

INTISARI

Perkembangan kendaraan listrik di Indonesia merupakan bagian dari upaya pengurangan emisi gas rumah kaca, seiring dengan meningkatnya kesadaran terhadap pentingnya transportasi ramah lingkungan. Salah satu inisiatif yang dijalankan adalah pengembangan becak listrik oleh Workshop GATe UGM. Penelitian ini bertujuan untuk merancang perencanaan produksi pada *assembly plant* becak listrik guna mendukung peningkatan kapasitas produksi menjadi 1.000 unit per tahun dengan transformasi *in-house* komponen menjadi berbasis perakitan.

Penelitian ini dilakukan melalui beberapa tahapan, mulai dari penyusunan *bill of materials* (BoM), penyusunan *material requirement planning* (MRP), penjadwalan *supplier*, perancangan alur perakitan, analisis kebutuhan tenaga kerja, penjadwalan produksi, perancangan tata letak fasilitas menggunakan metode CORELAP dan pendekatan intuitif, serta analisis kelayakan investasi.

Hasil penelitian menunjukkan bahwa untuk memenuhi target produksi, diperlukan sistem penjadwalan produksi yang konsisten, pengadaan komponen dengan *lead time* yang terstruktur, dan tata letak fasilitas yang efisien. Rancangan tata letak yang direkomendasikan menggunakan algoritma CORELAP dengan nilai TCR yang lebih tinggi dibandingkan pendekatan intuitif. Kemudian berdasarkan analisis kelayakan investasi, *assembly plant* becak listrik dinyatakan layak dijalankan dengan nilai NPV sebesar Rp17.796.183.128; IRR sebesar 81,42%; B/C *ratio* sebesar 1,24; PBP selama 1,05 tahun; dan BEP sebanyak 303,84 unit. Dengan perencanaan yang terintegrasi, proses produksi diharapkan dapat berjalan lebih efektif dan mendukung transisi Workshop GATe ke sistem produksi berbasis perakitan.

Kata kunci: Perencanaan Produksi, Becak Listrik, MRP, Tata Letak Fasilitas, Analisis Kelayakan Investasi.

ABSTRACT

The development of electric vehicles in Indonesia is part of the effort to reduce greenhouse gas emissions, in line with the growing awareness of the importance of environmentally friendly transportation. One such initiative is the development of electric pedicabs by the Workshop GATe UGM. This study aims to design a production planning system for the electric pedicab assembly plant to support an increase in production capacity to 1.000 units per year by transforming in-house component manufacturing into an assembly-based system.

The research was conducted through several stages, including the preparation of the bill of materials (BoM), material requirement planning (MRP), supplier scheduling, assembly line design, labor requirement analysis, production scheduling, facility layout design using the CORELAP method and an intuitive approach, as well as investment feasibility analysis.

The results indicate that to meet the production target, a consistent production scheduling system, structured component procurement with defined lead times, and an efficient facility layout are required. The recommended layout design utilizes the CORELAP algorithm, which yields a higher total closeness rating (TCR) compared to the intuitive approach. Furthermore, based on the investment feasibility analysis, the electric pedicab assembly plant is considered feasible, with a net present value (NPV) of IDR17.796.183.128; an internal rate of return (IRR) of 81,42%; a benefit-cost (B/C) ratio of 1,24; a payback period (PBP) of 1,05 years; and a break-even point (BEP) of 303,84 units. With an integrated planning approach, the production process is expected to run more effectively and support the transition of the GATe Workshop to an assembly-based production system.

Keywords: Production Planning, Electric Pedicab, MRP, Facility Layout, Investment Feasibility Analysis.