

Effect of Marine Environment on Corrosion of Mild Steel

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Corrosion is a major problem in steel structures used in marine environments. This project was carried out to investigate the effect of environmental factors in Sri Lankan coastal area for the uniform corrosion rate of mild steel. The results are used to derive an equation for the calculation of the corrosion rate. This project also serves as a part of a large-scale project to create a corrosion map for Sri Lanka.

Mild steel samples were exposed to the marine environment for a four month period in Negombo, Moratuwa, Galle and Tangalle. The samples were collected in every two weeks for the analysis of corrosion rate. In addition, passive samples were placed on each place to investigate the Sulphur deposition and Salinity of those areas, and both parameters were measured monthly.

Statistical analysis of the data was done to derive the following equation to obtain a relationship of corrosion rate with the environmental conditions such as level of Salinity, Sulphur deposition, cumulative rainfall and temperature.

$$CR=0.245(T)+0.023(SO_2)+0.034(RF)+0.005(CI) + 8.435$$

Where, CR = Corrosion Rate ($\text{mg.m}^{-2}\text{day}^{-1}$)

T= Temperature ($^{\circ}\text{C}$)

RF= Rainfall (mm.day^{-1})

SO = Sulphur deposition rate ($\text{mg.m}^{-2}\text{day}^{-1}$)

CI² = Chloride deposition rate (mg.m day^{-1})

This method has the advantage of assessing the corrosion rate of mild steel, before applications such as structural requirements.

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