

INTISARI

Bendungan Matenggeng terletak di Desa Matenggeng, Kecamatan Dayeuhluhur, Kabupaten Cilacap, Provinsi Jawa Tengah, merupakan bendungan yang di rencanakan dengan saluran pengelak berupa terowongan. Terowongan tersebut berbentuk tapal kuda dengan panjang 514 m dan diameter 8 m. Penelitian ini bertujuan untuk mengetahui kondisi geologi dan geologi teknik daerah penelitian, menentukan geometri lereng lereng portal terowongan, menentukan metode penggalian dan sistem penyangga terowongan yang stabil. Metode penelitian yang dilakukan berupa pemetaan geologi, pengamatan kualitas massa batuan permukaan dan bawah permukaan, pengujian laboratorium, analisis kestabilan lereng portal terowongan menggunakan perangkat lunak RS2, metode penggalian berdasarkan *Rock Mass Rating* (RMR) dan *Japan Society of Civil Engineer* (JSCE), serta analisis kestabilan sistem penyangga terowongan menggunakan perangkat lunak RS2 berdasarkan RMR, Q-System dan JSCE. Berdasarkan hasil analisis, daerah penelitian tersusun oleh satuan batupasir tufan dengan sisipan batulanau dan satuan breksi andesit tufan. Struktur geologi yang ada berupa sesar geser dekstral (diperkirakan), sinistral (diperkirakan) dan kekar-kekar gerus. Analisis secara numerik dengan perangkat lunak RS2 dilakukan pada lereng portal terowongan dan sistem penyangga terowongan. Dari hasil analisis kondisi lereng desain bagian *inlet* dan *outlet* dengan kemiringan antara 70°-71° diperoleh kondisi tidak stabil pada bagian *outlet*, sehingga dilakukan modifikasi kemiringan lereng menjadi 36°-45° serta memberi perkuatan berupa rockbolt dan shotcrete sehingga lereng menjadi stabil. Sistem penyangga yang memberikan nilai *total displacement* relatif paling kecil (stabil) adalah sistem penyangga berdasarkan JSCE. Terdapat nilai *total displacement* besar pada dua section pengamatan, maka dilakukan modifikasi terhadap sistem penyangga berdasarkan JSCE dengan memberikan material forepoling, menambah panjang dan mengurangi spasi rockbolt sehingga diperoleh pengurangan *total displacement* pada bagian atap, dinding dan lantai terowongan sebesar 4.94% hingga 43.79%.

Kata kunci : Bendungan Matenggeng, Terowongan, Klasifikasi Massa Batuan, Kestabilan Lereng, Metode Penggalian, Sistem Penyangga, Metode Numerik.

ABSTRACT

Matenggeng Dam is located in Matenggeng Village, Dayeuhluhur Subdistrict, Cilacap Regency, Central Java Province, which is a planned dam with a tunnel channel. The tunnel is horseshoe shaped with 514 m length and 8 m diameter. This study aims to determine the geological and engineering geology conditions of the study area. It also determines the geometry of the slopes of the tunnel portal, the excavation method and a stable tunnel support system. Research methods carried out in the form of geological mapping, observation of surface and subsurface rock mass quality, laboratory testing, stability analysis of tunnel portal slopes using RS2 software, excavation methods based on Rock Mass Rating (RMR) and Japan Society of Civil Engineers (JSCE), as well as analysis of the stability of the tunnel support system using RS2 software based on RMR, Q-System and JSCE. Based on the results of the analysis, the study area is composed of tuff sandstone units with siltstone inserts and tuff andesite breccia units. Existing geological structures in the form of dextral (estimated), sinistral (estimated) shear faults and fractured joint. Numerical analysis with RS2 software was carried out on the slope of the tunnel portal and the tunnel support system. From the results of the analysis of the slope design conditions of the inlet and outlet with a slope of between 70°-71°, it is found that the unstable conditions at the outlet, so that the slope is modified to 36°-45°, provide rockbolt and shotcrete reinforcement so that the slope becomes stable. The support system that provides the least relative value of total displacement (stable) is a support system based on JSCE. There is a large total displacement value in the two observation sections, so a modification of the support system based on JSCE by providing forepoling material, increasing length and reducing rockbolt space so that the total displacement reduction on the roof, walls and floor of the tunnel is obtained by 4.94% to 43.79%.

Keyword : Matenggeng Dam, Tunnel, Rock Mass Classification, Slope Stability, Excavation Method, Supporting Systems, Numerical Methods.