

Proyek Pembangunan Jalan Seksi 6C-1:SP.3 ITCI Simpang 1B Sumbu Kebangsaan Timur KIPP di Kabupaten Penajam Paser Utara, Provinsi Kalimantan Timur membangun konstruksi dinding penahan tanah kantilever sepanjang 100 m. DPT ini berfungsi melindungi lereng timbunan tanah dari potensi rembesan yang berasal dari embung yang direncanakan pada Sub BWP 1B-1C. Lokasi proyek didominasi oleh tanah jenis *clay shale*, yang dikenal memiliki sifat mudah melapuk akibat paparan udara maupun air. Karakteristik ini menjadikan *clay shale* menarik untuk diteliti lebih lanjut dari aspek geoteknik khususnya tentang pengaruh pelapukannya terhadap stabilitas struktur. Kajian ini bertujuan untuk mengevaluasi stabilitas dan kapasitas dukung dinding penahan tanah serta memberikan rekomendasi penulangan dan penjadwalan konstruksi.

Struktur dinding penahan tanah terdiri atas dinding, pelat dinding, dan tiang bor dengan diameter 0.8 meter dan panjang 15.7 meter. Kajian ini mengintegrasikan tiga bidang keilmuan teknik sipil yaitu geoteknik, struktur, dan manajemen konstruksi. Dari sisi geoteknik, dilakukan analisis stabilitas berdasarkan SNI 8460:2017 dan perhitungan kapasitas dukung tiang bor menggunakan metode Reese & O'Neill (1989). Dari sisi struktur, analisis kebutuhan tulangan dilakukan berdasarkan SNI 2847:2019. Dari sisi manajemen konstruksi, kajian ini mencakup penjelasan metode pelaksanaan berdasarkan konstruksi di lapangan dan rekomendasi penjadwalan konstruksi dengan metode *Precedence Diagram Method* (PDM) dan Microsoft Project. Hasil uji *Standard Penetration Test* (N-SPT) menghasilkan data tanah, sementara interpretasi Google Earth Pro dan Global Mapper memberikan data kontur. Muka air tanah teridentifikasi berada dalam kedalaman 5.2 meter.

Hasil kajian menunjukkan bahwa faktor keamanan terhadap guling, geser, dan daya dukung tanah masing-masing adalah 2.09, 3.46, dan 10.81, yang telah memenuhi kriteria desain. Pemodelan numerik dengan Plaxis 2D menunjukkan faktor keamanan sebesar 1.515 pada kondisi statis dan 1.411 pada kondisi seismik yang juga masih memenuhi kriteria desain. Rekomendasi penulangan mencakup penggunaan tulangan vertikal dan horizontal D14-150 pada bagian dinding, tulangan longitudinal D14-150 dan tulangan transversal D24-150 pada bagian pelat. Perencanaan penjadwalan pelaksanaan konstruksi berlangsung selama 52 hari.

Kata kunci: dinding penahan tanah, tiang bor, *clay shale*, Plaxis 2D, stabilitas lereng

In the Road Construction Project Section 6C-1: SP.3 ITCI Simpang 1B Sumbu Kebangsaan Timur KIPP, located in Penajam Paser Utara Regency, East Kalimantan Province, includes the construction of a 100 meter long cantilever retaining wall. This structure is designed to protect the embankment slope from potential seepage originating from the planned retention pond in Sub-BWP 1B-1C. The project site is predominantly composed of clay shale, a soil type known for its susceptibility to weathering when exposed to air or water. These characteristics make clay shale an important subject for further geotechnical study, particularly regarding how its weathering affects structural stability. This study aims to evaluate the stability and bearing capacity of the retaining wall and provide recommendations on reinforcement design and construction scheduling.

The retaining wall structure consists of the wall, wall footing, and bored piles with a diameter of 0.8 meters and a length of 15.7 meters. This study integrates three civil engineering disciplines: geotechnical, structural, and construction management. From the geotechnical perspective, a stability analysis was conducted based on SNI 8460:2017, and the bearing capacity of bored piles was calculated using the Reese & O'Neill (1989) method. Structurally, the reinforcement requirements were analyzed in accordance with SNI 2847:2019. From the construction management standpoint, the study includes an explanation of construction methods based on field practices and provides construction scheduling recommendations using the Precedence Diagram Method (PDM) and Microsoft Project. Soil data were obtained through the Standard Penetration Test (N-SPT), while contour data were derived from interpretations using Google Earth Pro and Global Mapper. The groundwater was identified at a depth of 5.2 meters.

The analysis results show safety factors against overturning, sliding, and bearing capacity of 2.09, 2.46, and 10.81 respectively, all of which meet the design requirements. Numerical modeling using Plaxis 2D yielded safety factors of 1.515 under static conditions and 1.441 under seismic conditions. Reinforcements recommendations includes D12-150 and D24-150 for the wall and slab components. The construction schedule estimated a total duration of 52 days.

Keywords: retaining wall, bored pile, clay shale, Plaxis 2D, slope stability