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WORLD RECORD ON INFLATABLE STRUCTURES FOR HANGARS

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FIRE SAFETY PERFORMANCE OF MEMBRANE STRUCTURES

PROJECTS




SCENIC FUNNEL-SHAPED SHADING STRUCTURE

CONTEMPORARY LIGHTWEIGHT STRUCTURE FOR A CASTLE

SOFT-ROBOTIC COWORKING POD COROLLA

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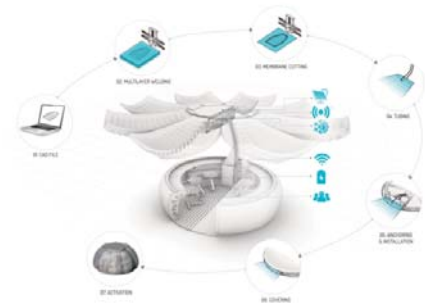
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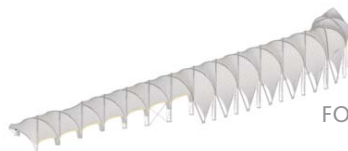
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Edito

Dear Reader

Being a network, we rely very much on meeting each other regularly. The Covid 19 pandemic changed our live dramatically. Instead of physical meetings, we meet now virtual, which makes it easier to meet, but it is of course not the same thing.

A year has passed now, since we started with the new TensiNet international non-profit association. Our activities have been concentrated this year in our support for a future Eurocode for membrane structures, and on the topic Sustainability and Comfort.

This 40th issue of TensiNews brings a variety of interesting articles. Recent projects from all over the world are presented. A tensile structure in Luxemburg, an Amphitheatre in Turkey, a canopy in the UK, a shading roof over a courtyard in Italy and a walkway covering in Australia. Two temporary or demountable structures, a mobile theatre for a roadshow through the USA and an inflatable hangar for Saudi Arabia. Research results are presented, a bending active pavilion with knitted fabric, and a design study for Dubai Expo. To determine the fire performance of ETFE, a test protocol is proposed, and the environmental performance of ETFE has been analysed in a PhD study.

We have started the organisation of our next TensiNet Symposium, you find herein a first information, and more will follow soon. For this autumn some conferences are scheduled, and we all hope that we might be able to join and find a smooth way back to normality.

I hope to meet again soon. Meanwhile enjoy this issue of TensiNews. Stay healthy.

Yours sincerely,
Bernd Stimpfle

Forthcoming Events

Please verify if events haven't been cancelled or been replaced by a tele-conference due to COVID 19 virus

TECHTEXTIL 2021 *Beyond innovation* | postponed to 21-24/06/2022 | Frankfurt am Main, Germany | <https://techtextil.messefrankfurt.com/frankfurt/en.html>

Textile Roofs 2020/2021 | 10-12/05/2021 | Berlin, Germany | www.textile-roofs.com POSTPONED

IASS Annual Symposium and Spatial Structures Conference 2020/2021 - Inspiring the next generation | 23-27/8/2021 | University of Surrey, Guildford, UK | <https://www.surrey.ac.uk/iass2021>

STRUCTURAL MEMBRANES 2021 | 13-15/09/2021 | Technical University of Munich, Germany | <https://congress.cimne.com/membranes2021/frontal/default.asp/>

International Conference on Advanced Building Skins Conference & Expo 2021 | 20-21/10/2021 | Bern, Switzerland | www.abs.green

Aachen-Dresden-Denkendorf International Textile Conference 2021 | 9-10/11/2021 | Stuttgart, Germany | <https://www.aachen-dresden-denkendorf.de/en/itc/>

TensiNet Meetings

1st General Assembly
5/5/2021 at 15.00

The 1st General Assembly of TensiNet will be held online.

TensiNet sessions at Advanced Building Skins Conference & Expo 2021

TensiNet will be represented at the 16th Advanced Building Skins Conference & Expo with two TensiNet sessions on Membrane Architecture: "Skins from fabrics and foils" and "Building Membrane Cladding Systems". More information will follow.

Courses

IMS BAUHAUS® Degree "Archineer®"

online course - All further information about this new programme can be found on the website <https://www.ims-institute.org/education-1/archineer/>

TensiNet Symposium 2023 at Nantes University

The next TensiNet Symposium 2023 will be organized in collaboration with Nantes University in May or June 2023. The focus will be on **Textile architecture: the seventh established building material. Designing reliable and sustainable structures for the urban environment.** The 3 main topics are:

STRUCTURAL MEMBRANE: contemporary, innovative, adaptive daring and impactful solutions

In Jules Verne's hometown, with its focus on innovation and futuristic issues, textile architecture can provide answers to current problems, especially for ever denser cities and for a world that is always on the move.

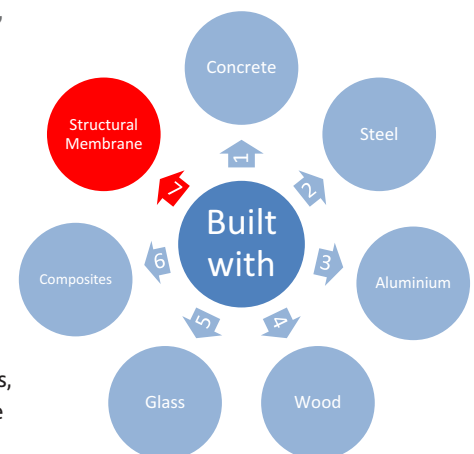
TENSIONED MEMBRANE STRUCTURES: the seventh building material

Recent advances in the design of membrane structures, development of a Eurocode dedicated to structural membranes: the word membrane must now be part of the daily vocabulary of architects, designers and decision-makers, and the specificities of membrane design must be part of the knowledge of all structural engineers.

STRUCTURAL MEMBRANE: an answer to issues of the 21st century

Lightweight design, well-being, environmental impact, energy and acoustic performance, life cycle of materials and structures, end of life of membrane structures: these keywords are part of the current and future construction challenges and are an important message for the younger generations.

More information will follow in the upcoming months!



Hosting festivities and activities under a contemporary lightweight structure.



Figure 1. The Koerich Castle, the situation before the intervention in 2018 © Ney & Partners

The Koerich Castle, situated along a small stream in the Eisch valley of Luxembourg, is a Medieval vestige rooted in the 12th century and recognized as one of the seven monumental castles in the valley (Fig. 1). The Luxembourgish government, the current owner of the castle, initiated a conservation intervention, which also creates new cultural spaces that make use of the old castle.

One of the new features of the castle is the capacity for hosting various festivities and activities (such as shows and concerts) on the elevated platform in the old corps-de-logis. The dimensions of this space are approximately 31m by 10m, with a total surface of 306m². The inner space is enclosed by three façades of 13m height, including the south face which forms a spectacular backdrop when seen from the inner court. Ney & Partners was asked to propose a design for a canopy covering the stage, which would enable hosting events while protecting it from the weather conditions. The design with a tensile membrane structure was chosen after different design variants were presented to the client.

Design

Thick masonry walls of the existing east, west and south façades allow the integration of a lightweight structure tensioned in the air between these walls. A primary cable is installed atop the east and the west façades and laid along the axis of the corps-de-logis. The membrane is hung from the two high points on the primary cable and stretched across by the edge cables along the lower perimeter of the structure. The edge cables, anchored on multiple perimeter points on the masonry walls, provide the necessary prestresses to the entire membrane surface.

Starting from the geometric configuration in the preliminary sketch (Fig. 2), six lower points are extended outwards to positions that are 80cm from the interior surface of the wall, in order to maximise the covered

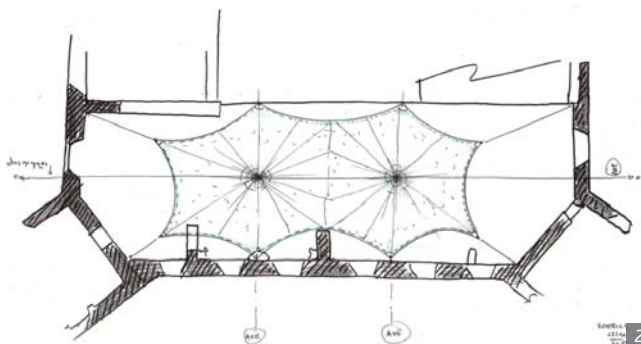


Figure 2. Sketch in the preliminary design illustrating the membrane and its fixation in the existing corps-de-logis © Ney & Partners

Tensile Membrane Structure for the Koerich Castle

Luxembourg

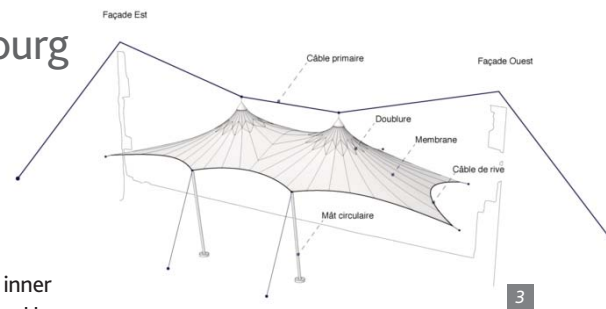


Figure 3. Axonometry © Ney & Partners

area. Two lower points facing the inner court are supported by two columns made of tubular steel profiles with a diameter of 168mm and a height of 7m, which sit on a rocker bearing of 60mm diameter.

Requiring no structural support on the platform allows the event organisers to flexibly program the layout for various purposes. The chosen geometry, with a surface area of 240m², defines two equivalent spaces that can either be organized into an audience space and a performance space, or can be entirely dedicated to the stage space. From the viewpoint of architectural integration, the advantage of this solution is its lightness. Not only is the structure support-free and lightweight in the physical sense, it also showcases the character of time in a contemporary language. The visual appearance of the structure demonstrates an excellent integration, maximising the playful contrast between the massiveness of the ancient masonry works with its strictly defined geometry and the lightness of the membrane with a more natural fluid form (Fig. 3).

Detailing

Water is drained at all eight perimeter points. A rise of 100mm along the edge of the membrane, realised by inserting circular foam profiles, guides the water on the membrane surface to the downspouts. Stainless steel downspout pipes collect water at six points along the interior face of the wall. At two points facing the inner court, water is drained through the supporting masts. These masts are not only used as structural support for the membrane and the drainage of rainwater, but also used to illuminate the stage area (Fig. 4). Several lights are installed at the column head. Other lighting points, independent from the roof structure, are also used to complete the stage lighting.

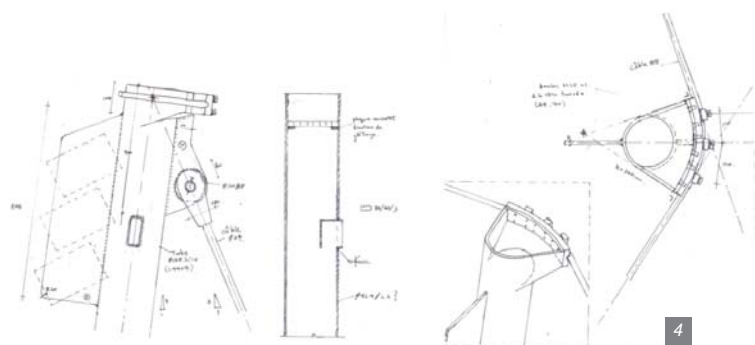


Figure 4. Detail of the mast head © Ney & Partners