

Requirements and Testing of Membrane Materials for Retractable Membrane Structures

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ABSTRACT

Retractable roofs for outdoor stages, centre-courts and stadiums became more and more popular over the last 10 years. Due to the demand of weather independence for events and more comfort for actors, spectators as well as planning security for the management this trend is steadily increasing.

One favoured kind of retractable roofs exist out of coated fabric, which gets folded along an axial tracking system. The folding proceeds around one-, two or even three axis. Hereby the fabric and its coating is subjected to enormous tear and wear. Depending on the membrane material as well as the number of cycles driving of the roof is lasting longer or shorter until the first damage occurs.

Unfortunately the suitability of the desired membrane material for this specific application isn't well known or investigated and often not considered during the design phase.

Furthermore the mechanical properties of the membrane as well as the behaviour of the composite construction out of fabric and reinforcements like webbing belts or cables has to be examined with the utmost care.

Due to the lack of official researches in this matter own studies and experiments have been performed to gain more planning certainty. A test to determine the preferable material as well as a method to investigate the composite behaviour will be explained.

REFERENCES

[1] Julian Heidrich, "Application of the Flexometer Test on membrane fabric used for retractable membrane structures", Structural membranes 2013