

## **Instrumentasi Lapangan untuk Pengukuran Kadar Air Tanah dan Matric Suction Akibat Perubahan Cuaca = Field Instrumentation for Measuring Soil Water Content and Matric Suction Due to Weather Changes**

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### **Abstrak**

Mekanika tanah tak jenuh mempelajari perilaku tanah yang mengandung air dan udara dalam pori-porinya. Salah satu parameter utama adalah matric suction, yaitu perbedaan tekanan antara air dan udara di dalam tanah. Perubahan cuaca seperti curah hujan dan suhu udara memengaruhi proses infiltrasi dan evapotranspirasi. Hal tersebut akan berdampak pada kadar air serta matric suction sehingga membentuk hubungan khas dalam Soil Water Characteristic Curve (SWCC). Untuk memahami dinamika ini, dilakukan pengukuran real-time menggunakan moisture sensor untuk kadar air, tensiometer untuk matric suction dan weather station untuk curah hujan. Penelitian ini dilakukan di Fakultas Teknik Universitas Indonesia dengan pemantauan pada top soil. Data yang diperoleh dianalisis untuk melihat bagaimana perubahan kadar air dan matric suction terjadi akibat siklus basah-kering yang dipicu oleh curah hujan. Hasilnya memberikan gambaran yang lebih jelas mengenai respons tanah tak jenuh terhadap perubahan cuaca dan dapat digunakan dalam studi geoteknik serta pemantauan kondisi tanah secara langsung.

.....Unsaturated soil mechanics studies the behavior of soil containing both water and air within its pores. One of the key parameters is matric suction, which represents the pressure difference between water and air in the soil. Weather changes, such as rainfall and temperature variations, influence infiltration and evapotranspiration processes, affecting soil water content and matric suction, thus forming a distinctive relationship known as the Soil-Water Characteristic Curve (SWCC). To understand this dynamic, real-time measurements were conducted using a moisture sensor for water content, a tensiometer for a matric suction, and a weather station for rainfall data. The study was carried out at the Faculty of Engineering, Universitas Indonesia, with monitoring at the top of soil. The collected data was analyzed to observe changes in soil water content and matric suction due to wetting-drying cycles triggered by rainfall. The results provide a clearer understanding of how unsaturated soil responds to weather variations and can be utilized for geotechnical studies and direct soil condition monitoring