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Modeling of Deformation and Fracture of Non Woven Felts

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A micromechanical model was developed to simulate the mechanical behavior of non-woven felts. The material is represented as a bidimensional network of straight fibres of finite length. The intersection between fibers formed the nodes of the model. Adjacent nodes were connected through rods that transferred load in the fiber direction. Additionally, torsional spring elements were added to penalize the angle variation between crossing fibers. Fibers were assumed to behave as non-linear elastic solids taking into account inelastic effects such us fiber buckling, fracture and fiber sliding. Computational simulations were compared with experimental data available on a non-woven felt made up of polyethylene fibers with different testing configurations

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