

SARI

Bendungan Gondang membendung Sungai Garuda, anak Sungai Bengawan Solo yang terletak pada lereng barat laut Gunung Lawu. Pada saat pelaksanaan proyek pembangunan Bendungan Gondang kondisi geologi teknik dan kestabilan lereng daerah sandaran kanan dan daerah genangan belum dilakukan penelitian. Oleh karena itu, penelitian dilakukan untuk menentukan karakteristik geologi teknik daerah Bendungan Gondang. Data yang digunakan dalam penentuan karakteristik geologi teknik terdiri dari beberapa aspek, meliputi kelerengan, batuan, tanah, struktur geologi, dan kondisi airtanah (hidrogeologi). Metode penelitian yaitu pemetaan geologi teknik dengan skala 1:5.000 serta melakukan pengujian sifat keteknikan pada sampel tanah dan batuan untuk mengetahui karakteristik geologi teknik bendungan Gondang. Metode *Geological Strength Index* digunakan untuk menentukan kualitas massa batuan permukaan. Hasil penelitian menunjukkan bahwa terdapat enam kelas lereng yaitu kelas lereng datar-hampir datar, landai, miring, agak curam, curam, dan sangat curam. Daerah penelitian tersusun oleh satuan geologi berupa breksi andesit dan breksi andesit tufan serta struktur geologi berupa sesar geser dekstral dan kekar gerus. Berdasarkan hasil pemetaan kekuatan massa batuan dengan *Geological Strength Index* (GSI) didapati bahwa kelas massa batuan di daerah penelitian terdiri dari kelas massa batuan sangat buruk, buruk, sedang, dan baik. Berdasarkan aspek batuan dan kualitasnya serta jenis tanah, daerah penelitian terdiri lima satuan geologi teknik yaitu satuan breksi andesit dan breksi andesit tufan kualitas sangat buruk, breksi andesit dan breksi andesit tufan kualitas buruk, breksi andesit dan breksi andesit tufan kualitas sedang, breksi andesit dan breksi andesit tufan kualitas baik, serta satuan *sandy elastic silt*. Nilai ekskavabilitas batuan (Pettifier, 1994) pada batuan breksi andesit dan breksi andesit tufan kualitas buruk hingga breksi andesit dan breksi andesit tufan kualitas baik tergolong *hard digging*, sedangkan pada breksi andesit dan breksi andesit tufan kualitas sangat buruk tergolong *easy digging*. *Sandy elastic silt* berdasarkan hasil analisis X-Ray Diffraction (XRD) menunjukkan bahwa mineral lempung penyusun *sandy elastic silt* adalah klorit dan kaolinit. Penentuan tingkat kestabilan lereng daerah penelitian dilakukan dengan melakukan pemodelan berdasarkan analisis kestabilan lereng metode Bishop. Hasil pemodelan kestabilan lereng titik longsor pada daerah genangan dan *burrow area* Jimber berada dalam kondisi tidak stabil dengan nilai faktor keamanan < 1 . Lereng tebing utara spillway berada dalam kondisi kritis dengan nilai faktor keamanan berkisar 1-1,25. Lereng sandaran kanan Bendungan Gondang dan daerah genangan hulu dalam kondisi stabil dengan nilai faktor keamanan $> 1,25$.

Kata kunci : Bendungan Gondang, karakteristik geologi teknik, *Geological*

Strength Index, faktor keamanan

ABSTRACT

Gondang Dam embankment Garuda River, upstream of Bengawan Solo River, which situated in north west slope of Lawu Mountain. The engineering geology condition and slope stability of right slope abutment and reservoir area are not researched yet when the dam is under construction. Therefore, the research is conducted to determine the engineering geology of Gondang Dam area. The data which are used, consist of some aspects such as : slope, rocks, soils, geological structures, and ground water. Research method is engineering geology mapping with 1:5000 scale and engineering characteristic experiment for both soil samples and rock samples to determine engineering characteristic of Gondang Dam. Geological Strength Index method is used to determine the surface quality of rock mass. The research result show that there are six classes of slope such as : plane-slightly plane, slightly, inclined, slightly steep, steep, and very steep slope class. Research area consist of andesite breccia and andesite tuff breccia as a geology unit also shear joints and dextral strike slip fault as a geology structure. Based on result of rock mass with Geological Strength Index (GSI) can be found five classes of rock mass at research area such as very poor, poor, fair, and good rock mass. Based on rock and the quality also type of soil, research area consist of five engineering geology units such as: andesite breccia and andesite tuff breccia with very poor quality, andesite breccia and andesite tuff breccia with poor quality, andesite breccia and andesite tuff breccia with fair quality, andesite breccia and andesite tuff breccia with good quality, and sandy elastic silt unit. Rock excavability (Pettifor, 1994) at andesite breccia and andesite tuff breccia with poor until good quality are hard digging, whereas andesite breccia and andesite tuff breccia with very poor quality are easy digging. Sandy elastic silt based on X-Ray Diffraction (XRD) show that clay minerals in sandy elastic silt is chlorite and caolinite. Slope stability level at research area are determined by slope modelling with Bishop method. The result of slope stability at landslide point of reservoir area and Jimber burrow area are in unstable condition with safety factor < 1. Slope of north wall spillway are in critical condition with safety factor around 1-1,25. Slope of Gondang Dam right abutment and upstream reservoir are in stable condition with safety factor >1,25.

Key words : Gondang Dam, engineering geology characteristic, Geological Strength Index, safety factor