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BEYOND THE HARRIS' MODEL TO OPTIMALLY DEFINE LOT SIZES IN A MAKE-TO-STOCK MULTI-LINE PRODUCTION SYSTEM

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Abstract: Since 1913, the Harris' model is adopted within intermittent production sys-tems to size the batches to produce and purchase. For each product, the model sets the so-called Economic Order Quantity (EOQ) as the quantity op-timally trading-off the cost of orders and the average stock cost. Traditional-ly, the EOQ from the Harris' model is a milestone for make-to-stock (MTS) production systems. In addition, existing extensions of the base model are in the direction of including multiple actors of the supply chain, i.e. joint eco-nomic lot size, and tailored product management policies, i.e. consignment stock. A basic hypothesis behind the lot size models is that the production line productivity is higher than the average market demand so that a dynamic equilibrium becomes feasible. Nevertheless, in the case of permanent or temporary high product request, the productivity of a single production line can be insufficient. This case makes of interest the adoption of multi-line production systems. Such systems are made of parallel production lines able to produce the same product at the same final qualitative standards so that the output is a unique batch of identical products. This paper investigates MTS multi-line systems presenting two formulations of the EOQ model for the case of identical lines (1) and the case of lines with different productivity and setup cost[2]. Finally, an application of the model is done with data taken from a leading company operating in the bev-erage packaging sector.