ABSTRAK

PEMETAAN UTILITAS BAWAH PERMUKAAN MENGGUNAKAN DATA *GROUND PENETRATING RADAR* (GPR) UNTUK OPTIMALISASI PERENCANAAN PEMBANGUNAN GEDUNG "A" DI PEJOMPONGAN, JAKARTA PUSAT

Oleh
Via Oktaviani
NIM: 115220053
(Program Studi Sarjana Teknik Geofisika)

Pembangunan Gedung "A" di Jakarta Pusat memerlukan informasi kondisi bawah permukaan yang akurat karena kawasan ini memiliki kepadatan utilitas yang tinggi, seperti pipa dan kabel. Keterbatasan informasi mengenai utilitas bawah permukaan dapat menyebabkan penentuan titik uji sondir (CPT) yang berpotensi menimbulkan kerusakan jaringan utilitas dan gangguan layanan. Oleh karena itu, diperlukan metode pemetaan bawah permukaan yang efektif dan non-destruktif untuk mendukung perencanaan pembangunan yang aman dan efisien.

Penelitian ini menggunakan metode *Ground Penetrating Radar* (GPR) dengan data sekunder hasil akuisisi menggunakan alat IDS berfrekuensi 400 MHz pada area pembangunan Gedung "A". Pengukuran dilakukan pada 26 lintasan, kemudian data diolah menggunakan *Software Reflexw* melalui tahapan filter *Move Starttime*, *Subtract-Mean (Dewow)*, *Energy Decay*, *Bandpass Butterworth, Background Removal*, serta *Kircoff Migration*. Interpretasi radargram dilakukan untuk mengidentifikasi posisi, kedalaman, dan jenis material utilitas bawah permukaan, yang selanjutnya dikorelasikan dan dipetakan secara spasial sebagai dasar optimalisasi penentuan titik uji sondir (CPT).

Hasil analisis *Ground Penetrating Radar* (GPR) pada daerah penelitian menunjukkan adanya anomali hiperbola pada radargram yang mengindikasikan keberadaan utilitas logam dengan rata rata kedalaman 0,2 meter hingga 0,48 meter dan utilitas non-logam dengan rata-rata kedalaman 0,22 meter hingga 0,68 meter. Utilitas tersebut memiliki pola kemenerusan pada arah Barat Laut–Tenggara dan Timur Laut–Barat Daya, dengan total 6 utilitas logam dan 9 utilitas non-logam yang terpetakan di area penelitian. Berdasarkan hasil pemetaan utilitas bawah permukaan, direkomendasikan 4 titik uji sondir (CPT) yang relatif aman dengan diindikasikan berada di luar jalur utilitas bawah permukaan.

Kata kunci: *Ground Penetrating Radar* (GPR), pembangunan, uji sondir, utilitas.

ABSTRACT

MAPPING OF UNDERGROUND UTILITIES USING GROUND PENETRATING RADAR (GPR) DATA FOR THE OPTIMIZATION OF BUILDING "A" CONSTRUCTION PLANNING IN PEJOMPONGAN, CENTRAL JAKARTA

By
Via Oktaviani
NIM: 115220053
(*Geophysical Engineering Undergraduate Program*)

The construction of Building "A" in Central Jakarta requires accurate information on subsurface conditions because this area has a high density of utilities, such as pipes and cables. Limited information regarding subsurface utilities can lead to the selection of cone penetration test (CPT) locations that could potentially cause damage to utility networks and service disruptions. Therefore, an effective and non-destructive subsurface mapping method is needed to support safe and efficient construction planning.

This study utilized the Ground Penetrating Radar (GPR) method, employing secondary data acquired using a 400 MHz IDS device in the construction area of Building "A." Measurements were taken along 26 survey lines, and the data were processed using Reflexw software through the following filtering stages: Move Starttime, Subtract-Mean (Dewow), Energy Decay, Bandpass Butterworth, Background Removal, and Kircoff Migration. Radargrams were interpreted to identify the location, depth, and material type of subsurface utilities, which were then correlated and spatially mapped to serve as the basis for optimizing the determination of cone penetration test (CPT) points.

The results of the Ground Penetrating Radar (GPR) analysis in the study area revealed hyperbolic anomalies on the radargrams, indicating the presence of metallic utilities at an average depth of 0.2 meters to 0.48 meters and non-metallic utilities at an average depth of 0.22 meters to 0.68 meters. These utilities exhibit a continuous pattern in the Northwest–Southeast and Northeast–Southwest directions, with a total of 6 metallic utilities and 9 non-metallic utilities mapped within the study area. Based on the results of the subsurface utility mapping, four relatively safe cone penetration test (CPT) locations are recommended, all of which are indicated to be outside the paths of the subsurface utilities.

Keywords: Ground Penetrating Radar (GPR), construction, Cone Penetration Test (CPT), utilities.