

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

BY

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**This is to certify that the thesis entitled
CONFINEMENT OF REINFORCED CONCRETE COLUMNS WITH
WELDED WIRE REINFORCEMENT (WWR)**

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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.