



ABSTRACT of M.SC. THESIS

Title : **Bond Behaviour of High Strength and Corrosive Resistant Steel Reinforcement**
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ABSTRACT

Bond between the concrete and the reinforcing steel is the main factor affecting the behaviour of the reinforced concrete structures. Advances in material science have led to the production of High Strength reinforcing bars that are characterised by their higher strength and corrosion resistance compared to the conventional steel. Using these bars allows the reduction of the reinforcement ratio hence leads to a more economical design and expand the service life of concrete structures.

The objective of this research is to evaluate the bond behaviour of High Strength reinforcing bars for concrete structures and to study the effect of different parameters believed to affect

the bond characteristics. Nine reinforced concrete spliced beams were constructed using 13 mm and 19 mm bar diameters, having different development lengths and levels of confinements. The beams were tested using Four Point bending setup to provide constant moment region over the splice zone. Test results indicate that using a splice length of 3ϕ , stresses up to 80 MPa and 63 MPa can be developed for bar sizes 13 mm. and 19 mm. MMFX bar without confinement, respectively. Using the minimum spacing for 10 mm. diameter stirrups for 3ϕ splice length, the ultimate tensile strength and the yield strength can be developed for the 13 mm. and 19 mm. MMFX bar, respectively. Research findings indicate that published equations of the ACI 308 Committee report (2003) can be safely used to predict the splice strength of MMFX steel reinforcement with a reduction factor of 0.92. Splice strength can be also very conservatively predicted by the Egyptian Code (2002). Using test results of this research combined with test results by researcher at N.C. State University, a rational model to estimate the stresses in spliced MMFX bars was developed which can be adequately used to predict the splice strength of MMFX steel reinforcement.

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STATEMENT

This thesis is submitted to the Engineering Faculty of Ain Shams University for the degree of Master of Science in Civil Engineering (Structural Engineering).

The work included in this thesis has been carried out by the author in the department of Structural Engineering, Ain Shams University, from October ٢٠٠٥ to December ٢٠٠٧.

No part of this thesis has been submitted for a degree or a qualification at any other university or institution.

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DEDICATION

To my parents

Who are the reason why I am everything I am

To my husband

For whom I am trying to be the best I can

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