CHAPTER V
CONCLUSION

This chapter contains the conclusion of the research and the suggestion for further research.

5.1 Conclusion

Based on the research that has been done, the following conclusion can be drawn.

1. The optimal group replacement interval for the five chain conveyor systems in the palm oil processing facility varies between 14 and 15 months depending on the assumed Time to Repair (TTR). When implemented using a TTR of 1 hour, the total combined monthly cost across all machines is Rp12,566,325,637.25, which is significantly lower than the total monthly cost under the current failure-based maintenance strategy of Rp19,207,042,619.72. This result highlights that the proposed group replacement model offers substantial cost savings while also improving operational reliability by minimizing unexpected breakdowns.
2. The developed group replacement model provides a practical and structured tool for improving maintenance planning in the palm oil industry. By replacing reactive maintenance with a scheduled group replacement approach, companies can minimize downtime and improve overall cost-efficiency. In addition, a manual sensitivity analysis was conducted by varying the Time to Repair (TTR) values and inputting the corresponding replacement costs into the model. The results of this analysis confirm that the group replacement strategy consistently offers lower costs than failure-based maintenance, even under different TTR scenarios.

5.2 Suggestion

The following suggestion are drawn for future research.

1. Future research could incorporate simulation of the proposed maintenance strategy to better evaluate how different maintenance approaches affect the overall performance of the palm oil processing plant.
2. A variable cost structure can be introduced in future studies to more accurately assess the impact of cost fluctuations on the effectiveness of the group replacement strategy.
3. Further research could also investigate other machine components or failure types to develop a more comprehensive and integrated maintenance planning approach for the entire production system.