

ABSTRAK

PT. Arundaya Global Fortune merupakan perusahaan yang bergerak di bidang produksi arang dengan bahan baku utama berupa kayu sono, rambutan, mangga, dan asem. Permasalahan yang dihadapi perusahaan adalah fluktuasi permintaan, *lead time* pemesanan yang panjang yang menyebabkan terjadinya kekurangan dan kelebihan bahan baku. Hal ini berdampak pada keterlambatan produksi dan meningkatnya biaya penyimpanan. Penelitian ini bertujuan untuk mengoptimalkan pengendalian persediaan bahan baku melalui penerapan metode *Vendor Managed Inventory* (VMI) dengan pendekatan probabilistik dan simulasi *monte carlo*. Penelitian dilakukan melalui analisis data historis permintaan, biaya pemesanan, biaya penyimpanan, serta perhitungan nilai pemesanan optimal, *safety stock*, *reorder point*, dan *service level*. Hasil penelitian menunjukkan bahwa penerapan metode VMI mampu menurunkan total biaya persediaan dari Rp 1.690.782.801,01 menjadi Rp 1.314.999.790,15. Selain itu, tingkat layanan yang dicapai sebesar 99% menandakan bahwa risiko kekurangan bahan baku dapat ditekan secara signifikan. Meskipun demikian, tidak semua jenis bahan baku menunjukkan efisiensi biaya yang sama; pada kayu asem justru terjadi peningkatan biaya, sehingga penerapan VMI perlu dievaluasi secara selektif berdasarkan karakteristik bahan baku. Dengan demikian, metode VMI terbukti efektif dalam meningkatkan efisiensi pengendalian persediaan dan menjaga kontinuitas produksi, namun implementasinya harus disesuaikan dengan kondisi aktual dan jenis bahan baku yang digunakan.

Kata Kunci: Persediaan, Probabilistik, *Reorder Point*, *Safety stock*, Total Biaya, *Vendor Managed Inventory* (VMI).

ABSTRACT

PT. Arundaya Global Fortune is a company engaged in charcoal production, using sono wood, rambutan wood, mango wood, and tamarind wood as its main raw materials. The company faces problems such as fluctuating demand and long lead times, which result in shortages and excesses of raw materials. These issues lead to production delays and increased storage costs. This study aims to optimize raw material inventory control through the implementation of the Vendor Managed Inventory (VMI) method using a probabilistic approach and Monte carlo simulation. The research was conducted by analyzing historical demand data, ordering costs, holding costs, and calculating optimal order quantity, safety stock, reorder point, and service level. The results show that the application of the VMI method successfully reduced the total inventory cost from to Rp 1.314.999.790,15. In addition, the service level reached 99%, indicating that the risk of raw material shortages can be significantly minimized. However, not all types of raw materials showed the same level of cost efficiency; for tamarind wood, there was actually an increase in cost. Therefore, the implementation of VMI needs to be evaluated selectively based on the characteristics of each raw material. In conclusion, the VMI method is proven effective in improving inventory control efficiency and maintaining production continuity, but its application must be adjusted to actual conditions and the specific type of raw material used.

Keywords: *Inventory, Probabilistic, Reorder Point, Safety stock, Total cost, Vendor Managed Inventory (VMI).*