

INTISARI

Struktur bawah Jembatan Mercu Bangunan Pelimpah di Bendungan Bagong direncanakan menggunakan *counterfort abutment* dan pilar dinding dengan fondasi *bored pile* sedalam 40.00 meter di bawahnya. Penelitian ini bertujuan untuk mengetahui stabilitas pada *abutment* dan pilar, serta daya dukung yang ada pada fondasi kelompok tiang *bored pile*.

Data parameter tanah diperoleh melalui Uji Penetrasi Standar dan Uji Kuat Tekan Uniaksial. Analisis dilakukan dengan metode analitis dan metode elemen hingga 2D. Analisis lokal terhadap daya dukung tanah *abutment* dan pilar digunakan persamaan Hansen, sedangkan analisis lokal terhadap daya dukung fondasi *bored pile* digunakan metode Reese dan O'Neill.

Berdasarkan hasil analisis lokal, *abutment* kanan memiliki faktor keamanan terhadap stabilitas penggulingan = 1.50, stabilitas penggeseran = 6.20, dan daya dukung tanah = 0.10 dengan daya dukung izin kelompok tiang fondasi *bored pile* pada diameter 1.00 m = 19604.50 kN dan diameter 1.20 m = 11096.39 kN. Pilar pembilas memiliki faktor keamanan terhadap stabilitas penggulingan = 0.69, stabilitas penggeseran = 1.96, dan daya dukung tanah = 0.069 dengan daya dukung izin kelompok tiang fondasi *bored pile* pada diameter 1.00 m = 9395.60 kN dan diameter 1.20 m = 11081.55 kN. *Abutment* kiri memiliki stabilitas penggulingan = 0.73, stabilitas penggeseran = 1.82, dan daya dukung tanah = 1.52 dengan daya dukung izin kelompok tiang fondasi *bored pile* pada diameter 1.00 m = 17627.36 kN dan diameter 1.20 m sebesar 9146.96 kN. Untuk hasil analisis global dalam berbagai kondisi, jembatan dengan *bored pile* diameter 1.00 m didapatkan deformasi 62.05 cm, penurunan elastik 44.33 cm, tegangan efektif 5035 kN/m², dan tekanan air pori 237 kN/m², sehingga menghasilkan faktor aman sebesar 1.44. Jembatan dengan *bored pile* diameter 1.20 m mendapatkan deformasi 60.58 cm, penurunan elastik 43.13 cm, tegangan efektif 4890 kN/m², dan tekanan air pori 271.40 kN/m², sehingga menghasilkan faktor aman sebesar 1.45.

Kata Kunci: Struktur Bawah Jembatan, Analisis Lokal, Analisis Global, Stabilitas, Daya Dukung

ABSTRACT

Bottom structure of the Spillway Bridge in Bagong Dam is planned to use a counterfort abutment and pilar with bored pile in-depth 40.00 meters. This research aims to analyze the stability and bearing capacity of the bored pile foundation in abutment and pilar.

Soil parameter uses standard penetration test and uniaxial compressive strength test data. The methods used in the research are the analytical method and the 2D finite element method. Local analysis of the soil bearing capacity of the abutments and pillar used the Hansen equation, while the bearing capacity of bored pile foundations used the Reese and O'Neill method.

Based on the results of local analysis, the right abutment has a safety factor for overturning stability of 1.50, safety factor for shear stability of 6.20, and soil bearing capacity of 0.10 with a bearing capacity of bored pile foundation group permits at a diameter 1.00 m of 19604.50 kN and a diameter 1.20 m of 11096.39 kN. Flushing Pile has a safety factor for overturning stability of 0.69, safety factor for shear stability of 1.96, and soil bearing capacity of 0.069 with a bearing capacity of bored pile foundation group permits at a diameter 1.00 m of 9395.60 kN and a diameter 1.20 m of 11081.55 kN. Left abutment has a safety factor for overturning stability of 0.73, safety factor for shear stability of 1.82, and soil bearing capacity of 1.52 with a bearing capacity of bored pile foundation group permits at a diameter 1.00 m of 17627.36 kN and a diameter 1.20 m of 9146.96 kN. The result of global condition analysis with bored pile foundation diameter of 1 meter has a deformation of 62.05 cm, elastic settlement of 44.33 cm, effective strength of 5035 kN/m², and active pore pressure of 237 kN/m². In a bored pile foundation diameter of 1.20 meters, the result of global condition analysis has a deformation of 60.58 cm, elastic settlement of 43.13 cm, effective strength of 4890 kN/m², and active pore pressure of 271.40 kN/m².

Keywords: Bridge Substructure, Local Analysis, Global Analysis, Stability, Bearing Capacity