SARI

Bendungan Bendo akan membendung Kali Ngindeng yang terletak di Kabupaten Ponorogo, Provinsi Jawa Timur. Bendungan Bendo merupakan bendungan dengan tipe urugan random inti tegak. Penelitian ini bertujuan untuk mengetahui karakteristik geologi teknik dan kondisi kestabilan lereng pada sandaran bendungan. Pengambilan data dilakukan dengan melakukan pemetaan geologi teknik. Pemetaan geologi teknik dilakukan dengan mengamati aspek geologi teknik yang meliputi morfologi berdasarkan kemiringan lereng, batuan dan tanah, struktur geologi dan hidrogeologi. Kondisi kemiringan lereng daerah penelitian berdasarkan klasifikasi kemiringan lereng Van Zuidam (1983) terdiri atas lereng datar, lereng landai, lereng miring, lereng agak curam, lereng curam, lereng sangat curam dan lereng curam ekstrem. Satuan litologi daerah penelitian tersusun atas breksi andesit, breksi polimik, andesit, endapan pasir lempungan, dan endapan bongkah-pasir dengan kondisi segar sampai lapuk tinggi. Berdasarkan aspek geologi teknik, satuan geologi teknik terdiri atas endapan bongkah-pasir, *clayey sand, fat clay with sand-sandy fat clay, fat clay with gravel-elastic silt with gravel,* breksi polimik kualitas sangat buruk, breksi polimik kualitas buruk, breksi polimik kualitas sedang, andesit kualitas sedang, andesit kualitas baik, dan breksi andesit kualitas sangat baik. Kualitas massa batuan ditentukan berdasarkan klasifikasi *Geological Strength Index* (GSI) dan kemudian didapatkan lima kelas massa batuan, yaitu kualitas sangat baik (nilai GSI 76-95), kualitas baik (nilai GSI 56-75), kualitas sedang (nilai GSI 41-55), kualitas buruk (21-40), dan kualitas sangat buruk (<20). Struktur geologi yang ditemukan pada daerah penelitian terdiri atas satu sesar turun berarah barat laut-tenggara, dua sesar diperkirakan berarah barat laut-tenggara, dan kekar tiang. Kondisi hidrogeologi lereng daerah penelitian terdiri atas tata air lereng lembab dan lereng kering. Kondisi kestabilan lereng ditentukan menggunakan analisis kesetimbangan batas dan metode *Bishop's Simplified* dengan kriteria keruntuhan *Mohr-Coulomb* dan *Generalized Hoek-Brown*. Berdasarkan pemodelan dan analisis kestabilan lereng diketahui bahwa semua segmen pada sandaran barat daya dalam kondisi stabil dan aman. Sementara itu, kondisi lereng pada sandaran timur laut terbagi menjadi kondisi stabil yang aman dan kritis. Pada Segmen DAM Bendo A-B, Segmen DAM Bendo C-D, dan Segmen DAM Bendo E-F dalam kondisi stabil dan aman, sedangkan Segmen DAM Bendo G-H dan Segmen DAM Bendo Q-R lereng dalam kondisi stabil dan kritis.

Kata kunci: Bendungan Bendo, sandaran bendungan, karakteristik geologi teknik, *Geological Strength Index*, analisis kestabilan lereng

ABSTRACT

Bendo dam will embank Ngindeng River, located in Ponorogo Regency, East Java Province. Bendo dam has random zonal earthfill dam type. The aim of this research is to define the geotechnical characteristic and slope stability condition on dam abutment. Data collection has done by surface geotechnical mapping. Geotechnical mapping is based on geotechnical aspects consists of morphology (slope), rock and soil, geological structure, and hydrogeology. The slope condition in research area based on slope classification by Van Zuidam (1983) consists of flat slope, gently slope, sloping slope, moderately steep slope, steep slope, very steep slope, and extremely steep slope. The lithology unit of study area consists of andesite breccia, polymict breccia, andesite, clayed sand deposit, and boulder-sand deposit which has fresh to high weathering degree rock condition. Based on engineering geology aspect, engineering geology unit consists of boulder-sand deposit, clayey sand, fat clay with sand-sandy fat clay, fat clay with gravel-elastic silt with gravel, very poor quality polymict breccia, poor quality polimict breccia, fair quality polymict breccia, fair quality andesite, good quality andesite, and very good quality andesite breccia. The rock mass quality is determined by Geological Strength Index (GSI) classification. Based on the result, there are five classes of rock mass, those are very good quality (76-95 GSI value), good quality (56-75 GSI value), fair quality (41-55 GSI value), poor quality (GSI value 21-40), and very poor quality (<20 GSI value). Geological structures found in research area consists of a normal fault with northwest- southeast direction, two estimated normal faults with northwest- southeast direction, and columnar joint. The hydrogeological slope condition in research area consists of moist and dry slope water system. Slope stability condition is determined by limit equilibrium analysis and Bishop's Simplified method with Mohr-Coulomb and Generalized Hoek-Brown failure criterion. Based on slope modelling and analysis result, it could be stated that all of slope along southwest abutment in stable and safe condition. While, slope condition along northeast abutment consists of stable slope which is safe and critical condition. A-B Bendo DAM segment, C-D Bendo DAM segment, and E-F Bendo segment are in stable and safe condition, whereas G-H Bendo DAM segment and Q-R Bendo DAM segment are in stable and critical condition.

Keywords: Bendo dam, earth dam abutment, engineering geology characteristic, Geological Strength Index, slope stability analysis