

ABSTRAK

PT XYZ merupakan perusahaan manufaktur tekstil yang menerapkan sistem produksi *Make-to-Order* (MTO), di mana proses produksi dilakukan berdasarkan pesanan yang diterima. Bahan baku utama berupa kain *greige* sebagian besar diimpor dari luar negeri, khususnya China, dengan waktu pengadaan (*lead time*) yang bervariasi antara 18–20 hari, dan dapat mencapai 40–45 hari apabila harus melalui proses penenunan ulang. Sistem pengadaan yang masih bersifat reaktif menyebabkan ketidakefisienan dalam pengendalian persediaan, ditandai dengan 14% kekurangan bahan baku dan hanya 86% pemenuhan selama dua tahun terakhir, serta tingginya potensi *stockout*. Penelitian ini bertujuan untuk menganalisis permintaan bahan baku *greige* pada periode April hingga September 2025 berdasarkan data historis dari April 2023 hingga Maret 2025, serta menghitung *safety stock* optimal guna mengantisipasi ketidakpastian permintaan dan fluktuasi *lead time*. Evaluasi metode peramalan dilakukan menggunakan indikator MAPE, MAD, dan MSD, dengan MAPE sebagai acuan utama karena memberikan ukuran kesalahan relatif yang mudah diinterpretasikan. Hasil penelitian menunjukkan bahwa metode *Holt-Winters Exponential Smoothing* merupakan metode terbaik untuk *Recycle CDC Stretch* (MAPE 12,99%) dan *Light Dull Matt Fifi* (MAPE 36,24%), sedangkan *Double Moving Average* (DMA) paling akurat untuk *Recycle Averie* (MAPE 8,21%). Rata-rata *lead time* pengadaan untuk ketiga jenis *greige* berkisar antara 22–25 hari, dengan standar deviasi 15–18 hari dan rentang waktu 8–69 hari, yang dipengaruhi oleh proses produksi pemasok, bea cukai, dan pengiriman internasional. Berdasarkan tingkat layanan 95%, perhitungan *safety stock* optimal adalah 69.097,38 meter untuk *Recycle CDC Stretch*, 39.301,07 meter untuk *Light Dull Matt Fifi*, dan 55.818,56 meter untuk *Recycle Averie*. Dengan penerapan metode *forecasting* dan perhitungan *safety stock* yang tepat, perusahaan diharapkan mampu meningkatkan efisiensi perencanaan bahan baku dan mengurangi risiko kritis *stockout*.

Kata Kunci: *Forecasting, Safety Stock, Lead Time, Stockout, Bahan Baku Greige, Make to Order*

ABSTRACT

PT XYZ is a textile manufacturing company that applies a Make-to-Order (MTO) production system, in which production is carried out based on incoming customer orders. The main raw material, greige fabric, is predominantly imported from abroad, particularly China, with procurement lead times varying between 18–20 days, and extending to 40–45 days if new weaving is required. The current reactive procurement system leads to inefficiencies in inventory control, as indicated by a 14% raw material shortage and only 86% fulfillment over the past two years, along with a high potential for stockouts. This study aims to analyze the demand for greige raw materials for the period April to September 2025, based on historical data from April 2023 to March 2025, and to calculate the optimal safety stock to anticipate demand uncertainty and lead time variability. Forecasting methods were evaluated using MAPE, MAD, and MSD, with MAPE selected as the primary indicator due to its ability to provide a relative percentage-based error that is easier to interpret across different material scales. The results show that the Holt-Winters Exponential Smoothing method is the most accurate for Recycle CDC Stretch (MAPE 12.99%) and Light Dull Matt Fifi (MAPE 36.24%), while the Double Moving Average (DMA) method performs best for Recycle Averie (MAPE 8.21%). The average procurement lead times for the three types of greige range from 22 to 25 days, with standard deviations of 15 to 18 days and a lead time range of 8 to 69 days, influenced by supplier production processes, customs clearance, and international shipping. Based on a 95% service level, the optimal safety stock calculated is 69,097.38 meters for Recycle CDC Stretch, 39,301.07 meters for Light Dull Matt Fifi, and 55,818.56 meters for Recycle Averie. By applying accurate forecasting methods and calculating appropriate safety stock levels, the company is expected to improve the efficiency of raw material planning and significantly reduce the risk of critical stockouts.

Keywords: *Forecasting, Safety Stock, Lead Time, Stockout, Greige Raw Material, Make to Order*