CHAPTER VI
CONCLUSION AND RECOMMENDATION

This chapter contains the conclusion of the research that has been done and suggestions for further research.

6.1 Conclusion

Based on the research, it has been obtained an optimized class-based allocation of 14 cement bag SKUs across 34 storage locations. The result showed that high-frequency items were allocated closest to the I/O point, reducing the average travel distance per pallet by 49.8%. The implementation of the 5S lean warehousing approach to eliminate non-structural wastes identified through fishbone analysis. The five pillars of 5S Sort, Set in Order, Shine, Standardize, and Sustain were applied across the storing, picking, and inspection processes. This led to improved item visibility, reduced dead stock, clearer standard operating procedures, and enhanced discipline among operators.

Overall, the integration of FBS and 5S resulted in significant operational improvements. The travel distance was reduced, warehouse workflows became more efficient, and identified wastes such as transportation, waiting, and error waste can be minimized. These improvements not only contribute to better warehouse performance but also offer long-term environmental and economic benefits, such as reduced consumable items cost, and lower CO_2 emission and waste such as plastic and rubber.

6.2 Suggestions

The following suggestions are made for future research.

1. Future research is recommended to explore the integration of Frequency-Based Storage with digital WMS platforms. By using real-time data and automation, researchers can analyze how system based slotting and barcode tracking further enhance inventory accuracy and material handling efficiency.
2. Future research could develop dynamic storage models that adapt in real-time or periodically such as quarterly or monthly to changes in product movement trends.
3. While 5S was effective in eliminating several types of waste, future research may explore the addition of other lean tools such as Kaizen, Kanban, or Visual Management Boards. These tools may offer further improvements in process flow, inventory control, and waste reduction.
4. future research can integrate ergonomics and safety criteria into warehouse layout design. Evaluating how slotting and layout changes affect operator fatigue, accident risk, and physical strain could add valuable insights into human-centered warehouse optimization.
5. Since this research focused on a unit-load cement bag warehouse, future research can apply the same framework to different warehouse types such as piece-picking warehouses, cold storage, or e-commerce centers to examine its adaptability and effectiveness in other warehouse contexts.