

***Analysis of Facility Layout to Reduce Material Handling Distance in the
Monthly Locomotive Maintenance Area at Depo Cipinang PT KAI***

Oleh Citra Amelia Azzahra

ABSTRACT

This research aims to analyze and design alternative facility layouts in the monthly locomotive maintenance area at the Cipinang Depot of PT KAI (Persero) to reduce the high material handling distances caused by the existing layout, which does not adequately support the required workflow. This study employs a descriptive quantitative approach using the Systematic Layout Planning (SLP) method. Data were collected through direct observation, interviews with management, and documentation of maintenance activities (primary data), and were supported by depot operational records (secondary data). The analysis stages include the preparation of input data, From-To Chart, Activity Relationship Chart, Activity Relationship Diagram, space requirement calculations, Space Relationship Diagram (SRD), Modifying Considerations and Practical Limitations, the development of alternative layouts, and evaluation. Through the rearrangement of areas such as the spare parts room, periodic maintenance area, repair area, and workshop to place them closer according to the sequence and relationship of activities, the flow of material movement becomes shorter and the distance between processes is reduced compared to the previous condition. The results show that the total material handling distance in the existing layout, which was 160.25 meters, can be reduced to 121.8 meters after implementing the proposed layout. Thus, the proposed layout contributes to a reduction of 38.45 meters, or approximately 23.98%, from the material handling distance of the existing layout.

Keywords: Facility Layout, Systematic Layout Planning (SLP), Material Handling Distance, Locomotive Maintenance.

Analisis Tata Letak Fasilitas untuk Mengurangi Jarak Perpindahan Material pada Area Pemeliharaan Bulanan Lokomotif di Depo Cipinang PT KAI

Oleh Citra Amelia Azzahra

ABSTRAK

Penelitian ini bertujuan untuk menganalisis dan merancang alternatif tata letak fasilitas pada area pemeliharaan bulanan lokomotif di Depo Cipinang PT KAI (Persero) untuk meminimalkan jarak perpindahan material yang tinggi akibat layout eksisting yang belum mendukung alur kerja yang diperlukan. Penelitian ini menggunakan pendekatan kuantitatif deskriptif dengan metode Systematic Layout Planning (SLP). Data dikumpulkan melalui observasi langsung, wawancara dengan pihak manajemen, serta dokumentasi aktivitas pemeliharaan (data primer), dan diperkuat dengan catatan operasional depo (data sekunder) periode Oktober 2025. Tahapan analisis mencakup penyusunan Data masukan, *From-To Chart*, *Activity Relationship Chart*, *Activity Relationship Diagram*, perhitungan kebutuhan ruang, *Space Relationship Diagram* (SRD), *Modifying Consideration and Practical Limitation*, penyusunan alternatif tata letak, dan evaluasi. Melalui penataan ulang area seperti ruang sparepart, area perawatan berkala, area perbaikan, dan workshop agar posisinya lebih berdekatan sesuai urutan dan hubungan aktivitas yang berlangsung maka alur perpindahan material menjadi lebih singkat dan perpindahan antarproses dapat dilakukan dengan jarak yang lebih rendah dibandingkan kondisi sebelumnya. Hasil penelitian menunjukkan bahwa total jarak perpindahan material pada layout eksisting sebesar 160,25 meter dapat berkurang menjadi 121,8 meter setelah penerapan layout usulan. Dengan demikian, terdapat pengurangan jarak perpindahan material layout usulan sebesar 38,45 meter atau sekitar 23,98% dari jarak perpindahan material layout eksisting.

Kata Kunci: Tata Letak Fasilitas, *Systematic Layout Planning* (SLP), Jarak Perpindahan Material, Pemeliharaan Lokomotif.