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Reconfiguration of a flexible flat plate under snow loading FRDRICK GOSSELIN, Ecole Polytechnique de Montreal, Department of Mechanical Engineering, Montreal, Canada, EMMANUEL DE LANGRE, cole Polytechnique, Laboratoire d'hydrodynamique, Palaiseau, France — Snow and wind constitute two of the main sources of mechanical loading on terrestrial plants. Plants bend and twist with large amplitude to bear these loads. For the past ten years, various authors have sought to decompose the problem of plant reconfiguration under fluid flow into its fundamental mechanical ingredients by studying the reconfiguration of simple flexible structures such as beams, plates, rods and strips. Here, we adopt a similar approach to these studies and consider the snow interception of a flexible flat plate. We performed two sets of experiments on thin flexible rectangular plates supported at their center: in the first one, a plate was subjected to real snowing events; in the second one, a plate was loaded with glass beads acting as a granular media similar to snow. Moreover, a theoretical model coupling the Elastica formulation to a loading with a set angle of repose is developed. The model is found to be in good agreement with the experiments on glass beads. Asymptotic scaling laws can be found similarly to the Vogel exponents of reconfiguring structures. For the real snow loading, it is found that the cohesive force in snow which is highly dependent on the snow temperature complicate things greatly.

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