

A Simulation Model for Evaluating Warehouse Layout Design Parameters based on Process Strategy

Dissanayake S^a, Rupasinghe T^b and Niwunhella H^b

^aHayleys Advantis Limited, Colombo, Sri Lanka

^bDepartment of Industrial Management, University of Kelaniya, Sri Lanka

*Corresponding author e-mail address: sadna2003@gmail.com

Products flowing through the supply chain to warehouses is a necessary evil: although there is no value addition to the product, warehousing is inevitable due to market volatility and uncertainty. Therefore, customized value propositions have been introduced to the warehouse which has led to changes in its role. In such conditions, performance of the warehouse is critical for customer value creation, be it in terms of cost, speed or accuracy. Therefore, the need to improve the warehouse operation is significant. This paper is an attempt to use Arena simulation package to describe a simulation model of a warehouse operation process for receiving and issuing goods. The aim of this study is to find warehouse design decisions that optimize the performance of an operation considering different process options, in relation to given input parameters. Six different strategies are simulated to evaluate feasibility in relation to overall cost and service levels. The simulation is done for a set of input parameters considering changes in design variables. Results show the total cost, resource and time required for each option in a predictable manner. Moreover, it provides a tool to understand system behaviours by carrying out “what-if” assessments and to identify which factors can be changed to optimize operations. Therefore the purposes of this study are to 1) identify the input, decision and response parameters of the warehouse process, 2) derive values for each based on time and activity based study, 3) develop a simulation model to support systematic decision making through “what-if” analysis, 4) conclude on the optimal processes based on input parameters, and 5) provide recommendations and future study opportunities to expand the paper.

Keywords: *Arena simulation, warehouse design, warehouse layout design, warehouse processes, warehouse simulation*