTIFUNCTIONAL TECHNICAL TEXTILES

REPORT

STRUCTURAL MEMBRANES 2015



PROJECTS

TRAFFIC HUB IN CALIFORNIA

BUILDING SHELL MADE OF ETFE CUSHIONS



*SPEEDKITS: Clever Roof set-up in Senegal © Vincent Virgo / Guy Buyte ▲
The exterior shell of the three-storey ARTIC building © John Linden ►*

 Buro Happold
www.burohappold.com

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

 CENO Membrane Technology GmbH
www.ceno-tec.de

 Dyneon
www.dyneon.eu

 FabricArt Membrane Structures
www.fabricart.com.tr/

 Form TL
www.Form-tl.de

 Mehler Technologies
www.mehler-technologies.com

 Messe Frankfurt Techtextil
www.techtextil.com

 Saint-Gobain
www.sheerfill.com

 Sefar
www.sefar.com

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www.sergeferrari.com

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contents



PROJECTS

PAGE

4 **Austria** BUTTERFLY MEADOW
"MORE GREEN INTO THE WHITE CITY"

4 **USA** PLATINUM AWARD TRAFFIC HUB IN CALIFORNIA SETS
NEW STANDARDS FOR SUSTAINABLE BUILDING

9 **USA** SPEARHEADS TENSILE MEMBRANE
CANOPY DESIGN AND CONSTRUCTION



13 **The Netherlands** A REVEALING COVER
FOR THE EU PRESIDENCY

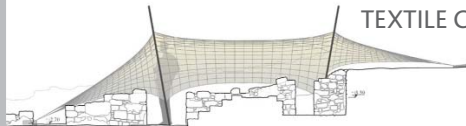
17 **Saudi Arabia** TENSILE FABRIC COVERING
PRINCE MOHAMMED BIN ABDULAZIZ INTERNATIONAL AIRPORT



REPORT

6 **STRUCTURAL MEMBRANES 2015**

VII INTERNATIONAL CONFERENCE ON
TEXTILE COMPOSITES AND INFLATABLE STRUCTURES



RESEARCH

10 **MULTITEXCO**

HIGH PERFORMANCE SMART MULTIFUNCTIONAL
TECHNICAL TEXTILES FOR THE CONSTRUCTION SECTOR



14

SPEEDKITS



18 **ICD/ITKE RESEARCH
PAVILION 2014-15**

APETISER UPCOMING SYMPOSIUM 2016



ARTICLE

8

COVERTEX JOINS PFEIFER GROUP

MISC

19

BOOKREVIEW

TEXTILE MATERIALS FOR LIGHTWEIGHT CONSTRUCTIONS
TECHNOLOGIES – METHODS – MATERIALS – PROPERTIES

ANNOUNCEMENTS

12

ADVANCED COURSE ON FIBRE-BASED MATERIALS
AND PRODUCTS 13-14-15 JUNE 2016

12

AACHEN-DRESDEN-DENKENDORF INTERNATIONAL
TEXTILE CONFERENCE 24-25 NOVEMBER 2016

20

NOVEL STRUCTURAL SKINS 26-28 OCTOBER 2016

Edito

Dear Reader,

This issue of TensiNews presents recent membrane and foil projects for infrastructure projects, such as the ARTIC Anaheim traffic hub covered with ETFE cushions, and the new passenger terminal of the international airport in Medina with a variety of membrane roofs. Furthermore a single layer ETFE covered public space in Graz, a stand covering for a stadium in Florida and the application of 3D printing for large façade elements are introduced. The research project Multitexco on high performance smart textiles is described, as well as the research project Speedkits on the development of emergency kits for humanitarian organisations.

Last October the Seventh Structural Membranes symposium took place in Barcelona where several TensiNet members gave a lecture. Joseph Llorens wrote a summary of the event for us. During the symposium we held our annual general meeting and a partner meeting.

The Eurocode working group contributed to CEN TC 250 WG5 which has finalized and submitted the science and policy (SaP) report "Prospect for European guidance for the Structural Design of Tensile Membrane Structures", providing background information to the future technical specification and Eurocode. It has now been published by the joint research centre (JRC) and the standardisation bodies are asked for an evaluation. We expect to start with the elaboration of a technical specification by the end of this year.

Together with COST Action TU1303 WG5 'From material to structure and limit states: codes and standardisation' the TensiNet Eurocode working group is already continuing the work towards a technical specification. The groups have confirmed that they want to organise a Round Table session for experts in the domain of tensile surface structures to discuss the importance of this Eurocode and to increase involvement of other experts.

The COST Action TU1303 'Novel structural skins' (www.novelstructuralskins.eu), where TensiNet is very active, held a meeting at the Politecnico in Milan on the 16th and 17th of March. The plenary lectures were held by Maurizio Gaudagnini from the University of Sheffield on composites in construction, Marco Perino from the University of Turin on adaptive façades, Carl Maywald of Vector-Foiltec on ETFE for indoor comfort and Christoph Gengnagel from Universität der Künste in Berlin on hybrid skins.

During the COST Action TU 1303 meeting in Milan we held a partner meeting, and the kick-off meeting of our new working group "good practice" took place, chaired by Heidrun Bögner-Balz.

We are now only a few months away from the TensiNet / COST TU1303 Symposium 2016 (see also <http://conferences.ncl.ac.uk/tensinet2016>), which will take place at Newcastle University, from the 26th till the 28th of October 2016. The symposium has the theme Novel Structural Skins, the same as the COST Action. We have received more than 70 contributions covering a wide spectrum of the five main topics, and several interesting keynote speakers have already confirmed their presence. Wednesday 26th of October 2016 in the afternoon takes place the open session with the focus on built projects. Architects, engineers and professionals are invited to learn more about structural skins and the recent development. You find in this issue of TensiNews an appetiser from Jan Knippers who is one of the keynote speakers.

We look forward to seeing you all in Newcastle or on other tensile structures related events. In the meantime we hope you enjoy this issue of TensiNews.

Yours sincerely, Bernd Stimpfle



Forthcoming Events

Textile Roofs 2016

Berlin, Germany • 2-4/05/2016

www.textile-roofs.com

Advanced course on fibre-based materials and products

University of Minho in Guimarães, Portugal
13-15/06/2016 • Registrations and more

information: www.fibrenamics.com/en/advancedcourse

Email: fibrenamics@fibrenamics.com

ICSA 2016

Guimarães, Portugal • 27-29/07/2016

www.icsa2016.com

IASS 2016

Tokyo, Japan • 26-30/09/2016

<http://iass2016.jp/>

TENSINET - COST ACTION TU1303 SYMPOSIUM 2016 Novel structural skins

Newcastle, UK • 26-29/10/2016

<http://conferences.ncl.ac.uk/tensinet2016/>

Aachen-Dresden-Denkendorf International Textile Conference,

Dresden, Germany • 24-25/11/2016

www.aachen-dresden-denkendorf.de/itc/

Forthcoming Meetings

Partner Meeting 2 and Annual General Meeting

Thursday 27 October

Newcastle University

Annual General Meeting 18.00 - 18.30

Partner Meeting 18.30 - 19.30

<http://conferences.ncl.ac.uk/tensinet2016/>

CORRECTION

TensiNews 28 / page 11

Apology: Figure 8 on page 11 should have been attributed to Sabrina Afrin.

TensiNews 29 / page 4

Additional information: Architect: Ar. Mustapha

Khalid Palash / Architect to the contractor:

Ar. Golam Morsalin Choudhury Rana

SaP-Report

'Prospect for European guidance for the Structural Design of Tensile Membrane Structures'

As announced in the CEN TC250 meeting of the 20th of November, the Science and Policy Report (SaP-Report)

'Prospect for European guidance for the Structural Design of Tensile Membrane Structures' has been published by JRC (Joint Research Centre).

This version will be made available to the European Standardisation Bodies for evaluation as 'basis' for the Technical Specifications.

Comments can be given during 6 months. After this period of 6 months CEN TC250 will decide if - taking the comments into account - the elaboration of the Technical Specifications can start or not (decision expected by November 2016).

You can download the on-line version from:

<http://eurocodes.jrc.ec.europa.eu/showpublication.php?id=540>

Graz, Austria Butterfly meadow

The new public open space and important junction in front of the University Hospital in Graz was designed themed to "more green into the white city".



Introduction

Even the name for the project "butterfly meadow" has been selected and implemented faithfully. The whole open space that was designed new, covers an area of about 6000m² and should give a park-like character. The main structure, a single-layer, trussed ETFE foil and

steel roofing is located in the eastern part of the square (Fig. 1).

Project

In the plan view, the shape is reminiscent of two interlocking eggs - perhaps the earliest development stage of a butterfly? The two ellipses are set to a total of eight,

slightly inward, to each oval centre, inclined columns. In its longest dimension, one oval amounts to about 17m and in its short dimension to about 9m. The covered area of the whole roofing amounts to about 220m² (Fig. 2).

Each oval consists of a steel sheet and three respectively four also

elliptical cutouts for the ETFE foil, a total of seven ETFE openings. The cutouts are covered with a transparent and printed ETFE foils. The domed shape is obtained by pressing thrust plates by means of trussed cables upwards against the foil. One difficulty was to find a way that allows to transfer the

TRAFFIC HUB IN CALIFORNIA SETS NEW STANDARDS FOR SUSTAINABLE BUILDING

DYNEON

Platinum award for building shell made of ETFE cushions

South California, USA

Introduction

The "Anaheim Regional Transportation Intermodal Center" (ARTIC), a traffic hub in Orange County, South California which opened at the end of 2014, will be used by more than forty million visitors and travellers every year. This transit station links many diverse means of public and private transport and in addition houses restaurants and shops under a building shell made of film cushions. The films extruded from 3M Dyneon Fluoroplastic ETFE are part of the reason why the building is certified to the highest US environmental standard for buildings, LEED Platinum. The development of local and long-distance public transport is right at the top of the political agenda in southern California, which is plagued by traffic jams. The construction of the Anaheim Regional Transportation Intermodal Center (ARTIC) marks an important milestone here. At this hub near the State Route 57 and Interstate 5 highways, travellers can change to the most diverse means of transport. Here, the national railway network meets the regional Metrolink, a large number of bus routes and further means of transport such as airport shuttles, taxis and bicycle hire stations.



Low G-values and natural air circulation

The architecture of the ARTIC concentrates entirely on a bright, light-flooded ambience. The exterior shell of the three-storey building consists of 160 three-layer inflated film cushions. The Bavarian company Nowofol Kunststoffprodukte GmbH & Co. KG extruded about 19.000m² of NOWOFLON® ET 6235Z film from the high-performance material 3M Dyneon Fluoroplastic ET 6235Z. The underside of the upper film is printed in order to reduce the direct incidence of sunlight. The G-value of the cushions is so low that the ARTIC requires no air conditioning, despite the hot climate. At the front ends, 37m high glass facades open up the view into the interior. Hinged segments enable natural air circulation in the three-storey building when necessary.

Very resistant material with a long lifetime

The high-performance material 3M Dyneon ETFE is extremely resistant to chemical effects of all kinds. Films made from ETFE are very resistant to tearing and to UV radiation. They have proven their worth in lightweight roof constructions in all climatic zones for over forty years. The surface of