Abstract

A digital penetrometer has been designed using Atmel ATmega16 microcontroller for materials consistency test. This device has a photodiode as a driving control for motor stepper mechanism. The measurement of the digital penetrometer uses pressure in which a material is pressed by suppressing needle (cone) until a displacement of penetration distance occurs. The displacement is influenced by the hardness of the testing materials. The testing materials are polyvinyl alcohol (PVA) hydrogel. The materials have concentration variations of 10wt%, 12.5 wt% and 15wt% and freezing-thawing cycle variations of 2 cycles, 3 cycles, and 4 cycles. In this designated digital penetrometer, the obtained data are not much different from the analog penetrometer data. The graphs generated by the data of the device is linear. It can be concluded that the concentrations and freezing-thawing cycle are inversely proportional to the displacement due to pressure. The penetrometer digital has error repeatability of 6.7552%.

Kata kunci: Consistency, penetrometer, photodiode, polyvinyl alkohol, concentrations
Halaman ini sengaja dikosongkan