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Kinematics of Filament Winding on Slender Mandrels

A theoretical and experimental study of the placement of a filament on a mandrel using a lathe-type device has been conducted. The mandrel geometries considered include cylindrical and conical shapes of circular and elliptic cross-sections. The filament delivery modes include contact placement as well as distant delivery. The effect of start-up and reversal on the attainment of a permanent regime in the case of cylindrical mandrels or the non-uniform regime for conical mandrels are given special attention. The experimental part of the study also addresses the problem of filament stability on the mandrel.

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