ABSTRACT

Ground Penetrating Radar (GPR) has the potential to be used in inspecting the thickness of the concrete layer of the road in a non-destructive (not damaging the soil), so that the inspection on the road area made of concrete wide more effective and efficient. However, it is specific to the detection capabilities of the GPR system. Therefore, this final task carried out a good test of GPR system and can be used.

In this final project, GPR system modeling is done by using Vector Network Analyzer (VNA) to test the ability of the GPR system to detect the thickness of the concrete layer. The antenna model uses a bistatic configuration using a vivaldi antenna on the transmitter and receiver. Radar signal processing is performed on S-parameter recordings and processed using MATLAB.

The results of the experimental testing on the GPR model created shows that the GPR system can detect the thickness of the concrete road with a relative permittivity of concrete 5-10 with a working frequency of 1-8 GHz. The results of the thickness measurement of concrete by the A-Scan method obtained an accuracy rate of 88,65%. Another result obtained is that the GPR system is able to detect the concrete layer of the road from scanning in the desired area.

Keywords: *Ground Penetrating Radar* (GPR), S-parameter.