ABSTRACT

One of the main problems for structures made of metallic material is corrosion that erodes the structure of the metal to the extent that is very damaging. Corrosion is the destruction or degradation of metal due to the oxidation-reduction reaction between a metal with a variety of substances in the environtment and produce an undesirable residues called rust. Because of its destructiveness, corrosion becomes a serious problem and it is very important so that became the attention of industries in the world.

System designed to control the current protection to the metal in order to maintain current to remain on the cathodic protection criteria between 0,850 V to 1,5 V (in absolut value) agains reference electrode Ag/AgCl. Impressed Current Cathodic Protection then implemented to the steel metal with size 10 x 10 x 0,2 cm as the metal to be protected and then placed in the testing environments. Data Acquisition and Monitoring Program on the PC will automatically run when the Mulai button is pressed and immediately begin to monitor the condition of the system, perform data collection every ten minutes which is then stored into the database automatically, and every single day to once a month to do data backups for analysis.

Buck-Boost Converter act as actuators which is controlled by providing a PWM signal from the microcontroller for the switching process, the greater the PWM duty cycle is given, then the output current and output voltage of the Buck-Boost Converter would be even greater, and the greater the current and voltage applied to the metal, then the Ei voltage will be smaller.

Current requirement for testing metal is 3 mA known through current requirement test, so that a current of 6,292 mA in tap water environments, 5,493 mA in the seawater environments, 5,951 mA in the vinegar environtment, and 5,694 mA in the limewater environtment which is given when testing system can protect testing metal structure from corrosion process due to fulfillment of the electron needs and is still in the range of cathodic protection criteria.

Keywords: Corrosion Control, Impressed Current Cathodic Protection, Buck-Boost Converter, Data Acquisition, System Monitoring.