

Abstract Submitted
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Effect of Leading and Trailing Edge Geometry on the Aeromechanic Characteristics of Membrane Aerofoils¹ SARA ARBOS, ZI PANG, BHARATHRAM GANAPATHISUBRAMANI, RAFAEL PALACIOS, Imperial College — The geometry of the rigid leading and trailing edges that hold the membrane could affect the aeromechanic performance of membrane wings. In this study the interaction between the supports and a membrane aerofoil is explored. Tests are performed at low Reynolds numbers, 4.3×10^4 - 1.1×10^5 , and incidences of 0° - 30° . Four different leading and trailing edge geometries have been analysed focusing on the unsteady characteristics of the wake and the structural vibration of the membrane. Results indicate that aeroelastic coupling between vortex shedding and membrane vibration depends upon the type of membrane support. The wake's kinetic energy distribution has been found to be dependent on α for round supports but independent of α for rectangular supports. Finally, correlation between the membrane deflection and the lift generation has been found for all cases studied. Further analysis will be conducted and discussed.

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