Comprehensive design and engineering approach to mid sized retractable membrane roofs

Lienhard J.*, Michalski A.* and Kugel N.†

* str.ucture GmbH
Lindenspuerstrasse 32
70176 Stuttgart, Germany
e-mail: lienhard@str-ucture.com, web page: www.str-ucture.com

† arch²²
Lindenspuerstrasse 32
70176 Stuttgart, Germany
email: n.kugel@arch22.de - web page: http://www.arch22.de

ABSTRACT

Today the market is clearly split between individually planned and highly engineered membrane retractable roofs above 3000m² (e.g. stadium roofs) and the industrialized product based market for small retractable shading systems below 100m² in the private sector. Because of expensive planning and costs for mechanical driving systems only a few retractable membrane roofs in the mid-scale of 200 – 2000m² have been realized. However, there is an enormous and growing need for adaptive roofs and spatial division in an urban context for pedestrian zones, plazas as well as venues for open air stages.

The authors have developed new centralized mechanical driving systems which are included in parametric design and engineering models to design and engineer mid-sized retractable roofs. While most of the projects and research in the field of computational design, promote geometric and topologic complexity, the growing availability of tools that connect various design environments also offers a huge potential for the interdisciplinary design of classic lightweight structures.

The paper will present design and engineering background of built projects where such an integral design approach was successfully implemented.

Deployed and retracted 600m² membrane structure in Buchs, CH

REFERENCES
