

ABSTRACT

This study aims to analyze the efficiency of raw material inventory management—specifically polypropylene (PP) plastic pellets—at PT Gradien Manufaktur Indonesia. The company faces classic inventory issues such as overstocking and stockouts due to inaccurate demand forecasting and limited warehouse capacity. Using a descriptive quantitative approach, this research applies the Economic Order Quantity (EOQ), Reorder Point (ROP), and Safety Stock methods to evaluate the effectiveness of the current inventory system. The data analyzed includes 2023 historical demand, ordering costs, holding costs, material prices, and procurement lead time.

*The results indicate that implementing the EOQ method significantly reduces total inventory costs and optimizes **material** availability. Additionally, the calculation of Safety Stock and ROP enables the company to respond more adaptively to demand fluctuations and delivery uncertainties. These findings demonstrate that integrating probabilistic approaches into inventory management can enhance operational efficiency, reduce logistical waste, and ensure the continuity of production processes. This research provides practical insights for developing a more accurate, responsive, and sustainable supply chain strategy within the plastic manufacturing industry.*

Keywords: Inventory management, plastic pellets, EOQ, ROP, Safety Stock, production efficiency