

**PERENCANAAN ULANG FONDASI *BORED PILE* PADA
ABUTMENT JEMBATAN**

**(STUDI KASUS: JEMBATAN KALI SORAN JALAN TOL
SOLO–YOGYAKARTA–NYIA KULON PROGO STA 22+767)**

Ragil Dwi Ponco Buwono¹, Dila Oktarise Dwina², Nurza Purwa Abiyoga³

¹Mahasiswa, ²Pembimbing Utama, ³Pembimbing Pendamping

Program Studi Teknik Sipil, Jurusan Teknik Sipil, Kimia dan Lingkungan.

Fakultas Sains dan Teknologi, Universitas Jambi

Jalan Raya Jambi-Ma. Bulian, KM. 15, Mendalo Indah, Jambi, Kode Pos: 36361

Email: ragildwi977@gmail.com

ABSTRAK

Pembangunan Jembatan Kali Soran pada ruas Jalan Tol Solo–Yogyakarta–NYIA Kulon Progo memerlukan perencanaan fondasi bored pile yang tepat agar mampu menahan beban struktur dan meminimalkan penurunan. Metode analitis dengan persamaan *Reese & Wright* dipilih untuk perhitungan daya dukung fondasi. Sedangkan dalam perhitungan penurunan segera tiang fondasi menggunakan dua metode yaitu metode elemen hingga berupa program *Plaxis 2D V.20* dan metode analitis dengan persamaan *Vesic*. Adapun perencanaan ulang yang dilakukan yaitu dengan memodelkan alternatif *design* berdiameter 0,8 meter dan 1,2 meter dari diameter existing 1 meter untuk dibandingkan hasil terbaik dari perolehan perhitungan yang didapatkan.

Hasil analisis menunjukkan bahwa semakin besar diameter tiang kapasitas daya dukung akan semakin meningkat dan nilai penurunan juga cenderung lebih besar. Metode *Vesic* memberikan hasil penurunan lebih tinggi dibanding *Plaxis*, meskipun keduanya masih berada di bawah batas penurunan izin. Pada analisis kelompok tiang, efisiensi dan kapasitas sangat dipengaruhi jumlah tiang dan jarak antar tiang, di mana alternatif diameter 1,2 m terbukti lebih efisien karena membutuhkan jumlah tiang lebih sedikit dengan kedalaman lebih pendek. Dengan demikian, metode elemen hingga (*Plaxis*) dinilai lebih representatif terhadap kondisi lapangan, dan desain diameter 1,2 m dipilih sebagai alternatif yang optimal secara teknis dan ekonomis.

Kata kunci : Fondasi, Kapasitas Daya Dukung, SPT, Penurunan Fondasi, *Plaxis*

REDESIGN OF BORED PILE FOUNDATIONS ON BRIDGE ABUTMENTS

(CASE STUDY: KALI SORAN BRIDGE, SOLO–YOGYAKARTA–NYIA KULON PROGO TOLL ROAD, STA 22+767)

Ragil Dwi Ponco Buwono¹, Dila Oktarise Dwina², Nurza Purwa Abiyoga³

¹Student, ²Main Supervisor, ³Co-Supervisor

Civil Engineering Study Program, Department of Civil, Chemical, and
Environmental Engineering

Faculty of Science and Technology, Universitas Jambi

Jalan Raya Jambi–Ma. Bulian, KM. 15, Mendalo Indah, Jambi, Postal Code: 36361

Email: ragildwi977@gmail.com

ABSTRACT

The construction of the Kali Soran Bridge on the Solo–Yogyakarta–NYIA Kulon Progo Toll Road requires proper bored pile foundation planning to be able to withstand structural loads and minimize settlement. The analytical method with the Reese & Wright equation was chosen for the calculation of the foundation bearing capacity. Meanwhile, in the calculation of the immediate settlement of the foundation piles, two methods were used, namely the finite element method in the form of the Plaxis 2D V.20 program and the analytical method with the Vesic equation. The re-planning was carried out by modeling alternative designs with a diameter of 0.8 meters and 1.2 meters from the existing diameter of 1 meter to compare the best results from the calculations obtained.

The analysis results show that the larger the pile diameter, the greater the bearing capacity and the settlement value also tends to be greater. The Vesic method produces higher settlement results than Plaxis, although both are still below the permitted settlement limit. In the pile group analysis, efficiency and capacity are greatly influenced by the number of piles and the distance between them, where the 1.2 m diameter alternative is proven to be more efficient because it requires fewer piles with a shorter depth. Thus, the finite element method (Plaxis) is considered more representative of field conditions, and the 1.2 m diameter design is selected as the optimal alternative technically and economically.

Keywords: Foundation, Bearing Capacity, SPT, Foundation Settlement, Plaxis