

## INTISARI

Bendungan Manikin merupakan salah satu proyek terowongan di bawah Kementerian Pekerjaan Umum dan Perumahan Rakyat (PUPR) dengan tujuan mengoptimalkan pemanfaatan air dari Bendungan Manikin dan mempercepat serta mengatur aliran Sungai Manikin sehingga meminimalisir banjir, durasi dan luas genangan. Penelitian ini bertujuan untuk menentukan karakteristik geologi teknik yang mempengaruhi pembangunan terowongan dan menentukan metode ekskavasi massa batuan yang tepat.

Metode yang digunakan dalam penelitian ini meliputi pemetaan geologi dengan skala 1:10.000, pengukuran nilai GSI batuan permukaan dan bawah permukaan, pengukuran nilai *Rock Mass Rating* (RMR) pada muka bukaan terowongan, pengujian laboratorium terkait sifat keteknikan batuan dan tanah, analisis metode ekskavasi massa batuan berdasarkan *EXCASS System* berdasarkan Dagdelenler, dkk. (2020).

Hasil penelitian menunjukkan daerah penelitian terdiri dari 3 satuan geomorfologi, yaitu satuan dataran aluvial berlereng datar, satuan perbukitan banteh berlereng curam, dan satuan perbukitan banteh berlereng agak curam. Berdasarkan kondisi batuan dan tanah serta kualitasnya, daerah penelitian terbagi menjadi 5 satuan geologi teknik, yaitu pasir berangkal, satuan *packstone* kualitas sedang, satuan *napal/mudstone* kualitas buruk, satuan *napal/mudstone* kualitas sedang, dan satuan batulempung bersisik dengan fragmen (A) breksi piroklastik dan (B) basalt kualitas buruk. Struktur geologi berupa kekar gerus, kekar ekstensi, sesar naik, dan sesar turun. Air tanah sepanjang terowongan pada hasil galian dari *outlet* terowongan ditemukan titik aliran air tanah dengan intensitas sedang, salah satunya *steel rib* 144 dari outlet terowongan. *Stell rib* yang ditemukan aliran air tanah berada pada litologi basalt. Berdasarkan klasifikasi RMR, pada muka terowongan dengan kelas III (*fair rock*), Metode ekskavasi massa batuan yang sesuai dengan kondisi terowongan berupa *strong blasting*.

**Kata kunci\_ :** Terowongan pengelak, geologi teknik, kualitas massa batuan, metode ekskavasi massa batuan.

## ABSTRACT

*Manikin Dam is one of the tunnel projects under the Ministry of Public Works and Public Housing (PUPR) with the aim of optimizing the utilization of water from Manikin Dam and accelerating and regulating the flow of Manikin River in order to minimize flooding, duration and extent of inundation. This research aims to determine the engineering geology characteristics that affect the tunnel construction and determine the appropriate rock mass excavation method.*

*The methods used in this research include geological mapping with a scale of 1:10,000, measurement of GSI values of surface and subsurface rocks, measurement of Rock Mass Rating (RMR) values at the tunnel opening face, laboratory testing related to the engineering properties of rocks and soil, analysis of rock mass excavation methods based on the EXCASS System according to Dagdelenler, et al. (2020).*

*The results showed that the study area consists of 3 geomorphological units, which are flat slope alluvial plain unit, steep slope melange hills unit, and slightly steep slope melange hills unit. Based on the rock and soil condition and quality, the study area is divided into 5 engineering geology units, namely cobble sand deposits, medium quality packstone unit, poor quality marl/mudstone unit, medium quality marl/mudstone unit, and poor quality scaly claystone unit with pyroclastic breccia and basalt fragments. Geological structures consist of shear joints, extension joints, reverse faults, and normal faults. Based on groundwater conditions along the tunnel, groundwater flow points with moderate intensity were found in the tunnel outlet excavation results, one of which was the 144th steel rib from the tunnel outlet. The steel rib is located in basalt lithology. Based on the RMR classification, at the tunnel face with class III (fair rock), the rock mass excavation method that is suitable for tunnel conditions is strong blasting.*

**Keyword :** *Evasion tunnel, engineering geology, rock mass quality, rock mass excavation method.*