

REPORT

TENSINANTES2023

WG SUSTAINABILITY AND COMFORT

PROJECTS

TEMPORARY STRUCTURE IN PARIS

FROM CONCEPT TO REALITY IN INDIA

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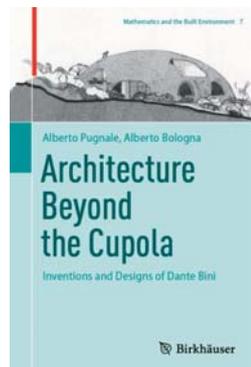
SUSTAINABLE MAINTENANCE GOOD PRACTICE
Maintain membrane structures on a regularly basis!
It does not always have to be new.

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MEMBRANE COVERS
OF BIOGAS STORAGE SYSTEMS

BOOK REVUE

Architecture Beyond the Cupola Inventions and Designs of Dante Bini



Authors:
Alberto Pugnale,
Alberto Bologna
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Number of Pages: 214

This book reviews Dante Bini's inventions and designs, focusing on his form-resistant Binishell and other pneumatic construction systems. Dante Bini's double profile of architect and builder underpins the narrative of the entire book. It is used to analyse the evolution of the early reinforced-concrete Binishell patent into a variety of automated construction systems based on the use of air. Dante Bini has always been quite proactive in promoting his work and disseminating the results of his experimentations and achievements via journal articles, conference presentations and public talks; promotional brochures in multiple languages were also prepared to export and license his patents in various countries, from Italy to the Americas and Australia. Despite this, a rigorous study of Dante Bini's work is still unavailable, and the relevance of this figure to contemporary architecture has yet to be discussed comprehensively. This book fills in this gap and arrives at the right time: during the last two decades, there has been an exponential interest in shell and spatial structures, particularly concerning the use of complex geometries and innovative construction techniques. This book will be of interest to academics in architectural design, theory and construction history, and practitioners and students interested in expanding their knowledge in the design and construction of shell and spatial structures.

TensinetnewsINFO

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Edito

Dear Reader

This June, the 7th edition of our TensiNet Symposium took place at Nantes Université. Under the "TENSINANTES2023" a wide range of interesting topics have been presented. Moreover, all participants enjoyed the three days, and were happy to meet again after such a long period with reduced contact. We have seen interesting projects presented, as well as new developments from industry and research.

It is a pleasure to have again a detailed summary of the symposium prepared by Josep Llorens. Thanks for this beautiful habit. During the symposium we held also our Annual General Meeting, and the Sustainability and Comfort working group met there to discuss actual topics.

Initiated by our permanent member Serge Ferrari, we arranged a series of podcasts under the name "Lightweight + Durable", which were recorded at the studios of Nantes Université. You find a link to these podcasts here in this issue.

Among other important information, this TensiNews is again full of new projects, research results and other contributions. A temporary structure in the centre of Paris is presented, a structure that is meant to stay in Paris for some years, and can then be dismantled and reused in different places and different configurations. Two other contributions show the sustainability of textile architecture, when properly maintained, cleaned and repainted. In India an atrium cover realised with a translucent membrane enhances the ambiance of a shopping mall, and at the same time forms a landmark. KIT presents a research project about biogas storage systems, investigating in the interaction between external actions and the behaviour of the gas chambers in structural analysis. Having so many contributions full of sustainable aspects, we cannot miss to have here also an update on the current work of our working group Sustainability and Comfort.

Please enjoy this issue of TensiNews and I hope to meet you soon, either in Valencia on the Structural Membranes Symposium beginning of October, or next April in Berlin at Textile Roofs, where we will have also our next general assembly.

Yours sincerely,
Bernd Stimpfle

Forthcoming Events

STRUCTURAL MEMBRANES 2023

| 2-4/10/2023 | Valencia, Spain |

<https://structuralmembranes2023.cimne.com/>

Advanced Building Skins Conference & Expo 2023

| 30-31/10/2023 | Bern, Switzerland

<https://abs.green/home>

Advanced Textiles Expo 2023 (IFAI)

| 1-3/11/2023 | Orlando, USA |

<https://advancedtextilesexpo.com/>

Techtextil and Texprocess 2024

| 23-26/04/2024 | Frankfurt, Germany |

<https://techtextil.messefrankfurt.com>

Textile Roofs Workshop 2024

| 28-30/04/2024 | Berlin, Germany |

<https://www.textile-roofs.com/>

6 Essener Membranbau Symposium 2024

| 20/09/2024 | University of Duisburg-Essen, Germany |

www.uni-due.de/iml

TensiNet General Assembly at Textile Roofs workshop 2024

The General Assembly 2024 will take place on Tuesday 30th April at 08.00 (before the start of the lectures).



Lightweight + Durable

By Serge Ferrari Group + TensiNet

In these podcasts, you'll discover the benefits of tensile architecture, and in particular how tensile structures help to reduce the carbon footprint of construction. Our experts, world-renowned for their expertise in this field, share their thoughts on this fascinating subject.

The 4 podcasts were recorded during the symposium TENSINANTES2023 at Nantes Université on Thursday 8th June 2023.

Carbon Footprint

How lightness could be an advantage in the construction sector compared to other traditional material?

Bruce Danziger & Zehra Eryuruk

<https://spotifyanchor.web.app/link/e/2Mi0AujfCBb>

Next Generation building through Tensile Architecture.

Nitin Govila

<https://spotifyanchor.web.app/link/e/JLl9YxmfCBb>

Sustainability and comfort

How does membrane architecture fits today's challenges in the built environment?

Ramon Sastre & Carol Monticelli

<https://spotifyanchor.web.app/link/e/oy6x6HpfCBb>

Tensioned membrane structures

The seventh building material for great construction.

Bernd Stimpfle & Peter Gosling

<https://spotifyanchor.web.app/link/e/mP0r0aefCBb>

TEMPORARY STRUCTURE

Grand Palais Éphémère

Paris, France



Figure 1: Global view towards the Eiffel tower @ IASO S.L.

The Grand Palais Éphémère is a temporary 10.000m² building designed by Wilmotte & Associés and constructed on the Champ-de-Mars in Paris, in front of the Ecole Militaire on the axis of the Eiffel Tower. During the time the emblematic Grand Palais is closed for major restoration work, this ephemeral building is intended to house the major art, fashion, and sporting events, such as the FIAC, Saut Hermès and Chanel fashion shows. During the summer 2024, the Grand Palais Éphémère will host the judo and wrestling competitions of the Paris Olympics. The building overseen by the Réunion des musées nationaux; Grand Palais and Paris 2024 and produced by GL Events – is able to accommodate 9.000 people.

Concept

Located on the Champ-de-Mars, the Grand Palais Éphémère has a strong connection with the history of the Universal Exhibitions. The urban and aesthetic integration of the structure represented a major challenge and architectural ambition. The slightly curved design follows the curves of the feet of the Eiffel Tower viewed from its perspective. The height has been strictly limited to the needs of future use and therefore leaves the dome of the Military School sixteen metres higher visible. The curvature of the ensemble does not show any break in the lines between the roof, which has no acroterion.

The wooden structure of the building is not only designed to be modular and quick to assemble, but also to be reused in multiple configurations when it is dismantled after the 2024 Olympic and Paralympic Games. It required 1.500m³ of European spruce assembled in glued laminated timbers, sized for efficient road or river transport to reduce assembly time on site. At the end of four years of use, the building will be completely dismantled and reused. Stored by its builder-owner (GL Events), the four naves can be used separately to adapt to the size of different projects.

The Grand Palais Éphémère is a flexible, agile, circular bio-sourced construction, designed in wood, a renewable resource, from a sustainably managed forest (PEFC). In addition, the profile of the structural arches working in compression helps to minimise the mass of wood used. The resulting geometry of the framework arches provides a useful volume covered by a reduced roof area and the dual skin has significant acoustic, thermal and ventilating properties, thereby using less energy.

Start of the project

The initial project was designed with a mixed roof: steel sheets on the upper part and polycarbonate on the lower parts, but the installation time for the metal part was apparently not compatible with the construction schedule. GL EVENTS therefore consulted in the pre-project phase to find out whether it was viable to replace the metal part with a PVC membrane. During those discussions, the question arose to study the replacement of the polycarbonate with ETFE films to keep the aesthetic concept developed by Wilmotte. It was important for GL EVENTS to confirm that the textile roofing solution was not only technically feasible but would also fit within the timeframe of the site planning.

After demonstrating to GL EVENTS that the textile membrane alternative was technically viable and that everything could be installed within the construction schedule, the roofing initially planned with metal sheets + polycarbonate was finally validated in textile membranes and ETFE films by GL EVENTS and Wilmotte.

Following this, the tender for the textile roofing included:

- A light grey PVC textile membrane on the upper part of the building
 - A transparent ETFE film on the vertical parts (facades) of the building.
- Later the mesh membranes at the lateral sides were added together with additional transparent membranes on the top lateral sides.

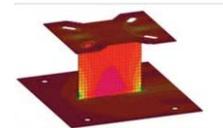
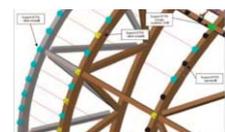


Figure 2a/b: Start on site with the erection of the wooden construction @ IASO S.L.
Figure 3a/b: 3D drawings of the preinstalled and calculated brackets @ IASO S.L.