

Architecture from textiles in motion

Erica HÖRTEBORN*, Malgorzata ZBOINSKA*, Delia DUMITRESCU^a, Chris WILLIAMS*,
Benjamin FELBRICH^b

* Chalmers University of Technology, Göteborg, Sweden. erica.horteborn@chalmers.se

^a University of Borås. ^b University of Stuttgart.

Abstract

Wind is one important concern when it comes to its impact on textile structures within architecture. One method to limit wind-caused displacements is to heavily pre-stress the structures. We discuss an alternative approach, in which wind is seen as a positive design parameter for architectural textiles. We explore how one could work with the shape and internal structure of the textile to design architectural structures which become kinetic volumes when airflow is applied. The implications of such a design approach are formulated based on a two-day workshop at the conference Advances in Architectural Geometry (AAG) 2018. The explorations embraced digital and physical simulations of textile behaviors arising from the presence of wind. Smart textiles, whose structures can be changed using heat, were employed to explore how the geometrical expressions of textiles under wind load can be affected through local internal textile property changes. The ambition was to investigate the possibility of dynamically altering the 3-dimensionality of the textiles by reshaping them in real-time using airflow. The main conclusion from the workshop is that the dialogue between the digital and physical simulations seems to play an important role in supporting and enhancing the process of designing the geometrical expressions of textiles subjected to dynamic influence. A combination of the digital and the physical design tools enables the creation of a unique workflow to generate architectural design typologies that would have been difficult to develop if such complementary design tools have not been employed.