

ABSTRACT

PT XYZ, a company engaged in logistics and distribution, faces major challenges in warehouse management due to an unstructured storage system. The irregular placement of goods causes the process of searching for and retrieving products to be inefficient, with an average distance traveled of 572.1 meters per retrieval activity. This situation has resulted in increased processing time and the potential for damage to goods due to improper stacking. Based on these issues, this study aims to design a goods allocation system that can minimize travel distance and improve operational efficiency by comparing two methods: Dedicated Storage and Class-Based Storage. This study employs a quantitative approach through direct field observations, data collection on product dimensions, weight, storage-receipt-shipping frequency, and the existing warehouse layout. Calculations are performed using throughput analysis, space requirement analysis, throughput-to-space ratio (T/S), and the rectilinear distance method to measure actual travel distance. In the Dedicated Storage method, product allocation is based on the highest T/S value, indicating the efficiency of space utilization for activities. The results show that the best alternative from this method reduces travel distance to 491.03 meters (efficiency of 14.17%). Meanwhile, in the Class-Based Storage method, product grouping based on ABC classification (Class A, B, C) yielded the best result of 502.08 meters (12.24% efficiency). The design validation was conducted in collaboration with PT XYZ management, who stated that the proposed solution aligns with operational needs and has the potential to reduce processing time, as well as significantly simplify the product retrieval process. In addition to distance efficiency, the design results also consider flexibility in addressing dynamic demand patterns and diverse product characteristics. The Dedicated Storage method is recommended for warehouses with stable demand patterns and high accuracy requirements, while Class-Based Storage is more suitable for dynamic and complex warehouses.

Keywords: Product Allocation, Travel Distance, Dedicated Storage, Class-Based Storage, Operational Efficiency