



# **STRUCTURAL BEHAVIOR OF BEAMS COMBINING ULTRA HIGH STRENGTH CONCRETE AND NORMAL STRENGTH CONCRETE**

*By*

**Ahmed Mohamed ISMAIL**

A Thesis Submitted to the  
Faculty of Engineering at Cairo University  
in partial fulfillment of the  
Requirements for the degree of  
DOCTOR OF PHILOSOPHY

**In  
STRUCTURAL ENGINEERING**

**FACULTY OF ENGINEERING, CAIRO UNIVERSITY  
GIZA, EGYPT**

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**Title of Thesis:** " Structural Behavior Of Beams Combining Ultra High Strength Concrete  
And Normal Strength Concrete "

**Key Words:** Ultra High Strength Concrete, Composite Sections, Static Loads, Beams

This thesis present a study on the structural behavior of UHSC, NSC and composite beams using (UHSC) and (NSC) with the effect of different parameters under the static loads effect. This study aims mainly to reach the optimum thickness of UHSC layer in composite beams. This experimental program consists of ten reinforced concrete beams, with different parameters, which were longitudinal reinforcement ratio, type of used concrete and the thickness of UHSC layer. In addition, this research presents analytical models for beams that have been practically tested. Then the results were discussed and analyzed with a comparison between the experimental and the theoretical results.

## ***DEDICATION***

***To My Dear great Father to whom I owe too much For his encouraging & to whom I will always miss him in all my life moments.***

***To My Dear Mother, to whom I owe and love too much, for her personal support.***

***God save her & gives her good Health.***

***To My Dear wife for her patience and support.***

***To My Sweety Kids YASMINE & YOUSSEF***

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