

INTISARI

Pembangunan Struktur di Indonesia menjadi pekerjaan utama bagi majunya infrastruktur demi meningkatkan efisiensi kegiatan ekonomi suatu negara. Jalan tol merupakan salah satu pembangunan struktur yang menggunakan bahan beton. Pembangunan jalan tol yang menggunakan beton perlu dilakukan penelitian dengan metode yang cocok agar jalan tol efektif saat digunakan di Indonesia.

Penelitian ini merancang ulang tebal perkerasan kaku pada jalan Tol Cimanggis–Cibitung dengan metode Manual Desain Perkerasan Jalan 2017 dan metode AASHTO 1993 dengan umur rencana 40 tahun yang hasilnya untuk menentukan tebal perkerasan dan tulangan dari JRCP dan JPCP. Penelitian ini juga akan merencanakan Celah *Expansion Joint* apa yang tepat untuk penggunaan jalan Tol Cimanggis–Cibitung bila jalan Tol dirancang pada *Elevated Toll Road* atau Jembatan.

Hasil perhitungan analisis didapat tebal pada *American Association of State Highway and Transportation Officials* (AASHTO) 1993 didapatkan tebal pelat sebesar 33 cm sedangkan Manual Desain Perkerasan Jalan (MDPJ) 2017 mendapatkan tebal pelat sebesar 30,5 cm. Hasil perhitungan perancangan sambungan dan penulangan pada metode Manual Desain Perkerasan Jalan 2017 pada tipe *Jointed Plain Concrete Pavement* JPCP didapat 16 mm pada diameter *tie-bar*, jarak antar *tie-bar* 750 mm, panjang *tie-bar* 700 mm. Selanjutnya pada perhitungan *Dowel* didapat diameter 36 mm (baja polos), 300 mm jarak antar *Dowel*, dan 450 mm Panjang *Dowel*. Untuk tipe *Jointed Reinforced Concrete Pavement* JRCP akan ditambahkan tulangan berdiameter 12 mm dan 350 mm untuk jarak antar tulangan. Perhitungan perancangan sambungan dan penulangan pada metode *American Association of State Highway and Transportation Officials* (AASHTO) 1993 pada tipe *Jointed Plain Concrete Pavement* JPCP didapat 13 mm pada diameter *tie-bar*, jarak antar *tie-bar* 430 mm, panjang *tie-bar* 640 mm. Selanjutnya pada perhitungan *Dowel* didapat diameter 38 mm (baja polos), 300 mm jarak antar *Dowel*, dan 450 mm Panjang *Dowel*. Untuk tipe *Jointed Reinforced Concrete Pavement* JRCP akan ditambahkan tulangan berdiameter 12 mm dan 350 mm untuk jarak antar tulangan. Dilanjutkan perhitungan Panjang Celah *Expansion Joint* yang tepat untuk bentang yang panjangnya sampai 30 m yaitu didapatkan celah sepanjang 17 mm.

Kata kunci: Struktur perkerasan kaku, MDPJ 2017, AASHTO 1993, JPCP, JRCP

ABSTRACT

Structural development in Indonesia is the main job for the advancement of infrastructure in order to increase the efficiency of a country's economic activities. The toll road is one of the construction structures that use concrete materials. The construction of toll roads that use concrete needs to be researched with suitable methods so that toll roads are effective when used in Indonesia.

This study redesigned the rigid pavement thickness on the Cimanggis–Cibitung Toll Road using the 2017 Road Pavement Design Manual and the 1993 AASHTO method with a design life of 40 years. This research will also plan what Expansion Joint Gap is right for the use of the Cimanggis–Cibitung Toll Road if the toll road is designed on an Elevated Toll Road or Bridge.

The results of the calculation of the analysis obtained thickness at the American Association of State Highway and Transportation Officials (AASHTO) 1993 obtained a plate thickness of 33 cm while the Road Pavement Design Manual (MDPJ) 2017 obtained a plate thickness of 30.5 cm. The results of the calculation of connection and reinforcement design in the 2017 Road Pavement Design Manual method on the JPCP Jointed Plain Concrete Pavement type obtained 16 mm in tie-bar diameter, tie-bar distance 750 mm, tie-bar length 700 mm. Furthermore, in the calculation of the Dowel, the diameter is 36 mm (plain steel), 300 mm the distance between the dowels, and 450 mm the length of the dowel. For the type of Jointed Reinforced Concrete Pavement JRCP will be added reinforcement with a diameter of 12 mm and 350 mm for the distance between the reinforcement. Calculation of the design of joints and reinforcement in the 1993 American Association of State Highway and Transportation Officials (AASHTO) method on the type of Jointed Plain Concrete Pavement JPCP obtained 13 mm in tie-bar diameter, tie-bar distance 430 mm, tie-bar length 640 mm. Furthermore, in the calculation of the Dowel, the diameter is 38 mm (plain steel), 300 mm the distance between the dowels, and 450 mm the length of the dowel. For the type of Jointed Reinforced Concrete Pavement JRCP will be added reinforcement with a diameter of 12 mm and 350 mm for the distance between the reinforcement. Continuing to calculate the correct Expansion Joint Gap Length for spans up to 30 m in length, that is, a gap of 17 mm is obtained.

Keywords: Rigid pavement structures, MDPJ 2017, AASHTO 1993, JPCP, JRCP