CONFINEMENT OF REINFORCED CONCRETE COLUMNS WITH WELDED WIRE REINFORCEMENT (WWR)

BY

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This is to certify that the thesis entitled
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DEDICATED TO
MY PARENTS AND FAMILY

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NOTATIONS

f_c' __ *Specified compressive strength of concrete*

f_{ce} __ *Effective concrete strength*

f_{cc} __ *Compressive strength of confined concrete in specimen*

f_{yl} __ *Yield strength of longitudinal steel bars*

f_{yt} __ *Yield strength of transverse reinforcing steel bars*

A_{sh} __ *Cross sectional area of transverse reinforcement*

s __ *Center to center spacing of transverse reinforcement*

A_{core} __ *Cross sectional area of core concrete measure c/c of ties*

A_{gross} __ *Cross sectional area of concrete specimens*

A_s __ *Cross sectional area of longitudinal reinforcing steel bars*

P_{test} __ *Load carried by concrete specimens during testing*

P_u __ *Failure load predicted by confinement model*

K_s __ *Strength gain factor*

ε_{s1} __ *Minimum strain corresponding to maximum stress*

P_n __ *Nominal axial load capacity of concrete column*

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ABSTRACT

Construction of high rise buildings and use of high strength concrete require confinement of concrete to cater for the strength and ductility. In seismic regions, adequate confinement of columns for greater ductility is probably the most important feature of structural design. Confidence in configuration of lateral confinement for improved performance of structural concrete will help in safer and economical design of structures.

Pakistan is a developing country and use of welded wire reinforcement (WWR) wraps is not common here. Especially in reinforced concrete columns its use is limited and this may be the first study to observe the performance of concrete columns with WWR wraps as the confinement reinforcement.

Sixteen samples of reinforced concrete columns with different configurations of lateral and longitudinal steel were prepared and subsequently tested in the laboratory under monotonic loading. The efficacy of use of "Welded Wire Reinforcement" wraps as well as conventional lateral reinforcement was studied as confinement reinforcement, and results were compared and analyzed for theoretical verification. Columns with welded wire reinforcement as well as those confined with 135 degree ties provide better confinement.