

Design and assessment of lean handling buffers in forward-reserve model

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Abstract

Recently increasing e-commerce applications insist managers to adopt flexible and agile warehousing practices. The design decisions concerning storage-handling devices like costs and number devices; storage capacity; forward-reserve layout design and material flow, are important as it affect performance and costs throughout warehousing lifespan. Sufficient literature exists addressing these decisions in different contexts while ignoring major function of providing efficient materials handling and effective buffering. This paper considers forward-reserve scenario of a distribution warehouse and assesses the performance trade-offs from lean context in order to reduce storage waste. The proposed approach combines traditional time-motion study along with measurement based management (MBM) method. The broad objective is to decide 'lean buffer' i.e., 'just-right storage capacity' of handling devices to achieve desired throughput. The picking-packing activities have been observed and data are analyzed providing lean guidelines using rigorous production engineering methods. The investigated lean management strategies confirm existence of relationship between throughput and up-down times of processing units. Further guidelines are provided improving system throughput; identifying and reducing non-value added (NVAs) activities along with future scope. This study provide guidelines to the practitioners thinking lean adoption in storage and handling design, which is still in nascent phase.

Keywords

Lean buffer design; Lean Warehousing; Measurement based management; Lean assessment; Picking productivity

Biography

Bhavin Shah is Research scholar at National Institute of Industrial Engineering (NITIE), Mumbai, India. He has research experience of 7 years in various fields like supply chain management, operations management, computer algorithms, web applications and information technology-management. He has published research articles in areas like supply chain and operations management, industrial engineering, cloud computing and data mining. His current research area is Lean issues in warehousing, optimization and operations management.

Vivek Khanzode is an Associate Professor at National Institute of Industrial Engineering (NITIE), Mumbai, India. He has research interests in area of Lean warehousing, Lean manufacturing and Work system design. He is involved in teaching operations and supply chain management and is also the reviewer for several international journals. He has more than 20 years of experience including industrial, managerial, teaching/training, research and consultancy.