INTISARI

Pembangunan Terowongan Alimuddin–Kakap di Kota Samarinda, Provinsi Kalimantan Timur dilakukan pada daerah yang memiliki kondisi geologi kompleks, sehingga diperlukan adanya penyelidikan komprehensif. Penelitian ini bertujuan untuk mengevaluasi karakteristik geologi teknik serta mengetahui kestabilan lereng pada portal *inlet* dan *outlet* terowongan melalui penilaian terhadap aspek geomorfologi, litologi, struktur geologi, dan kondisi air tanah. Metode penelitian meliputi pemetaan geologi teknik skala 1:8.000, evaluasi sampel *core* batuan bawah permukaan, penentuan kualitas massa batuan berdasarkan *Rock Mass Rating* dan *Geological Strength Indeks*, analisis petrografi, pengujian sifat indeks dan keteknikan batuan & tanah, serta analisis kestabilan lereng portal *inlet* dan *outlet* menggunakan metode *Slope Mass Rating* (SMR). Geomorfologi daerah penelitian berdasarkan morfometri terbagi menjadi satuan dataran aluvium berlereng landai (0 – 2º), perbukitan homoklin berlereng agak curam – curam (16 – 55º), dan perbukitan denudasional berlereng agak curam (8 – 16º). Satuan batuan daerah penelitian yang teridentifikasi, yaitu: (1) satuan batulanau sisipan batupasir-batubara lapuk sedang dan lapuk sangat tinggi, dengan kualitas sedang dan sangat buruk; (2) satuan batupasir sisipan batulanau-batulempung-batubara lapuk rendah dan lapuk sangat tinggi, dengan kualitas baik dan sangat buruk; (3) satuan perselingan batulanau-batupasir-batulempung lapuk rendah hingga lapuk sangat tinggi, dengan kualitas baik hingga sangat buruk. Struktur geologi yang berkembang di daerah penelitian berupa kekar gerus dengan arah gaya utama NE – SW. Kedalaman muka air tanah di daerah penelitian diperkirakan berkisar 27.3 – 62.14 m dari permukaan tanah. Kestabilan lereng pada portal *inlet* dan *outlet* terowongan didominasi lereng stabil sebagian (SMR 41 – 60), lereng tidak stabil (SMR 21 – 40), dan lereng sangat tidak stabil (SMR 0 – 20). Rekomendasi rekayasa teknis untuk lereng stabil sebagian adalah pembuatan selokan kecil, *spot* atau *systematic bolting*, serta lubang drainase, untuk lereng tidak stabil adalah ekskavasi ulang, pembuatan lubang drainase, serta pembuatan *shotcrete* sistematik, sedangkan lereng sangat tidak stabil direkomendasikan untuk ekskavasi ulang serta perkuatan lereng.

Kata kunci: *Geological Strength Index*, karakteristik geologi teknik, *Rock Mass Rating*, *Slope Mass Rating*, Terowongan Alimuddin – Kakap, tingkat kestabilan lereng.

ABSTRACT

The construction of the Alimuddin–Kakap Tunnel in the geologically complex Samarinda City of East Kalimantan Province necessitated a comprehensive engineering geological investigation. This study aimed to evaluate engineering geological characteristics and determine the slope stability at the tunnel's inlet and outlet portals through assessments of geomorphology, litology, geological structures, and groundwater conditions. The research methods include 1:8,000-scale engineering geological mapping, subsurface rock core samples evaluation, rock mass quality assessment using Rock Mass Rating (RMR) and Geological Strength Index (GSI), petrographic analysis, testing of index and engineering properties of rocks and soils, as well as slope stability analysis at the inlet and outlet portals using the Slope Mass Rating (SMR) method. The geomorphology of the area comprises alluvial plains (0–2°), homoclinal hills with moderately steep to steep slopes (16–55°), and denudational hills with moderately steep slopes (8–16°). The rock units in the study area consist of: (1) interbedded siltstone with sandstone-coal, exhibiting moderate to very high weathering levels and moderate to very poor quality; (2) sandstone interbedded with siltstone-claystone-coal, with low to very high weathering levels and good to very poor quality; (3) alternating siltstone-sandstone-claystone, with low to very high weathering levels and good to very poor quality. Geological structures identified in the study area include shear fractures trending NE–SW. The groundwater table was estimated between 27.3 and 62.14 ms below the ground surface. Slope stability analysis revealed conditions ranging from partially stable slopes (SMR 41–60), unstable slopes (SMR 21–40), to very unstable slopes (SMR 0–20). Based on these instabilities, technical recommendations for partially stable slopes include the construction of small drainage ditches, spot or systematic bolting, and drain holes. Unstable slopes require, re-excavation, drain holes, and systematic shotcrete application while very unstable slopes necessitate re-excavation and slope reinforcement measures.

Keywords: Alimuddin–Kakap Tunnel, engineering geological characteristics, Geological Strength Index, Rock Mass Rating, Slope Mass Rating, slope stability levels.