Abstract

Metal detection is a typical measurement technology task. During the development, I have been faced with the major challenges of signal processing and measurement technology.

This thesis leads the reader through the development process, starting with the requirements specified for the device and finally leading to the measurements with the completed system.

In this thesis, the planning and implementation of a microcontroller based metal detector is introduced. The system consists of cheap devices with small computational capacity. I try to make the device able to perform a complex measurement procedure.

In the thesis, I deal with problems related to measurement technology, signal processing and circuit errors. One of the problems to be solved was that the change of the used sensor's (search coil) output signal was of 1% magnitude even in the presence of a large metal object, so during the processing of the output it was important to use the correct signal conditioning.

The implemented software running on the fabricated device makes it well suited to detect large metal objects and indirectly acquire information about their type. The objective set at the beginning of the semester, which was the design and implementation of a portable, low cost device was fully satisfied. The metal detection function of the device can be enhanced even solely by further development of the software.