

The Perceptions among the Construction Industry on the Induced Chloride Corrosion for Reinforced Concrete Structure in Sarawak

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ABSTRACT

Corrosion is the main issue affecting the reinforced concrete structures, especially those built near the river and sea water. The structures constructed could be exposed to the possibility of corrosion and chemical reaction that would reduce the durability and strength of the structures. The main objective of the study is to identify the perceptions and opinions among players of the construction industry such as local authorities, developers, consultants, contractors and other agencies, in relation to the induced chloride corrosion for reinforced concrete structures in Sarawak. The finding shows that 74% of respondents are aware of the effect of the corrosion on the reinforced concrete structures, and only 6.8% of them are not aware of it. The most common grades of concrete delivered by the ready-mixed concrete suppliers are 25 MPa to 50 MPa with a 5 MPa interval. Meanwhile, the respondents agreed that the minimum grade of concrete to combat chloride is 30 MPa, with the highest percentage of about 27.6%. The highest factor that contributes to the corrosion of the reinforced concrete structures is sea water, about 84.8%; this is compared with 6.1% due to carbonation process from fresh water and 9.1% due to chemical attacks. The recommended concrete covers are as follows: 50 mm, about 45.2% (highest); this is followed by 75 mm, 25 mm and 100 mm with percentages of 20.5%, 17.8% and 2.7% respectively. Approximately 27.4% of the respondents declared that 5 km is the maximum distance within which the structures exposed to chloride attacks would require treatment; this is followed by 2 km, 15 km, 20 km, 30 km and 25 km with percentages of 17.8%, 13.7%, 9.6%, 8.2% and 4.1% respectively. To prevent the occurrence of corrosion and reduced quality of the structures, an overwhelming 94.5% of the respondents agreed that a guideline on the chloride resistance of reinforced concrete structures needs to be produced and implemented in Sarawak.

Keywords:

Reinforced concrete structure; corrosion;
chloride

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1. Introduction

The penetration of chloride ions into the concrete cover is mainly caused by a diffusion transport mechanism due to the high concrete permeability; it is widely viewed as the major problem to the reinforced concrete structures built along the coastal corridors and within partially submerge to spray zones. The penetration of chloride ions into the concrete cover also increases the development

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