

INTISARI

Bendungan Jragung merupakan bendungan yang berlokasi di Kabupaten Semarang, Provinsi Jawa Tengah yang membendung Sungai Jragung. Tujuan pembangunan Bendungan Jragung antara lain untuk mereduksi banjir yang terjadi di area hilir Bendungan Jragung, suplai air irigasi di daerah Jragung, suplai kebutuhan air baku untuk masyarakat Kabupaten Semarang, sebagai potensi Pembangkit Listrik Tenaga Mikrohidro (PLTM), dan mengembangkan kesempatan potensi pada bidang pariwisata. Salah satu bahaya geologi yang terkait pembangunan bendungan adalah gerakan tanah pada lereng di area genangan bendungan. Oleh karena itu, diperlukan penelitian mengenai kondisi geologi teknik serta analisis kestabilan lereng pada area genangan Bendungan Jragung. Adapun data yang diperlukan dalam penentuan kondisi geologi teknik lokasi penelitian meliputi geomorfologi, batuan, struktur geologi, dan air tanah. Metode penelitian dilakukan dengan melakukan pemetaan geologi lokasi penelitian pada skala 1:25.000, pemetaan geologi teknik area genangan Bendungan Jragung pada skala 1:25.000, melakukan pengujian sifat keteknikan batuan, dan analisis kestabilan lereng menggunakan *Limit Equilibrium Method* (LEM) dengan kriteria keruntuhan *Generalized Hoek-Brown* pada dua kondisi, yaitu sebelum dilakukan pengisian air dan sesudah dilakukan pengisian air.

Hasil penelitian menunjukkan bahwa lokasi penelitian terdiri dari tiga satuan geomorfologi, yaitu dataran banjir berlereng landai-miring, perbukitan denudasional berlereng landai-miring, dan perbukitan lipatan berlereng agak curam-curam. Lokasi penelitian tersusun oleh empat satuan batuan, yaitu batulempung karbonatan, batupasir karbonatan, batulanau karbonatan, dan breksi vulkanik. Tingkat pelapukan batuan pada area genangan bendungan dibagi menjadi enam satuan, yaitu batulanau karbonatan lapuk sedang, batulanau karbonatan lapuk tinggi, batupasir karbonatan lapuk sedang, batupasir karbonatan lapuk tinggi, batulempung karbonatan lapuk sedang, dan batulempung karbonatan lapuk tinggi. Kualitas massa batuan berdasarkan *Geological Strength Index* (GSI) permukaan dibagi menjadi dua, yaitu GSI rentang nilai 20 – 30 dan 30 – 40. Terdapat struktur geologi yang berkembang berupa lipatan yang terdiri dari tiga sinklin dan dua antiklin, kekar gerus, sesar naik, dan sesar geser sinistral. Kedalaman muka air tanah berada pada ketinggian 50-120 mdpl dengan kedalaman 1-35 meter. Kondisi kestabilan lereng pada lokasi penelitian yang didapatkan dari analisis kestabilan lereng menunjukkan bahwa pemodelan kondisi sebelum pengisian air menunjukkan pada lereng bagian utara, barat, barat laut, dan selatan dari area genangan berada dalam kondisi yang stabil, sedangkan pada lereng bagian tenggara dari area genangan berada dalam kondisi yang tidak stabil. Selanjutnya, pemodelan kondisi sesudah pengisian air menunjukkan pada lereng bagian utara, barat, barat laut, tenggara, dan selatan dari area genangan berada dalam kondisi yang stabil.

Kata kunci: area genangan Bendungan Jragung, kondisi geologi teknik, analisis kestabilan lereng, *Limit Equilibrium Method* (LEM), *Generalized Hoek-Brown*, *Geological Strength Index* (GSI).

ABSTRACT

Jragung Dam is a dam located in Semarang Regency, Central Java Province which dams the Jragung River. The purpose of the construction of the Jragung Dam includes reducing floods that occur in the downstream area of the Jragung Dam, irrigation water supply in the Jragung area, supply of water needs for the people of Semarang Regency, as a potential Microhydro Power Plant (PLTM), and develop potential opportunities in the tourism sector. One of the geological hazards associated with dam construction is the movement of soil on slopes in reservoir area of the dam. Therefore, research is needed on engineering geological conditions and slope stability analysis in reservoir area of the Jragung Dam. The data needed in determining the geological conditions of the research location include geomorphology, rocks, geological structures, and groundwater. The research method was carried out by conducting geological mapping of the research location at a scale of 1:25.000 and engineering geological mapping at the reservoir area of Jragung Dam at a scale of 1:25.000, laboratory testing the engineering properties of rocks, and analyzing slope stability using the Limit Equilibrium Method (LEM) with generalized Hoek-Brown rock failure criteria in two conditions, namely before water filling and after water filling.

The results showed that the research location consisted of three geomorphological units, namely gently slope-sloping floodplains, gently slope-sloping denudational hills, and moderately steep-steep folding hills. The research location is composed of four rock units, namely carbonaceous claystone, carbonaceous sandstone, carbonaceous siltstone, and volcanic breccia. The level of weathering of rocks in the dam reservoir area is divided into six units, namely moderately weathered carbonaceous siltstone, highly weathered carbonaceous siltstone, moderately weathered carbonaceous sandstone, highly weathered carbonaceous sandstone, moderately weathered carbonaceous claystone, and highly weathered carbonaceous claystone. Based on rock mass quality from Geological Strength Index (GSI) of the surface is divided into GSI range from 30–40 and 40–50. There is a geological structure that developed include a fold consisting of three synclines and two anticlines, shear joints, reverse fault, and a sinistral strike-slip fault. The depth of groundwater level is at an altitude of 50-120 meters above sea level with a depth of 1-35 meters. The condition of slope stability at the research location obtained from the slope stability analysis showed that in modeling of conditions before water filling showed that the northern, western, northwestern, and southern slopes of reservoir area were in stable condition, while on the southeastern slopes of reservoir area were in an unstable condition. Furthermore, modeling of conditions after water filling showed that the northern, western, northwestern, southeastern, and southern slopes of reservoir area were in stable condition.

Keywords: *reservoir area of Jragung Dam, engineering geological conditions, slope stability analysis, Limit Equilibrium Method (LEM), Generalized Hoek-Brown, Geological Strength Index (GSI).*