PEMBUATAN SENSOR *ELECTRICAL CAPACITANCE VOLUME TOMOGRAPHY* (ECVT) UNTUK MENGUKUR KETEBALAN LAPISAN *COATING*

Abstrak

Material memiliki sifat-sifat tertentu yang jika digunakan secara terus menerus akan mengalami penurunan performa karena kondisi operasi, sehingga menyebabkan material terdegradasi. Pencegahan perlu dilakukan agar tidak tejadi kerugian, yaitu dengan metode *coating*. Aspek penting dalam *coating* adalah ketebalan lapisan yang diterapkan. Perlu adanya tahapan inspeksi untuk melihat hasil coating, salah satunya menggunakan sensor *electrical capacitance volume tomography* (ECVT). Dengan mengukur nilai kapasitansi material dan lapisan *coating* sensor ECVT dapat mengetahui ketebalan lapisan *coating*. Tujuan dari publikasi ini adalah membuat sensor ECVT untuk mengukur ketebalan material uji dan ketebalan *coating* serta meneliti karakteristik dan performa sensor yang dibuat. Benda uji yang digunakan adalah kayu, akrilik, kayu yang telah di *coating* dan akrilik yang telah di*coating* dengan variasi 1, 5, dan 10 lapisan. Ketebalan awal material uji dan hasil setelah *coating* telah diukur sebelumnya menggunakan mikrometer sekrup. Nilai kapasitansi diukur menggunakan kapasitometer dan sensor ECVT. Hasil menunjukan sinyal karakterisasi sensor mengalami pemuncakan pada frekuensi 20 kHz yang stabil hingga 1300 kHz dan juga perbedaan nilai kapasitansi tiap material uji dan material uji dengan lapisan *coating*, semakin bertambahnya ketebalan lapisan maka nilai kapasitansi ikut membesar. Pengukuran uji performa optimum dihasilkan pada benda uji kayu dengan ketebalan substrat 5 mm. Hal ini dikarenakan benda uji kayu dengan ketebalan substrat 5 mm memiliki nilai selisih ketebalan substrat dan lapisan *coating* yang paling kecil

Kata Kunci: *coating*, ketebalan, ECVT, kapasitansi.

FABRICATION ELECTRICAL CAPACITANCE VOLUME TOMOGRAPHY (ECVT) SENSOR SYSTEM FOR THICKNESS COATING MEASUREMENT

Abstract

The material has certain properties which, if used continuously, will experience a decrease in performance due to operating conditions, causing the material to degrade. Prevention needs to be done so that losses do not occur, namely by the coating method. An important aspect in coating is the thickness of the coating applied. It is necessary to have an inspection stage to see the results of the coating, one of which is using the electrical capacitance volume tomography (ECVT) sensor. By measuring the material capacitance value and the coating layer, the ECVT sensor can determine the thickness of the coating layer. The purpose of this publication is to make an ECVT sensor to measure the thickness of the test material and coating thickness and to examine the characteristics and performance of the sensor being made. The test objects used were wood, acrylic, coated wood and coated acrylic with variations of 1, 5, and 10 layers. The initial thickness of the test material and the yield after coating were previously measured using a micrometer screw. The capacitance value is measured using a capacitometer and an ECVT sensor. The results show that the sensor characterization signal experiences a peak at a stable 20 kHz up to 1300 kHz and also the difference in the capacitance value of each test material and test material with a coating layer, the increase in layer thickness, the greater the capacitance value. The measurement of the optimum performance test resulted in wood specimens with a substrate thickness of 5 mm. This is because wood specimens with a substrate thickness of 5 mm have the smallest difference in substrate thickness and coating.

Keywords: coating thickness, ECVT, capacitance