INTISARI

Kemacetan pada persimpangan di Kalibanteng, Semarang perlu diuraikan dengan membuat perlintasan tidak sebidang, yaitu *Flyover* Kalibanteng Semarang yang dirancang dengan lebar 8,5 m dan panjang total 720 m. Struktur atas dirancang dengan *box girder* beton prategang cor ditempat yang spesifik, pembebanan sesuai RSNI T-02-2005, dan beban gempa sesuai T-04-2004-B. Perancangan ulang dilakukan untuk memberikan alternatif desain sesuai standar terbaru.

Perancangan ulang dilakukan dengan *posttensioned prestressed segmental concrete box girder* metode *span-by-span* bentang 40 m. Penampang digunakan sesuai AASHTO-PCI-ASBI *Segmental Box Girder Standards*, pembebanan sesuai SNI 1725:2016, beban gempa sesuai RSNI3 2833:201X, dan persyaratan beton sesuai SNI 2847:2013. Pemodelan digunakan CSiBridge dan analisis struktur digunakan Microsoft Excel. Perancangan ulang digunakan variasi tinggi penampang yaitu 1800 mm, 2100 mm, dan 2400 mm. Kuat tekan beton ditentukan dengan iterasi mulai dari 40 MPa. Jumlah kabel *low-relaxation-7-wire strands* (ASTM A416 *Grade* 270) yang digunakan ditentukan berdasarkan iterasi.

Hasil perancangan ulang adalah penampang berdasarkan standar AASHTO-PCI-ASBI dapat digunakan sebagai alternatif desain. Kuat tekan beton digunakan 50 MPa, 41,5 MPa, dan 40 MPa. Jumlah *strands* digunakan 220 buah, 190 buah, dan 180 buah. Tulangan nonprategang digunakan BJTS40 diameter 16 mm. Material pada penampang 2400 mm hasil perancangan lebih efisien dibandingkan struktur eksisting, yaitu kuat tekan beton 40 MPa dibanding 41,5 MPa, luas penampang beton 4,15 m^2 dibanding 5,66 m^2, dan jumlah *strands* yang lebih sedikit dengan selisih hingga 84 buah pada diameter yang sama.

Kata kunci : *segmental*, *span-by-span*, *box girder*, beton prategang, *flyover*

ABSTRACT

Congestion at Kalibanteng, Semarang had to be minimalized by building an interchange. Flyover Kalibanteng Semarang width was 8.5 m and total length was 720 m, made with specific cast-in-place prestressed concrete box girder. Bridge loads defined according to RSNI T-02-2005 and earthquake loads according to T-04-2004-B. In this research, the superstructure was redesigned to give alternative bridge design based on the latest standards.

This redesign conducted with 40 m post-tensioned prestressed segmental concrete box girder with a method of span-by-span. The support system was simply-supported. The cross-section of the girder defined according to AASHTO-PCI-ASBI Segmental Box Girder Standards, bridge loads according to SNI 1725:2016, earthquake loads according to RSNI3 2833:201X, and reinforcement concrete according to SNI 2847:2013. Modeling conducted with CSiBridge and analysis conducted with Microsoft Excel. This redesign used vary heights of box girder, these are 1800 mm, 2100 mm, and 2400 mm. Concrete compressive strength defined by iteration, start from 40 MPa. The number of low-relaxation 7-wire-strands (ASTM A416 Grade 270) defined by iteration.

The results were cross-section according to AASHTO-PCI-ASBI could be used as an alternative design. Concrete compressive strength used were 50 MPa, 41,5 MPa, and 40 MPa. The number of strands used were 220, 190, and 180. Reinforcement steel used was 16 mm diameter of BJTS40. Materials used on 2400 mm section were more efficient compared to existing structure. The compressive strength was 40 MPa compared to 41,5 MPa. The cross-section area of the concrete was 4,15 m^2 compared to 5,66 m^2. Less number of strands used with saving up to 84 strands on the same diameter of the strand.

Keywords : segmental, prestressed concrete, span-by-span, box girder, flyover