## Analysis of Tent Structures

Some new fabrics for tent structures have a nonlinear stress-strain relation. This is cannot be taken into account in the software Easy, which is commonly used for tent design. Therefore, we want to analyse tent structures with a general purpose finite element program like ANSYS or MARC. The material behaviour can be entered either by selecting a readily available model or by linking a small fortran subroutine to the finite element program. The analysis will need to be geometrically and physically nonlinear due to the large displacements and nonlinear material behaviour.



Inchon Munhak Stadium, Korea Courtesy of Tensys Limited

The objective of this project is to develop a procedure for nonlinear stress analyses of membrane structures. This includes biaxial testing of the fabric to obtain the correct stress-strain behaviour, importing the shape into the finite element program, meshing the shape, entering the loading, performing the analysis and interpreting the results. The procedure will be tested on a challenging tent design.



Force flow in the Munich Olympics Roof Courtesy of J. Schlaich

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