

## Form-Finding of Tensioned Fabric Structure in Mathematical Monkey Saddle Model

**Authors :** Yee Hooi Min, Abdul Hadi, M. N., A. G. Kay Dora

**Abstract :** Form-finding has to be carried out for tensioned fabric structure in order to determine the initial equilibrium shape under prescribed support condition and pre-stress pattern. Tensioned fabric structures are normally designed to be in the form of equal tensioned surface. Tensioned fabric structure is highly suited to be used for realizing surfaces of complex or new forms. However, research study on a new form as a tensioned fabric structure has not attracted much attention. Another source of inspiration minimal surface which could be adopted as form for tensioned fabric structure is very crucial. The aim of this study is to propose initial equilibrium shape of tensioned fabric structures in the form of Monkey Saddle. Computational form-finding is frequently used to determine the possible form of uniformly stressed surfaces. A tensioned fabric structure must curve equally in opposite directions to give the resulting surface a three dimensional stability. In an anticlastic doubly curved surface, the sum of all positive and all negative curvatures is zero. This study provides an alternative choice for structural designer to consider the Monkey Saddle applied in tensioned fabric structures. The results on factors affecting initial equilibrium shape can serve as a reference for proper selection of surface parameter for achieving a structurally viable surface. Such in-sight will lead to improvement of rural basic infrastructure, economic gains, sustainability of built environment and green technology initiative.

**Keywords :** anticlastic, curvatures, form-finding, initial equilibrium shape, minimal surface, tensioned fabric structure

**Conference Title :** ICCSEE 2015 : International Conference on Civil, Structural and Environmental Engineering

**Conference Location :** London, United Kingdom

**Conference Dates :** August 20-21, 2015