ABSTRACT

Metals are widely used in the industrial sector, for example in the mining, machinery and shipping fields. However, metal will experience corrosion or rusting due to several factors, both internal and external. Corrosion is damage to metals that undergo oxidation-reduction reactions due to direct contact with the environment and oxygen. Metal corrosion will result in a decrease in the quality of the metal such as the erosion of the metal surface until the remaining life of the metal becomes low, so it must be overcome by preventing or slowing the corrosion rate. ICCP (Impressed Current Cathodic Protection) is one way to overcome corrosion on metal. ICCP works by providing an external current to the metal so that the metal becomes the cathode. This will put the metal in the protective potential so that the corrosion rate slows down.

In this research, a protection monitoring system is designed using the ICCP method that is able to prevent metal from corrosion based on IoT (Internet of Things). This system utilizes the ACS712 current sensor and voltage sensor to detect the current given by the source to the metal and the potential changes experienced by the metal in achieving corrosion and protection potential using the help of Ag/AgCl reference electrodes. Arduino Uno as a microcontroller, DC speed controller to provide current to the metal so that the metal does not experience quality degradation. The application of IoT in this study is to observe the potential and current of metal which can be accessed via a smartphone user so that monitoring can be done anywhere and anytime.The results of the study of metal potential measurements showed that the metal was well protected because the metal potential value was in the protection criteria, namely > 0.90 V vs. Ag/AgCl for Zn metal. The metal was tested in HCl, NaCl and H_2O with an average protection current of 0.102 Ampere which can be monitored on the Blynk platform in the form of graphs and numbers. This research is expected to be a solution in protecting metal corrosion.

Keywords : Corrosion, ICCP, IoT