

ABSTRAK

Ketidaktercapaian target produksi pada industri dirgantara dapat disebabkan oleh ketidakseimbangan kapasitas antarstasiun kerja yang memicu *bottleneck*, penumpukan *Work In Process (WIP)*, dan terganggunya aliran material. Penelitian ini bertujuan untuk menganalisis kondisi aktual sistem produksi, mengembangkan model simulasi yang merepresentasikan sistem produksi, serta menentukan alternatif perbaikan untuk meningkatkan pencapaian target produksi pada area *Sheet Metal Departemen Detail Part Manufaktur (DPM)* PT. Dirgantara Indonesia.

Penelitian menggunakan pendekatan kuantitatif dengan metode *Discrete Event Simulation (DES)* menggunakan perangkat lunak *FlexSim*. Pengumpulan data dilakukan melalui observasi langsung, wawancara, dan dokumentasi data operasional perusahaan periode 2025. Validasi model dilakukan menggunakan *Mean Absolute Percentage Error (MAPE)*, uji kesamaan dua rerata, dan uji kesamaan dua variansi.

Hasil simulasi kondisi *existing* menunjukkan *output* sebesar 14.829 unit dari target 40.311 unit atau hanya mencapai 36,79%, dengan total *WIP* sebesar 25.482 unit. *Bottleneck* teridentifikasi pada proses *Fitter Rubber Press Hand Forming* dan *Finish Forming*. Model simulasi menghasilkan nilai *MAPE* sebesar 1,02% dan dinyatakan valid. Pengujian tiga skenario menunjukkan bahwa Skenario 3 merupakan alternatif terbaik dengan penambahan operator/outsourcing, serta menjadi 3 shift, dan mencapai target produksi sebesar 40.311 unit, sekaligus menghilangkan penumpukan *WIP* dan memperlancar aliran material.. Dengan demikian, peningkatan kapasitas pada stasiun *bottleneck* berdasarkan prinsip *Theory of Constraints (TOC)* efektif dalam meningkatkan *throughput* dan mencapai target produksi.

Kata kunci : *Discrete Event Simulation, FlexSim, bottleneck, Work In Process, target produksi*

ABSTRACT

Failure to achieve production targets in the aerospace industry can be attributed to imbalances in capacity among workstations, which may generate bottlenecks, Work in Process (WIP) accumulation, and disruptions in material flow. This study aims to analyze the existing production system, develop a simulation model representing the production system, and determine improvement alternatives to increase production target achievement in the Sheet Metal Area of the Detail Part Manufacturing (DPM) Department at PT Dirgantara Indonesia.

This quantitative study employs a Discrete Event Simulation (DES) approach using FlexSim software. Data were collected through direct observation, interviews, and documentation of the company's operational data for 2025. Model validation was conducted using the Mean Absolute Percentage Error (MAPE), two-sample mean equality test, and two-sample variance equality test.

The existing-system simulation produced 14,829 units against a target of 40,311 units, representing only 36.79% target achievement, with total WIP reaching 25,482 units. Bottlenecks were identified at the Fitter Rubber Press Hand Forming and Finish Forming processes. The simulation model yielded a MAPE value of 1.02% and was therefore considered valid. Evaluation of three improvement scenarios indicated that Scenario 3 was the best alternative, involving additional operators/outsourcing and implementation of a three-shift system. This scenario achieved the production target of 40,311 units, eliminated WIP accumulation, and improved material flow. Therefore, increasing capacity at bottleneck stations based on the principles of the Theory of Constraints (TOC) is effective in improving throughput and achieving production targets, while improving overall production performance and supporting more balanced utilization of available resources.

Keywords: Discrete Event Simulation, FlexSim, bottleneck, Work In Process, production targets