

ABSTRAK

Industri tekstil merupakan industri yang strategis bagi perekonomian Indonesia, yakni sebagai penyumbang devisa terbesar ketiga senilai US\$13,27 miliar dan mampu menyerap 22,5% dari total tenaga kerja sektor industri. Namun terdapat masalah di industri tekstil, tepatnya di sektor pertenunan kain dimana terjadi persaingan dengan kain impor. Pada studi kasus departemen *weaving* PT. XYZ, permasalahannya adalah tidak tercapainya target produksi harian pada stasiun *looming Air Jet Loom* (AJL), dengan rata-rata produksi 50.764 meter dari target 60.602 meter karena rendahnya efisiensi produksi. Salah satu cara untuk meningkatkan efisiensi dan hasil produksi adalah dengan penurunan *cycle time*. Penurunan *cycle time* dapat dilakukan dengan mengurangi waktu *idle* atau *bottleneck* pada proses produksi.

Pada penelitian ini, simulasi digunakan untuk menganalisis penyebab tingginya *cycle time*. Metode simulasi digunakan karena banyaknya aspek ketidakpastian di sepanjang sistem serta mempermudah analisis skenario perbaikan. Model dibangun berdasarkan *Activity Cycle Diagram* (ACD) menggunakan Flexsim 2019, kemudian mengumpulkan data waktu proses setiap stasiun untuk disesuaikan dengan distribusi terbaik, dilanjutkan validasi dengan membandingkan *output* simulasi dengan *output* nyata.

Hasil *running* simulasi menunjukkan terdapat dua masalah terkait *cycle time* di *looming* AJL, yakni *bottleneck* proses *tying* dan *idle* menunggu operator AJL. Skenario perbaikan dikembangkan berdasarkan masalah tersebut, dimana skenario 1 & 2 menambahkan jumlah mesin pendukung *tying* dan skenario 3 & 4 menambah jumlah operator AJL untuk setup, sedangkan skenario 5 menggabungkan skenario terbaik dari setiap masalah. Skenario 5 keluar sebagai skenario yg mampu meningkatkan produksi terbesar, yakni meningkat 12,93% dan menurunkan waktu *idle* sebesar 13,10%. Dari dua masalah tersebut, *bottleneck* proses *tying* menjadi masalah yang berdampak paling signifikan terhadap rendahnya hasil produksi kain.

Kata Kunci: Simulasi, Industri Tekstil, Pertenunan Kain, *Flexsim*, *Cycle Time*

ABSTRACT

Textile industry is a strategic industry for the Indonesian economy, namely as the third largest foreign exchange earner of US\$ 13.27 billion and able to employ 22.5% of employment in the industrial sector. But there are problems in the textile industry, particularly in weaving industry where there is competition in sales with imported greige fabrics. At weaving department of PT. XYZ, problem that currently being faced is not achieving daily production targets at the Air Jet Loom (AJL) looming station, with an average production of 50,764 meters from the target of 60,602 meters due to low production efficiency. One way to increase efficiency and production output is to reduce cycle time. The reduction in cycle time can be done by reducing the idle time or bottleneck in the production process.

In this study, simulation is used to analyze the causes of high cycle time. This method is used because of uncertainty aspects throughout the production system and makes it easier to analyze the results of improvement scenarios. The model is built based on the Activity Cycle Diagram (ACD) using Flexsim 2019, collecting the processing time data for each station, doing concordance test, then testing validity of the model by comparing the simulation output with existing system output.

The results of running simulations show that there are two problems related to cycle time in AJL looming, the first one is bottleneck in tying process and the second is idle time in AJL process because of waiting for operator. The improvement scenarios are developed based on that problem, where scenario 1 and 2 are adding the number of supporting tying machine, then scenario 3 and 4 are increasing the number of AJL operators for setting up, while scenario 5 combines the best scenario of each problem. Scenario 5 becomes the best scenario which successfully reduces the total idle time of looming station by 13.10% and increases greige fabric production by 12.93%. From these two problems, it can be concluded that the bottleneck in tying process has significant impact for high idle time of the looming station and low production output of greige fabric.

Keywords: Simulation, Textile Industry, Weaving, Flexsim, Cycle Time