

SARI

Dalam pembangunan tubuh bendungan utama Bendungan Lau Simeme perlu dilakukan pengalihan air Sungai Percut, Sibiru-biru, Deli Serdang, Sumatera Utara menggunakan terowongan pengelak. Pembuatan terowongan pengelak tersebut memerlukan penyelidikan geologi teknik permukaan dan bawah permukaan untuk mengetahui karakteristik geologi teknik lokasi konstruksi terowongan pengelak, sehingga kestabilan terowongan juga metode penggalian yang digunakan pada konstruksi terowongan dapat dilakukan dengan tepat. Aspek yang digunakan sebagai data meliputi aspek tanah dan batuan, aspek geomorfologi, aspek struktur geologi, dan aspek air tanah. Metode penelitian dilakukan dengan pemetaan geologi teknik, penentuan kualitas massa batuan pada batuan inti, dan muka terowongan.

Daerah penelitian terdiri atas tiga satuan yaitu satuan breksi tuf, satuan batupasir tufan, dan satuan endapan pasir kerakalan. Secara geomorfologi terdiri dari dua satuan yaitu satuan punggung aliran piroklastik berlereng curam dan dataran kolovial. Kedalaman air tanah 40 – 80 m dari permukaan. Struktur geologi yang berkembang yaitu sesar turun dan kekar gerus. Karakteristik geologi teknik berdasarkan tingkat pelapukan terdiri atas empat satuan yaitu satuan batupasir tufan lapuk sedang, satuan batupasir tufan lapuk tinggi, satuan breksi tuf lapuk sedang, dan breksi tuf lapuk tinggi. Karakteristik geologi teknik berdasarkan kualitas massa batuan GSI (*Geological Strength Index*) permukaan terdiri atas lima satuan yaitu batupasir tufan kualitas sedang, batupasir tufan kualitas baik, breksi tuf kualitas buruk, breksi tuf kualitas sedang, dan breksi tuf kualitas baik. Terowongan pengelak sendiri tersusun atas kualitas massa batuan sedang (III) dan baik (II). Batuan dengan kualitas massa batuan tersebut memerlukan sistem penyangga berupa *rockbolts* dan *shotcrete* dengan metode ekskavasi berupa *blasting*.

Kata kunci: Terowongan pengelak, karakteristik geologi teknik, sistem penyangga terowongan, *Geological Strength Index*.

ABSTRACT

In the construction of the main body of the Lau Simeme Dam, it is necessary to divert the flow of Percut River, Sibiru-Biru, Deli Serdang, North Sumatra using a diversion tunnel. The making of diversion tunnel needs the surface and subsurface engineering geology investigations to determine the characteristics of engineering geology of the tunnel construction site, so the stability of the tunnel, the excavation methods, and the support systems can be done right. The aspects that can be used as data consist rock and soil aspects, geomorphological aspects, structural geology aspects, and hydrogeological aspects. The research methods are done by the engineering geology mapping, determining the quality of rock mass in the core drilling, and facemapping of the tunnel.

The research area consist of three lithological units: the tuff breccia unit, the tuffaceous sandstone unit, and the pebbly sand sediment unit. The research area based on geomorphological aspect consists of two units: the steep sloped ridge pyroclastic unit and colluvium plain unit. The depth of the groundwater around the research area is between 40-80 meters from the surface. The geological structures that develop are extension fault and shear joint. The characteristics of engineering geology based on weathering level consist of four units: the medium weathered tuffaceous sandstone unit, the high weathered tuffaceous sandstone unit, the medium weathered tuff breccia unit, and the high weathered tuff breccia unit. The characteristics of engineering geology based on the quality of the rock mass Geological Strength Index consist of five units: the fair and the good tuffaceous sandstone unit and the poor, the fair, the good tuff breccia unit. The diversion tunnel itself is structured by the fair (III) and the good (II) qualities. These qualities of rocks require support systems such as rockbolts and shotcrete with blasting excavation method.

Keywords: *Diversion tunnel, engineering geology characteristics, tunnel support system, Geological Strength Index*