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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Under the Supervision of

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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.

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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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