

INTISARI

NATHANAEL PUNTO ANJOTOSATRU, 2022, *Metode Pelaksanaan Prestressed Girder dan Evaluasi Tegangan Tendon berdasarkan Deviasi Regangan dalam Pekerjaan Stressing Girder pada Jembatan Interchange Kartasura Konstruksi Jalan Tol Solo – Yogyakarta – YIA Kulon Progo Seksi 1 Paket 1.1 STA 1+259*. (dibimbing oleh Ir. Fathi Basewed, M.T.)

Jalan Tol Solo – Yogyakarta – *Yogyakarta International Airport* Kulon Progo merupakan salah satu Proyek Strategis Nasional yang berfungsi untuk meningkatkan konektivitas dan aksesibilitas antar wilayah, pemerataan pembangunan, dan pertumbuhan ekonomi di wilayah Jawa Tengah. Salah satu struktur yang terdapat pada jalan tol ini adalah Jembatan *Interchange* Kartasura yang berada diatas *main road* dan berfungsi untuk menghubungkan jalan tol dengan Kota Kartasura.

Balok Jembatan *Interchange* Kartasura menggunakan balok prategang bertipe *PC-I girder*, dengan kabel *strand* dalam *tendon* parabola sepanjang *girder* ditarik menggunakan *hydraulic jack* melalui sistem *post-tensioning stressing*. Dengan demikian, pengawasan melalui perhitungan deviasi regangan *tendon* akibat *stressing* perlu dilakukan. Berdasarkan uraian diatas, tujuan penelitian ini adalah untuk menganalisis seluruh metode pelaksanaan *prestressed girder* dan mengevaluasi tegangan *tendon* berdasarkan deviasi regangan dalam pekerjaan *stressing girder* pada Jembatan *Interchange* Kartasura.

Pelaksanaan pekerjaan *prestressed girder* pada Jembatan *Interchange* Kartasura dibagi menjadi 3 (tiga) pekerjaan utama, yaitu pekerjaan persiapan, pekerjaan *stressing*, dan pekerjaan *grouting*. Pekerjaan *stressing* dilakukan dengan metode penarikan satu arah dengan dibantu oleh sistem pengangkur. Evaluasi nilai deviasi regangan menggunakan ketentuan ACI 318 pasal 18.18, SKSNI 1991 pasal 3.11.18, dan SNI 7833-2012 pasal 6.20.1, yaitu persyaratan nilai deviasi regangan untuk *post-tensioning* berada diantara $\pm 7\%$. Nilai elongasi desain *tendon* didapatkan sebesar 288,9mm, 289,9mm, 277,8mm, dan 279,8mm. Sementara itu, nilai elongasi aktual didapatkan sebesar 294,06mm, 292,88mm, 282,29mm, 283,47mm, 291,71mm, 281,12mm, 282,29mm, 295,24mm, 284,65mm, 285,83mm, 297,59mm, 284,65mm, dan 279,94mm. Dari nilai diatas, nilai deviasi regangan yang terjadi adalah sebesar 1,78%, 1,02%, 1,61%, 1,31%, 0,97%, 0,62%, 1,19%, 0,89%, 2,19%, 2,46%, 2,15%, 1,43%, 3,00%, -1,81%, 2,04%, 0,47%, dan 0,77%. Seluruh nilai tersebut sudah berada diantara $\pm 7\%$, sehingga seluruh tegangan *tendon* sukses memenuhi syarat teknis.

Kata Kunci : *prestressed girder*, *stressing*, deviasi regangan, metode pelaksanaan, beton prategang

ABSTRACT

NATHANAEL PUNTO ANJOTOSATRU, 2022, *Prestressed Girder Implementation Method and Tendons Stress Evaluation based on Strain Deviation in Stressing Girder Operation on the Kartasura Interchange Bridge Solo – Yogyakarta – YIA Kulon Progo Toll Road Construction Section 1 Package 1.1 STA 1+259. (supervised by Ir. Fathi Basewed, M.T.)*

Solo – Yogyakarta – Yogyakarta International Airport Kulon Progo Toll Road is one of the National Strategic Projects that serves to improve connectivity and accessibility between regions, equitable development, and economic growth in the Central Java region. One of the structures contained on this toll road is the Kartasura Interchange Bridge which is above the main road and serves to connect the toll road with Kartasura City.

Kartasura Interchange Bridge beams use PC-I girder type prestressed beams, with strand cables in parabolic tendons along the girder pulled using hydraulic jack through a post-tensioning stressing system. Thus, supervision through the calculation of tendon strain deviation due to stressing needs to be carried out. Based on the description above, the purpose of this study is to analyze the entire method of prestressed girders implementations and to evaluate tendon stress based on strain deviation in girder stressing work on the Kartasura Interchange Bridge.

The implementation of prestressed girder work on the Kartasura Interchange Bridge is divided into 3 (three) main jobs, namely preparatory work, stressing work, and grouting work. Stressing work is performed by the one sided method assisted by the anchoring system. Evaluation of the strain deviation value using the provisions of ACI 318 article 18.18, SKSNI 1991 article 3.11.18, and SNI 7833-2012 article 6.20.1, that is, the requirement that the strain deviation value for post-tensioning is between $\pm 7\%$. The elongation values of the tendon design were obtained at 288,9mm, 289,9mm, 277,8mm, and 279,8mm. Meanwhile, the actual elongation tendons values were obtained at 294,06mm, 292,88mm, 282,29mm, 283,47mm, 291,71mm, 281,12mm, 282,29mm, 295,24mm, 284,65mm, 285,83mm, 297,59mm, 284,65mm, and 279,94mm. From the above values, the deviation of strain that occurred was 1,78%, 1,02%, 1,61%, 1,31%, 0,97%, 0,62%, 1,19%, 0,89%, 2,19%, 2,46%, 2,15%, 1,43%, 3,00%, -1,81%, 2,04%, 0,47%, and 0,77%. All of these values are already between $\pm 7\%$, so the entire tendon stress successfully meets the technical requirements.

Keywords : *prestressed girder, stressing, strain deviation, method of implementations, prestressed concrete*