Modeling and Control of a Rotating Turret Winder Used in Roll-to-Roll Manufacturing

Article

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Abstract

In this paper, winding issues in an industrial R2R printing press using a rotating turret winder are investigated by utilizing a new mathematical model and data are collected during production runs. Production data and simulation results from the developed model are analyzed to identify the causes for tension disturbances that affect winding quality. Model simulations are conducted by incorporating production data as inputs to the model to gather insights into the effect of dynamic behavior of the rotating turret winder on winding web tension. The developed model captures the various dynamic events associated with the roll change operation with a rotating turret winder. Measured data are provided to support the results of this work in improving winding tension regulation during the roll change operation. The new model together with the analysis and recommendations provides a good framework for the development of model-based tension control schemes that can further improve winding tension regulation performance, and thereby improves wound roll quality.

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