

ABSTRACT

Production scheduling plays a crucial role in enhancing the efficiency of a company's production system. PT XYZ is a manufacturing company that faces issues with high Makespan values due to the use of suboptimal scheduling method. This problem negatively impacts the productivity and effectiveness of the company's production flow. This study aims to propose an alternative scheduling solution using the Non-delay Algorithm method to minimize Makespan and improve the sequence of production processes.

The problem addressed in this study is how to design a job shop scheduling system in the spare part manufacturing production process to minimize makespan at PT XYZ. The primary objective is to minimize makespan by applying the Non-Delay Algorithm method, which is designed to prioritize job sequences more efficiently, thereby reducing machine idle time and improving resource utilization.

The research methodology includes collecting production data, analyzing initial scheduling, implementing the Non-Delay Algorithm method, and verifying results. The collected data is analyzed to determine the optimal job sequence using the non-delay algorithm. The Non-delay Algorithm method was chosen for its ability to minimize makespan by avoiding unnecessary machine idle time during the production process. Data collection was conducted through interviews and direct observations at PT XYZ to obtain relevant data, such as working hours, job symbols, and the company's initial scheduling. This data was then processed to generate a more optimal job sequence.

The analysis results show that using the Non-delay Algorithm method can significantly reduce the makespan compared to the company's initial scheduling. The Makespan produced by the Non-delay Algorithm scheduling was reduced by 0,483%. The study results show that the application of the non-delay algorithm successfully reduced the makespan from 480 hours (60 days) to 232 hours (29 days) compared to the company's initial scheduling method.

The implementation of the Non-delay Algorithm method provides positive implications for PT XYZ in terms of increasing production efficiency and reducing job completion time. By using the Non-Delay Algorithm method, the company can significantly reduce Makespan, increase machine utilization, reduce work-in-

progress inventory, and improve the ability to meet production targets on time. Additionally, this research benefits students by applying production scheduling theory to real-world cases and helps companies develop more efficient scheduling strategies to enhance productivity.

This study concludes that the Non-Delay Algorithm method is an effective solution for minimizing makespan and improving production efficiency at PT XYZ. The implementation of this method can serve as a reference for other companies in improving production performance and overall operational efficiency.

Keywords — *Scheduling Design, Job Shop, Non-Delay Algorithm, Maskepan*