CORROSION PREVENTION OF STEEL STRUCTURES FOR SRI LANKA

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DEGREE OF MASTER OF ENGINEERING IN STRUCTURAL ENGINEERING DESIGN

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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. Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

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ABSTRACT

Sri Lanka has made a significant development in the design and construction sector during the last 10 years. The use of steel is one of the governing construction materials in the industries. One of the major concerns of existing steel structures is the durability. Corrosion and deterioration have become major challenges in the lifetime of the structure, as it is one of the major public focuses on the structures.

Standards are intended to assist engineers and corrosion experts in adopting best practice in corrosion protection of structural steel at new constructions with proper identification of an actual exposure. There are six environmental corrosivity categories according to BS ISO 12944 as C1, C2 C3, C4, C5 and C5 –M. Those are according to BS standard and they should be adapted for Sri Lanka. In this research environmental corrosivity category of SC1, SC2, SC3 and SC4 are classified for Sri Lanka considering corrosion affecting factors temperature, rainfall, coastal region and industrial zones. A field survey was carried out in different locations of the structure in the country to identify the pattern of corrosion according to variation of corrosion affecting factors.

Among the methods used to clean the surface of the steel before applying corrosion protection, ***sand blasting*** cleans best. However, it cannot be carried out in every location due to environmental issues and equipment required. Steel surface is difficult to clean using light tools because temporary stabilized corroded layer on the steel surface. If we change this surface (Convert surface grade A to Surface grade B), the light tools can be used for the surface preparation. Therefore a new method is proposed to change this surface grade. Firstly, sea ***water is sprayed*** on to the surface to increase the rate of corrosion and left for a day for rust to appear. Then it is cleaned by fresh water and surface salinity level should be checked using salinity meter. Then the surface can be prepared using “Cup-Brush application” method without using sand blasting. By this method well cleaned surface can be obtained and then the surface protection primer is applied on it immediately. This surface protection primer type and primer and paint thickness should be defined according to environmental corrosivity category.

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