



Cairo University

PUNCHING SHEAR BEHAVIOR OF RC FLAT SLABS WITH EMBEDDED STEEL BEAMS

By

BASSEM KHALED ABD EL AZIZ

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
STRUCTURAL ENGINEERING

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Title of Thesis:

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Key Words:

Embedded steel beam, Punching resistance, RC Flat slabs, and shear reinforcement system.

Summary:

The main objective of this research is to study the punching behavior of flat slabs and the possibility of resisting the punching shear failure without increasing the slab depth by using embedded crossed steel beams as a shear reinforcement system. An experimental program was carried out at the laboratory of the faculty of engineering Cairo university that consisted of six half scale slab specimens with interior column, in order to study three main parameters: arm length of the embedded steel beams, configuration position of the embedded beams, and increasing the steel beam web thickness using built up section. The experimental results were compared with different design codes in order to investigate the efficiency of using this system in flat slab punching resistance. In addition, modifications to an empirical formula were proposed. The results showed that using steel beams above columns in flat slabs is an effective method to resist punching stresses.

Acknowledgments

I would like to express my deepest appreciation to all those who provided me the possibility to complete this research. A special gratitude I give to Dr.Hany Abdalla, his willingness to motivate me contributes tremendously to my thesis. I also would like to thank him for showing me some examples related to this topic of this research.

Besides, I owe a deep sense of gratitude to Dr. Rasha Tharwat Senosy for her keen interest on me at every stage of my research. Her prompt inspirations, timely suggestions with kindness, enthusiasm and dynamism have enabled me to complete my thesis.

I would like to thank my family and friends for their understandings and supports towards me for completing this thesis.

Last but not least I would like to express my gratitude to the laboratory of the faculty of engineering Cairo University for carrying out the experimental staff program.

Dedication

I dedicate my thesis to my parents, sister and friends. I wish that my academic efforts make their dreams come true and feel proud of me the way I feel so proud of them.

BassemKhaled

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