

**OPTIMIZATION OF SPARE PARTS INVENTORY IN THE HEAVY
EQUIPMENT USING MULTI-CRITERIA DECISION ANALYSIS (MCDA)
WITH TOPSIS METHOD AT PT XYZ TARAKAN**

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



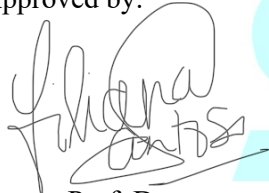
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ABSTRACT

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Logistical instability and the characteristics of strategic commodities in remote areas pose significant challenges to inventory management at PT XYZ. This research aims to solve the problem of inventory inefficiency for six major commodities (GEN, MCO, ISP, U/C, FIL, and HOS) that contribute to 83.4% of the company's inventory burden. The main problem found is that the Days of Inventory (DOI) value reached 66.4 days, exceeding the standard target of 60 days. The research methodology uses the DMAIC framework, which is developed with quantitative analytical modeling through Multi-Criteria Decision Analysis (MCDA). The four main criteria used in the assessment include: Demand Frequency, Order Lead Time, Part Criticality Level, and Unit Price. The research results show that implementing the TOPSIS method can increase stock availability from 81% in August 2025 to 84% in September 2025 and increase contribution from 81.3% to 84.4%. This analysis also validates the potential to reduce inventory value by 9.6% to achieve a Days of Inventory target of ≤ 60 days. In conclusion, the TOPSIS-based prioritization model provides an effective framework for balancing spare parts availability and working capital efficiency in challenging operational areas.

Keywords: *Spare Parts Inventory, Heavy Equipment, MCDA, TOPSIS, Days of Inventory.*



DEDICATION

This work, the fruit of tireless mental struggle and dedication, I dedicate with deep gratitude and love to my beloved parents, who instilled noble values and guided me on the path of knowledge, and to my soulmate, who has always faithfully provided support and encouragement in both good times and bad times.



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May this thesis be a true testament to my dedication and commitment to pursuing knowledge. I realize there are still many shortcomings in this work, therefore I always welcome constructive criticism and suggestions.

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