RETROFITTING OF PUNCHING SHEAR DAMAGED FLAT SLABS USING CARBON FIBER REINFORCED POLYMER (CFRP) SHEETS

V.G.M. Priyanjani

168921 T

Master of Science Degree in Structural Engineering Design

Department of Civil Engineering

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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V.G.M. Priyanjani Date

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Prof. Mrs. J.C.P.H. Gamage Date

Dissertation Supervisor

ABSTRACT

The punching shear failure of flat slabs is common in reinforced concrete buildings, and once the failure occurs, rectification is difficult and time consuming, which also affects building functionality. Hence, it is convenient to retrofit the flat slab structure to enhance the punching shear capacity while minimizing the disturbance to the structure. Therefore, a method was developed to retrofit punching shear damaged flat slabs using Carbon Fiber Reinforced Polymer (CFRP) sheets, considering the advantageous properties of the material, like the flexibility of usage, less weight, less thickness of material etc.

Thus, experimental and theoretical studies were carried out using 12 numbers punching shear failed flat slab panels with various repair materials and various CFRP sheet arrangements. The BS EN 1992-1-1: 2004 standard was used for theoretical analysis. A comparison of theoretical and experimental punching shear capacities concluded that the theoretical capacity is much higher than the experimental capacity, due to the difference of failure modes of the specimens.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES