DEVELOPMENT OF REBAR CORROSION DAMAGE QUANTIFICATION USING NON - DESTRUCTIVE TEST FOR BRIDGE DECK STRUCTURES

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By

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DECLARATION BY THE CANDIDATE

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The rapid expansion of Malaysia's maritime activities has increased the demand of several concrete made infrastructures. The corrosive nature of the seawater and the air surrounding it poses a great threat to rebars embedded in concrete which compromises structural integrity. Rebar corrosion via electrolysis was used to corrode steel rebar using Faraday's equation. This study is about the quantification of non-destructive test (NDT) to quantify corrosion damage of rebar so that rehabilitation works can start earlier with less costs. Three different NDT method were used in this study which is Ground Penetrating Radar (GPR), Half Cell Potential and Resistivity meter. RADAN 7 and SPSS were used to analyse readings. GPR results gained were satisfactory with R^2 values of 0.93 for both amplitude and attenuation relation with corrosion rebar damage. Visual hypothesis was also confirmed via B-scanning with imaging aid from RADAN7 software. HCP results produced reasonable corrosion versus HCP relations with R^2 values of 0.78 and 0.96 after outlaying category of results were omitted. Resistivity was found to be unreliable in the study with random and inconsistent data, and no decent relations of quantification were able to be made.

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