

*DESIGN AND DEVELOPMENT OF ACOUSTIC WAVE
SOIL MOISTURE METER*

DESIGN PROJECT

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April 2007



DESIGN AND DEVELOPMENT OF ACOUSTIC WAVE

SOIL MOISTURE METER

Undergraduate Design Project
Submitted to the Faculty of the
Cavite State University
Indang, Cavite

In partial fulfillment
of the requirements for the degree of
Bachelor of Science in Electronics and
Communications Engineering



00007356

*Design and development of acoustic wave
soil moisture meter
620.2 R63 2007
DP-224*

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SOIL MOISTURE METER**

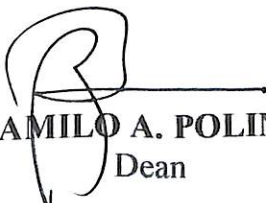
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ABSTRACT

ROGADOR, JENNY LYN V., TORIO, ANNALYN G., Design and Development of Acoustic Wave Soil Moisture Meter. Undergraduate design Project. Bachelor of Science in Electronics and Communications Engineering. Cavite State University, Indang, Cavite. April 2007. Adviser: Engr. Cesar C. Carriaga.

The design and development of acoustic wave soil moisture meter was conducted at Brgy. Bancod, Indang, Cavite. Its main objective is to design, develop and construct a portable soil moisture meter that uses acoustic wave in measuring the amount of soil moisture.

The system is composed of two main units: the Acoustic wave source and detector. The source is comprised of the frequency acoustic source that sends acoustic wave by means of piezo electronic tweeter. The detector is comprised of Microphone pre-amplifier, that detects acoustic wave coming from the source unit, the Analog to Digital Converter, Micro Controller Unit and the seven segment display. The system is powered by two 9V battery.

The evaluation of the design was done through monitoring of the data display of the device. The device was monitored for four days that showed a reading ranging from 98-99. Readings using the device were compared to the readings taken using commercially available moisture tester and interpreted as having no significant value for the study. The frequency of the sound wave used was 5 kHz, which is relatively high, cannot penetrate through solid objects. The higher the frequency, the shorter the wavelength, the slower a signal can penetrate through solid objects.

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DESIGN AND DEVELOPMENT OF ACOUSTIC WAVE SOIL MOISTURE METER^{1/}

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^{1/}A design project presented to the faculty of the Department of Computer and Electronics Engineering, College of Engineering and Information Technology, Cavite State University (CvSU), Indang, Cavite in partial fulfillment of the requirements for graduation for the degree of Bachelor of Science in Electronics and Communications Engineering with Contribution No. ECE-2006-07-008. Prepared under the supervision of Engr. Cesar C. Carriaga.

INTRODUCTION

In improving the quality of crop production, many factors should be taken into consideration. One important aspect is the moisture content of the soil. It is necessary, especially to farmers, and farm managers, to know the amount of water present in the soil because some crops are quite sensitive to water. The kind of soil to be used must also be taken into account because different types of soil have different water absorbing capacity.

Too much water can be damaging to many plants. Oxygen must move through the soil pores to replenish the soil atmosphere around the roots. When the pore spaces are filled with water instead of air, the diffusion of oxygen to the roots slows substantially. This lack of oxygen impairs the overall ability of the root system to