CORRELATION BETWEEN CORROSION RATE AND ULTRASONIC ATTENUATION ON STEEL

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March 2014

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 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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The above candidate has carried out research for the Masters thesis under my supervision.

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ABSTRACT

Corrosion is the gradual destruction of material, usually metal, by chemical reaction with its environment. Usually the corrosion rate cannot be measured directly which needs sample preparation, fixing of samples in a particular environment, measuring the weight loss during a given period of time and measuring other parameters (time of wetness, SO_2 & NO_2 concentration, etc.). This research work was based on measuring the corrosion rate using ultrasound technique, which can be named as a nondestructive testing method. Ultrasound defined as the sound waves, which has a frequency more than 20 kHz.

To investigate the behavior of corrosion in accelerated atmospheric conditions mild steel samples was exposed to the concentrated NaCl solution. The assessment mainly conducted by evaluating the loss of mass of specimens against the ultrasonic attenuation.

Weight loss is the parameter of corrosion rate and it has a relationship with the surface roughness of the samples. The surface roughness of the samples have an influence on the ultrasonic attenuation. Therefore, corrosion rate has a relationship between ultrasonic attenuation.

In this project, efforts were made to find a correlation between surface roughness and ultrasonic attenuation. An equation was derived to calculate the corrosion rate if the ultrasonic attenuation is measured. This method has the advantage of assessing the corrosion rate without sample preparation on a given component.

ACKNOWLEDGEMENT

I would like to offer my thanks to all the staff members at the Department of Materials Science and Engineering, Department of Chemical Processes and Engineering, Department of Mechanical Engineering.

It was a great opportunity to conduct this project under the supervision of Prof. R. G. N. De S. Munasinghe and Mr. V. Sivahar, Senior Lecturer of the Department of Materials Science and Engineering, University of Moratuwa. The great guidance received from them to successfully completing this project is highly appreciated.

Furthermore, my heartfelt gratitude extended to, Mr. V. S. C. Weragoda, Dr S. U. Adikary, Mr. S. P. Guluwita and Mr A. M. P. B. Samarasekara, Those who encouraged my work continually.

In addition, my sincere thank goes to Dr. (Mrs.) N. M. V. K Liyanage, former Head of the Department of Materials Science and Engineering and all the other staff members who provided assistance, knowledge and information for me.

I would also like to thank the laboratory staff Mr S. Chandrapala, Mr S. D. Karunarathna, Mr S.D.K.D Bandusena, Mr S. D. Chandrakumara and Mr S. M. Punchibanda.

In conclusion, I would like to express my pardon if I have inadvertently omitted the name of those to whom thanks is due.

H.G.S.M. Dayananda

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