Abstract

Non-destructive method or commonly called Non-Destructive Testing is a method that allows us to analyze a device, material, or system without having to damage the usefulness of the tool in the future. The pressure in this non-destructive method can be applied in the exploration field, which is able to find out the material content, as well as the position of the material content. Tomography is one of the techniques of Non-Destructive Testing works by injecting a round electric (AC) current through electrodes that are mounted around the object, and measuring the electrical potential between the electrodes. One type of tomography is Induced Current Electrical Impedance Tomography (ICEIT). ICEIT is a derivative of the Electrical Impedance Tomography (EIT) method which is based on Eddy Flow. In principle, the ICEIT system utilizes an alternating current induction with a predetermined frequency on a coil (coil) which then creates a magnetic field around the coil. The magnetic field interacts with the object and then the interaction can be seen by measuring the voltage difference at the edge boundary of the object. In this study an ICEIT system was made consisting of a series of coils and phantoms (object containers). The multicoil circuit has 9 pieces of copper wire with a wooden core in the shape of a beam and singlecoil having the same specifications as a larger size than multicoil. In multicoil it is necessary to find inductance values between coils that are uniform in their standard deviations and also the range of values between the coils and the diameter of the coil must match the dimensions of the object and the array. The results of experiments that have been done, the ICEIT system is able to produce patterns of distribution of different stress values in objects with two conditions, namely when homogeneous objects (laterite soils) and anomalous objects (laterite soils and iron powder) in multicoil and singlecoil tests. All voltage difference data on the electrode pair was acquired using an automatic acquisition system with a time delay between inductions of 10 seconds. Singlecoil produces optimal voltage compared to multiple coils with the highest voltage difference of 0.613 (mV) with homogeneous danV and anomaly of 0.363 (mV). Whereas multicoil produces the highest voltage difference of 0.497 (mV) with homogeneous danV and anomaly of 0.248 (mV). The adjacent and opposite electrode configurations produce a voltage which tends to be the same as the difference in voltage between adjacent and opposite of 0.012 (mV).

Keywords: *Non-Destructive Testing, ICEIT, Voltage difference, Singlecoil, multicoils, Coil system configuration*