ANALISIS KARAKTERISTIK TANAH DI KAWASAN KAMPUS UNIVERSITAS ISLAM NEGERI IMAM BONJOL PADANG SEBAGAI *SUBGRADE* JALAN

TUGAS AKHIR

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ABSTRAK

Karakteristik tanah memiliki peran penting dalam perencanaan dan pembangunan infrastruktur, termasuk di kawasan kampus UIN Imam Bonjol Padang. Penelitian ini bertujuan untuk mengidentifikasi karakteristik tanah melalui sifat fisik dan mekanik tanah di kawasan tersebut guna memberikan informasi mendalam terkait kesesuaian tanah sebagai tanah dasar konstruksi. Metodologi yang digunakan mencakup survei lapangan untuk pengambilan sampel tanah pada beberapa lokasi strategis di kawasan kampus, serta pengujian laboratorium meliputi uji sifat fisik seperti kadar air, Atterberg limit, berat volume dan berat jenis tanah seta distribusi ukuran. Dan pengujian sifat mekanik tanah meliputi uji konsolidasi, direct shear test, unconfined compressive strength test, pengujian pemadatan tanah di laboratorium dan uji kepadatan tanah lapangan dengan alat uji konus pasir. Serta dilakukan uji mineralogi yaitu uji difraksi sinar-x. Hasil pengujian kadar air tanah untuk ketiga titik sampel bernilai 30-44% . pengujian berat isi ketiga titik 2,6 gram/cm³. Berat jenis (Gs) 2,6 untuk ketiga titik. Berdasarkan sistem klasifikasi menurut USDA (United States Department of Agriculture), tanah di lokasi penelitian dapat diklasifikasikan sebagai tanah liat berlanau. Menurut sistem klasifikasi AASHTO (American Association of State Highway and Transpor-tation Officials), ketiga titik sampel diklasifikasikan menjadi kelompok A-7-5. Menurut sistem klasifikasi unifikasi, tanah di lokasi penelitian dapat diklasifikasikan sebagai lanauan elastis (MH), dengan nilai batas cair ketiga sampel berturut-turut ialah 62,03%, 65,45%, 56,00%. Nilai batas plastis tiap sampel ialah 34,34% untuk sampel satu, 39,57% untuk sampel dua, dan 34,41% untuk sampel tiga. Dari pengujian sifat mekanik tanah, nilai kohesi yang didapatkan ialah 0,26 – 0,31 kg/cm² dengan sudut geser antara 19° - 26°. Dan Kepadatan tanah di lapangan bernilai 60-68% dari kepadatan tanah maksimum tanah diuji di laboratorium. Uji kandungan mineralogi dengan difraksi sinar-X didapatkan kandungan mineral illite, attapulgite, monmorillonite, kaolinite, halloysite, quartz, vermiculite, dan chlorite pada tanah di kawasan kampus III UIN Imam Bonjol Padang, Padang.

Kata kunci : Karakteristik Tanah, Sifat Fisik, Sifat Mekanik, Klasifikasi, Difraksi Sinar-X.

ABSTRACT

The characteristics of soil play a crucial role in infrastructure planning and development, including at the UIN Imam Bonjol Padang campus area. This study aims to identify soil characteristics through the investigation of physical and mechanical properties of the soil in the area, providing in-depth information regarding its suitability as a subgrade for construction. The methodology employed includes field surveys for soil sampling at several strategic locations within the campus, as well as laboratory tests covering physical properties such as water content, Atterberg limits, bulk density, specific gravity, and particle size distribution. Mechanical properties were assessed through consolidation tests, direct shear tests, unconfined compressive strength tests, laboratory compaction tests, and in-situ density tests using the sand cone method. Additionally, mineralogical analysis was conducted using X-ray diffraction. The results showed that the soil water content at the three sampling points ranged from 30% to 44%. The bulk density at all three points was 2.6 g/cm³, with a specific gravity (Gs) of 2.6 for all samples. According to the USDA (United States Department of Agriculture) classification system, the soils in the study area can be classified as silty clay. Based on the AASHTO (American Association of State Highway and Transportation Officials) classification, all three samples fall into group A-7-5. According to the Unified Soil Classification System, the soils are classified as elastic silt (MH), with liquid limits of 62.03%, 65.45%, and 56.00% for the three samples, respectively. The plastic limits are 34.34% for the first sample, 39.57% for the second, and 34.41% for the third. Mechanical property tests revealed cohesion values ranging from 0.26 to 0.31 kg/cm², with internal friction angles between 19° and 26°. Field soil density was found to be 60–68% of the maximum laboratory compaction density. Mineralogical analysis using X-ray diffraction identified the presence of illite, attapulgite, montmorillonite, kaolinite, halloysite, quartz, vermiculite, and chlorite minerals in the soils at Campus III of UIN Imam Bonjol Padang.

Keywords : *Soil Characteristics, Physical Properties, Mechanical Properties, Classification, X-Ray Diffraction.*