



**Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Construction & Building Department**

Abstract of the M.Sc. Thesis submitted by:

Hassan Ahmed Hassan Ahmed Saad

Title of Thesis:

Effect of Environmental Corrosion on Sea Front Reinforced Concrete Structures

Supervisors: **Ass. Prof. Abdel Moneim Yaseen Sanad**

Dr. Maged Abdel Ghafaar Moussa

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ABSTRACT

Corrosion of reinforcement steel is a major factor affecting the deterioration of reinforced concrete structures. During corrosion, steel undergoes several phases of chemical reactions with consequent variation in steel section geometry and mechanical properties. At ultimate corrosion stage, the effective cross section area of steel is reduced with equivalent decrease in load carrying capacity leading to unsafe structures. During initial phase of corrosion, chemical reactions generate new products which irregularly increase steel bar diameters. The resulted products induce additional stresses on the structural member, causing cracking and spalling of the concrete cover, and subsequently faster deteriorate the member strength.

Concrete is a durable material, much more than steel and the encasement of steel in it provides the steel with a protective environment and allows it to function effectively as reinforcement. Durability of concrete structures is considered as implicitly acquired as long as the concrete strength satisfies the required design limitation. Bond between reinforcement and concrete is necessary to ensure composite action of the two materials. Testing for bond strength is carried out in variety of ways: standard pull-out, beam anchorage, beam end, and splice tests. The most common and