Collision Probability in an Automated Production Line under Erlang Distribution

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Flat Panel Displays (FPDs) are manufactured through many different processing equipments arranged sequentially in a line.   Although the constant inter-arrival time (i. e., the tact time) of glass substrates in the line should be kept as short as possible, the collision probability between glass substrates increases as the time becomes shorter.   Since the glass substrate is expensive and fragile, the collision should be avoided.   In this paper, we derive a closed form formula of the collision probability for a model, in which the processing time on each equipment is assumed to follow the Erling distribution.   We also show some numerical results and computer simulation results of the collision probability.