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## High fidelity model of a hook and loop fastener

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### ABSTRACT

There is a strong demand for new computational models that facilitate the design and the manufacturing process of hook and loop fastening products. Enhanced models can significantly shorten the design and production cycles by providing a quick turnaround time with minimal prototyping and testing. A set of experimental data was generated to characterize the mechanical behavior of polypropylene microfibers that are part of a multilayer material. A three dimensional micromechanical model was created to calculate the forces and the energy required for the attachment/detachment cycle using a Representative Hook and Loop Element model. The model accurately captures the mechanical behavior of the fastening joint given geometrical description and material information of the hook and loops.