

Design of Buffer Size in Warehouse System

Buffers that are temporary storage area for jobs handover in warehouse systems. Insufficient buffer size lead to much congestion, while excessive buffer size hampers the whole systems. To increase the working efficiency of the warehouse systems, proper buffers should be designed. However, jobs flow in real warehouse systems are complex and consistently variable, which make both the evaluation of the system performance and the design of buffer size become very difficult. In addition, other factors such as operation mechanism increase the analysis difficulty of the buffer size in the systems further.

The purpose of this study is to determine the size and location of buffers in warehouse systems. We used neighborhood search and drum-buffer-rope (DBR) methodology to determine the buffer location and update the buffer size. We proposed a throughput calculation approach to evaluate the effectiveness of the design buffer size efficiently. In the future, we will design numerical experiments and test the effectiveness of our proposed algorithm for the design of buffer size.

References:

- [1] Schmidt, L. C., & Jackman, J. (2000). Modeling recirculating conveyors with blocking. *European Journal of Operational Research*, 124(2), 422-436.
- [2] Gao, S., Higashi, T., Kobayashi, T., Taneda, K., & Ota, J. (2018). Fast buffer size design of production lines for meeting the desired throughput, *Proceedings of the 2018 IEEE International Conference on Robotics and Biomimetics (ROBIO 2018)*, December 12-15, 2018, Kuala Lumpur, Malaysia, (pp. 1413-1418).

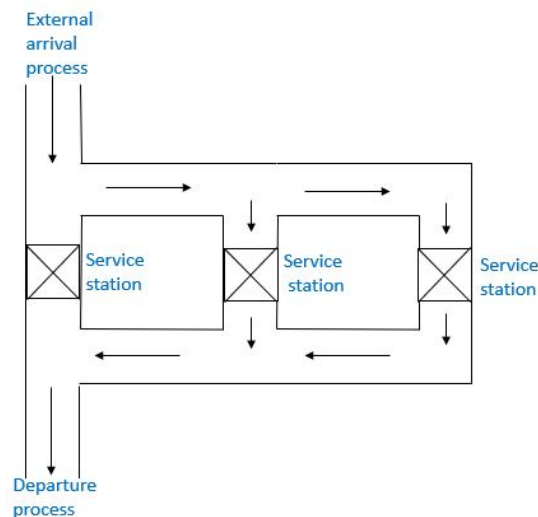


Fig 1. Example of a warehouse system