

Form and Force Interface between Cable Net Structures and Membrane Enclosures

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Abstract

This paper presents computational workflows developed to visualize, analyze and understand displacements in long span cable structures and how they affect membrane enclosures.

In light-weight specialty structures, the geometric non-linearity and long-span tensile elements result in small stiffness with large displacements. While such displacements may not govern the stability of the structure, they can have significant impact on the enclosure systems and detailing. Digital workflows unveil the opportunity to both process and visualize large amounts of structural analysis data, to understand and detail the interface between the structure and enclosure.

This paper will feature case-study stadia projects that feature a cable-net structures which span over 300 meters where such workflows have been utilized to design and integrate membrane enclosures on cable-net structures in a fluid and generative design environment.

Keywords: Cable-Net Structure, Computational Workflows, Displacement Visualization, Visual Programming, Iterative Design, Long-span Structure, Lightweight Structure

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