PREDICTION OF CORROSION BEHAVIOUR OF MILD STEEL IN DIFFERENT SRI LANKAN ATMOSPHERIC CONDITONS

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Declaration

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Abstract

Corrosion is defined as the deterioration of materials due to the reaction with its environment. According to the physical nature of environment, corrosion can be categorized as 'corrosion in atmosphere', 'corrosion in water', 'corrosion in sea', 'corrosion in soil' etc. Among them, corrosion of steel in atmosphere is identified as one of most important type of corrosion. Because studies show that corrosion cost of a country may vary between 1 to5% of their GDP and about one half of that cost is due to atmospheric corrosion.

Corrosion problem cannot be completely eliminated but it is possible to control by methods known as 'corrosion management systems'. Corrosion model is a one of the best tool that can be used for atmospheric corrosion management. Use of a corrosion model as a tool for corrosion prevention is the common practice in many other countries, but using this method is not a popular practice in Sri Lanka due to non availability of such model. Therefore, this project was carried out for the formulation of an atmospheric corrosion model that can be applicable in Sri Lankan atmosphere.

For this purpose, by reviewing internationally published literature a model structure was proposed. Then field exposure programs were conducted to obtain data required for model calibration. The model was calibrated with the obtained data and test has been done for goodness of fit and the model shows considerably acceptable goodness of fit with more than 80% of data are within the ±10% deviation from actual value. Finally, a completely different set of samples were placed in different locations and data gathered were used to find out the validity and forecasting capability of the model,. The model shows a good performance in forecasting capability with acceptable deviations.

Keywords: Prediction of Corrosion, Atmospheric Corrosion, Carbon Steel Corrosion

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