

STUDY OF INTERACTION BETWEEN AIR-SUPPORTED SHELLS AND WIND FLOW

EXPERIMENTAL RESEARCHES

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ABSTRACT

Analysis of the stress-strain state of pneumatic membrane structures under wind loads is the most important problem during in the design process. Studying of the wind pressure distribution through of the air-supported shells surface and changes of their shapes in an undisturbed air flow was performed during the wind tunnel tests .The large-scale air supported shell models with truncated spherical and semi-cylindrical forms were tested. The tests were carried out in the super critical streamline area ($Re = 10^6 \div 10^7$) corresponding to the auto model process of flow. In the course of the experiment the distribution of through shell surface, aerodynamic performances and changes of inside surplus pressure and displacements of the shell surface's points were studied. Paths and magnitudes of the principal tension stresses, "critical" inner pressure giving rise to unidirectional areas of stress state and the boundaries of these areas were established.