ABSTRAK

Peningkatan volume sampah menuntut peralihan operasional lokasi pembuangan menjadi Tempat Pengolahan Sampah Terpadu (TPST), seperti pada TPST Karyamulya di Kabupaten Ciamis. Perubahan tata letak kawasan ini mengharuskan pembangunan infrastruktur jalan lingkar (*loop road*) baru di atas elevasi tanah asli untuk mengakomodasi sirkulasi armada truk pengangkut sampah bermuatan berat. Jika struktur perkerasan tidak dirancang dengan matang, repetisi beban gandar ekstrem dapat memicu kegagalan struktur dini. Oleh karena itu, penelitian ini bertujuan untuk menghitung tebal struktur perkerasan lentur (*flexible pavement*) dan perkerasan kaku (*rigid pavement*) untuk umur rencana 20 tahun berdasarkan pedoman Manual Desain Perkerasan Jalan (MDPJ) 2024, serta melakukan komparasi teknis guna merekomendasikan jenis perkerasan yang paling sesuai.

Metode yang digunakan adalah deskriptif komparatif dengan pendekatan kuantitatif rekayasa yang terstruktur. Pengumpulan data primer dilakukan melalui pengujian lapangan menggunakan instrumen *Dynamic Cone Penetrometer* (*DCP*) pada lima titik trase jalan rencana untuk memperoleh persentase *California Bearing Ratio* (*CBR*) desain, serta survei volume Lintas Harian Rata-rata (LHR) armada operasional. Proyeksi analisis pembebanan kumulatif selama 20 tahun dihitung dengan mengintegrasikan laju pertumbuhan sampah Kabupaten Ciamis sebesar 3,78% per tahun, yang selanjutnya dikonversikan menjadi nilai *Cumulative Equivalent Standard Axle Load* (*CESAL*) sebagai parameter desain perkerasan lentur dan Jumlah Sumbu Kendaraan Niaga (JSKN) untuk perkerasan kaku.

Hasil analisis menyimpulkan bahwa nilai *CBR* desain tanah dasar adalah sebesar 10%, dengan akumulasi pembebanan lalu lintas mencapai $1{,}22 \times 10^6$ *ESA* dan $2{,}66 \times 10^5$ JSKN. Perancangan perkerasan lentur menghasilkan total ketebalan 60 cm, yang tersusun dari *AC-WC* (4 cm), *AC-BC* (6 cm), Lapis Fondasi *Cement Treated Base* (15 cm), LFA Kelas B (15 cm), dan *Capping Layer* (20 cm). Di sisi lain, perkerasan kaku memerlukan total ketebalan 67,5 cm, meliputi Pelat Beton BBDT (20 cm), Beton Kurus (12,5 cm), LFA Kelas A / B (15 cm), dan *Capping Layer* (20 cm). Mempertimbangkan keandalan struktural terhadap tegangan beban statis serta imunitas material terhadap kerusakan akibat paparan air lindi (*leachate*), struktur perkerasan kaku tipe BBDT sangat direkomendasikan sebagai prioritas utama pada zona operasional kritis di kawasan TPST Karyamulya.

Kata Kunci : Perkerasan Lentur, Perkerasan Kaku, Komparasi Teknis, MDPJ 2024, TPST.

ABSTRACT

The increasing volume of waste necessitates the operational transition of disposal sites into Integrated Waste Management Sites (TPST), such as TPST Karyamulya in Ciamis Regency. This spatial layout modification requires the construction of new loop road infrastructure on the original subgrade elevation to accommodate the circulation of heavily loaded garbage trucks. If the pavement structure is not comprehensively designed, the continuous repetition of extreme axle loads can trigger premature structural failure. Therefore, this study aims to calculate the structural thickness of flexible and rigid pavements for a 20 year design life based on the 2024 Road Pavement Design Manual (MDPJ) guidelines, and to conduct a technical comparison to recommend the most suitable pavement type.

The method utilized is a descriptive comparative quantitative engineering approach. Primary data collection was conducted through direct field testing using a Dynamic Cone Penetrometer (DCP) instrument at five points along the planned road alignment to obtain the design California Bearing Ratio (CBR) percentage, alongside an Average Daily Traffic (ADT) volume survey of the operational fleets. The 20 year cumulative loading projection was calculated by integrating the Ciamis Regency waste growth rate of 3.78% per year, which was subsequently converted into the Cumulative Equivalent Standard Axle Load (CESAL) parameter for flexible pavement design and the Total Commercial Vehicle Axles (JSKN) for rigid pavement.

The analysis results conclude that the subgrade design CBR value is 10%, with an accumulated traffic load reaching 1.22×10^6 *ESA and* 2.66×10^5 *JSKN. The flexible pavement design yields a total thickness of 60 cm, consisting of AC-WC (4 cm), AC-BC (6 cm), Cement Treated Base (15 cm), Class B LFA (15 cm), and a Capping Layer (20 cm). Conversely, the rigid pavement requires a total thickness of 67.5 cm, comprising a JRCP Concrete Slab (20 cm), Lean Concrete (12.5 cm), Class A / B LFA (15 cm), and a Capping Layer (20 cm). Considering the structural reliability against static load stresses and the material immunity to deterioration caused by leachate exposure, the JRCP rigid pavement structure is highly recommended as the primary priority for critical operational zones within the TPST Karyamulya area.*

Keywords : Flexible Pavement, Rigid Pavement, Technical Comparison, MDPJ 2024, TPST.