

INTRODUCTION TO TENSILE MEMBRANE STRUCTURES

Tensile Membrane structures combine creativity and aesthetics with resource-conserving materials, short construction period, low costs, long life and wide range of applications.

The state of the art materials like PTFE (Teflon) coated fiberglass, silicone coated fiberglass and the PVDF/PVC coated polyester are waterproof, fire resistant, anti-uv and anti-dirt, thus require very little maintenance. As the materials are lightweight, the structures are able to achieve longer spans and are easily constructed. These result in substantial costs savings in the foundation and the supporting structures. But the main draw to designers and developers may be the varying forms, shapes and aesthetics that the materials can provide. These structures serve as the primary architectural form determinant and provide much of the building envelope system.

The development of a typical tensile structure undergoes a simple process. The architectural and engineering design begins with shape determination or form finding analysis under load. The form and shape can be modified or adjusted to suit the stress/load boundary conditions. Once the design is completed, the next steps would be fabrication of fabric and supporting structures, and finally, erection. Fabrication of fabric begins with patterning which is a process of selecting an arrangement of two-dimensional panels to develop the three-dimensional surface. The erection or installation of the fabric structure would require careful handling of the materials as well as knowledge of the behavior of the materials.