ABSTRACT

Inventory is a crucial asset for companies to meet customer demand and ensure smooth production processes. PT Sinar Agung Selalu Sukses faces issues of stockouts that disrupt production and overstocking that slows cash flow. Raw materials stored for too long risk rusting and losing weight when melted, increasing iron demand. This problem is caused by suboptimal raw material ordering from suppliers. Therefore, developing a mathematical model to optimize inventory costs is essential to improving company efficiency. This study proposes a mathematical model to optimize inventory costs by considering supplier constraints such as raw material availability, price, and varying lead times. The methods used include forecasting, Economic Order Quantity (EOQ), and safety stock, solved through Mixed Integer Nonlinear Programming (MINLP). The reorder point is used to determine the optimal reorder level, and sensitivity analysis is conducted to evaluate the impact of parameter changes on the model. The results indicate that the annual raw material demand is 809,735 kg, with an optimal inventory cost of Rp6,943,611,000. Raw materials are supplied by UD Doa Ibu (659,480 kg) and CV Berkah Makmur (150,255 kg), with reorder points of 2,228 kg and 1,965 kg. This model optimizes inventory costs and provides strategic supplier selection and management recommendations.

Keyword: *Economic Order Quantity, Inventory Management, Mixed Integer Nonlinear Programming, Reorder Point, Supplier.*