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Research article

FIXING PLASTIC FOOD BOTTLES SYSTEM FOR ROTARY APPARATUSES

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Abstract

This research analyses a novel *Fixing plastic food bottles system* for conveyors and the turntable of rotary apparatuses. At relatively high conveyor speeds, plastic food bottles tend to tip over or slide on the conveyor belt on which they are placed. To address this issue, we developed the *Fixing plastic food bottles system*, designed to preserve plastic food bottles in an upright orientation and ensure the spacing between subsequent bottles for accurate movement. An in-depth examination of the kinematic and dynamic characteristics of flexible transport systems reveals that inertia force and jerk (the derivative of acceleration) during initiation and cessation are the underlying causes of this phenomenon. We examined several modelling methodologies for the acceleration and deceleration of conveyors in these situations, based on numerical applications. Furthermore, we examined the impact of the fastening mechanism on plastic food bottles during initiation and cessation at different accelerations. Through the study presented in this paper, we have deepened important aspects of operation for the model created, the *Fixing plastic food bottles system*, with the goal of being practically made and used in the food industry for filling liquids such as milk, yogurt, juices, or water, as well as for capping operations.