

ABSTRAK

STUDI POTENSI AMBLESAN BERDASARKAN INTEGRASI DATA GEOFISIKA DAN GEOTEKNIK DI TEROWONGAN PENGELAK BENDUNGAN TIGADIHAJI

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Terowongan Pengelak merupakan terowongan yang digunakan untuk mengelakan aliran air sungai sementara dari aliran asli, pada saat dilakukan proses kontruksi tubuh bendungan. Area perencanaan pembangunan tersebut mendapati suatu ancaman berupa potensi amblesan akibat pengaruh dari stabilitas batuan penyusun. Sehingga dilakukan studi dengan pendektan menggunakan integrasi data Geofisika dan Geoteknik untuk mendapatkan identifikasi faktor-faktor terjadinya amblesan.

Data Geofisika menggunakan data GPR berfrekuensi 40 Mhz yang terdiri dari 68 lintasan yang berorientasi baratdaya – timurlaut dan 20 lintasan yang berorientasi baratlaut – Tenggara. Pada data Geoteknik menggunakan data Log bor dan MAT berupa 1 titik bor dengan kedalaman 20 meter. Tahapan penelitian meliputi pengumpulan data, pengolahan data dan interpretasi data baik kualitatif maupun kuantitatif.

Hasil analisis GPR ditemukan adanya struktur amblesan dengan adanya penurunan pola refleksi amplitudo. Hasil integrasi dari seluruh analisis data menunjukkan kondisi bawah permukaan dibagi menjadi 4 lapisan yaitu fresh clay, whearhered clay, water table (15 m), dan saturated zone (15-30 m). Area yang berpotensi terjadinya amblesan memiliki ketebalan lapisan lapuk tinggi (12,051-12,632 meter) , kedalaman muka air tanah (15,411 – 16,647 meter), jenis tutupan lahan berupa zona *permeable* (Tanah), Ketebalan lapisan permeabel tinggi (16,05 -17,25 meter), ukuran butir kasar tinggi (8,040 – 8,274 meter) , ukuran butir halus rendah (7,207 – 7,705 meter) dan jenis litologi lempung. Berdasarkan hasil pembobotan metode *Analytical Hierarchy Proses* (AHP) didapatkan Peta Potensi Amblesan yang memiliki 3 kelas kerawanan potensi amblesan yaitu rendah (0,077 – 0,306), kelas sedang (0,306 – 0,533) dan tinggi (0,533 – 0,762)

Kata kunci: Amblesan, GPR, Log Bor, MAT, Terowongan Pengelak

ABSTRACT

STUDY OF SUBSIDENCE POTENTIAL BASED ON THE INTEGRATION OF GEOPHYSICAL AND GEOTECHNICAL DATA IN THE TIGADIHAJI DAM DIVERSION TUNNEL

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The Diversion Tunnel is a tunnel used to redirect the flow of a river temporarily from its original course during the construction process of a dam. The development planning area for this project faced a threat in the form of potential subsidence due to the influence of the stability of the constituent rocks. As a result, a study was conducted using an approach that integrates Geophysical and Geotechnical data to identify the factors contributing to subsidence.

Geophysical data was collected using GPR (Ground Penetrating Radar) with a 40 MHz frequency. This data consisted of 68 profiles oriented southwest to northeast and 20 profiles oriented northwest to southeast. Geotechnical data, on the other hand, was obtained from borehole log and ground water monitoring data from a single borehole with a depth of 20 meters. The research process included data collection, data processing, and both qualitative and quantitative data interpretation.

The analysis of GPR detected the presence of subsidence structures characterized by a decrease in amplitude reflection patterns. The integration of all data analyses indicated that the subsurface conditions could be divided into four layers: fresh clay, weathered clay, the water table (15 meters), and a saturated zone (15-30 meters). The area with potential subsidence was identified by the thickness of the weathered layer (12.051-12.632 meters), groundwater table depth (15.411-16.647 meters), land cover type permeable soil, thickness of the permeable layer (16.05-17.25 meters), high coarse grain size (8.040-8.274 meters), low fine grain size (7.207-7.705 meters), and clay lithology. Based on the results of the Analytical Hierarchy Process (AHP) weighting method, a Potential Subsidence Map was created, classifying the potential subsidence into three categories: low (0.077-0.306), moderate (0.306-0.533), and high (0.533-0.762).

Keywords: Borehole Log, , Diversion Tunnel, GPR, Ground Water, Subsidence