INTISARI

Jalan tol memiliki peranan penting dalam sektor transportasi dan mobilitas publik. Pembangunan Jalan Tol Yogyakarta–Bawen diharapkan dapat mendukung pengembangan industri/pariwisata daerah sekitarnya dan mempersingkat waktu tempuh antara Yogyakarta dan Semarang menjadi hanya 1,5 jam saja. Pembangunan ini menuntut perancangan struktur perkerasan yang tidak hanya andal secara teknis, tetapi juga efisien dari segi biaya selama umur layannya. Penelitian ini bertujuan untuk melakukan analisis komparatif antara alternatif perkerasan kaku dan perkerasan lentur untuk dapat memberikan rekomendasi jenis perkerasan yang paling ekonomis.

Tugas akhir ini secara khusus meninjau Jalan Akses Ambarawa Tol Yogyakarta–Bawen kemudian dilakukan perancangan tebal perkerasan dan analisis ekonomi berdasarkan siklus hidupnya. Perancangan tebal perkerasan dilakukan dengan metode AASHTO 1993. Kemudian analisis biaya siklus hidup dilakukan dengan metode *Life Cycle Cost Analysis* yang memperhitungkan biaya konstruksi, biaya pemeliharaan, dan biaya operasional kendaraan selama periode analisis 20 tahun. Pada perancangan ini, data sekunder berupa data LHR dan data prediksi pertumbuhan lalu lintas diperoleh dari PT Jasamarga Jogja–Bawen selaku pemilik proyek Tol Yogyakarta–Bawen. Data lain seperti tingkat inflasi dan diskonto diperoleh dari *website* Bank Indonesia.

Hasil perancangan diperoleh bahwa perkerasan kaku memiliki total tebal 61 cm dengan pelat beton sebesar 26 cm, CTB sebesar 15 cm, dan LFA B sebesar 20 cm. Sementara perkerasan lentur diperoleh total tebal 54 cm dengan AC-WC setebal 4 cm, AC-BC sebesar 6 cm, AC-*Base* sebesar 15 cm, LFA A sebesar 13 cm, dan LFA B sebesar 16 cm. Untuk analisis biaya siklus hidup diperoleh total *present value* untuk perkerasan kaku sebesar Rp23.332.666.653, lebih rendah dibandingkan perkerasan lentur sebesar Rp34.840.647.454. Dari nilai tersebut, diperoleh kesimpulan bahwa perkerasan kaku merupakan jenis perkerasan yang lebih ekonomis dengan potensi efisiensi biaya jangka panjang selama umur rencana sebesar 24%.

Kata kunci: Perkerasan kaku, Perkerasan lentur, Tebal perkerasan, AASHTO 1993, biaya siklus hidup.

ABSTRACT

Toll roads play a vital role in the transportation sector and public mobility. The construction of the Yogyakarta–Bawen Toll Road was expected to support the development of surrounding industrial and tourism areas as well as to shorten the travel time between Yogyakarta and Semarang to just 1.5 hours. This development demanded a pavement structure design that was not only technically reliable but also cost-effective over its service life. This research aimed to conduct a comparative analysis between rigid and flexible pavement alternatives to provide a recommendation for the most economical pavement type.

This research focused on the Ambarawa Access Road of the Yogyakarta–Bawen Toll, followed by a pavement thickness design and an economic analysis based on its life cycle. The pavement design was executed using the AASHTO 1993 method and the life cycle cost analysis was carried out using the Life Cycle Cost Analysis (LCCA) method, which considered construction costs, maintenance costs, and vehicle operational costs over a 20-year analysis period. In this design, secondary data, including LHR and traffic growth prediction data, were obtained from PT Jasamarga Jogja–Bawen as the project owner. Other data, such as inflation and discount rates, were sourced from the Bank Indonesia website.

The design results showed that the rigid pavement had a total thickness of 61 cm, comprising a 26 cm concrete slab, a 15 cm CTB layer, and a 20 cm LFA B layer. Meanwhile, the flexible pavement had a total thickness of 54 cm, consisting of a 4 cm AC-WC layer, a 6 cm AC-BC layer, a 15 cm AC-Base layer, a 13 cm LFA A layer, and a 16 cm LFA B layer. Life cycle cost analysis revealed that the total present value for the rigid pavement was Rp23.332.666.653, which was considerably lower than the Rp34.840.647.454 calculated for the flexible pavement. From these values, it was concluded that the rigid pavement was the more economical type, with a potential long-term cost efficiency of 24% over its design life.

***Keywords**: Rigid Pavement, Flexible Pavement, Pavement thickness, AASHTO 1993, Life Cycle Cost Analysis*