DEPARTMENT OF BUILDING SURVEYING
FACULTY OF ARCHITECTURE PLANNING AND SURVEYING
UNIVERSITY TECHNOLOGY MARA (UiTM)

STRENGTHENING REINFORCED CONCRETE STRUCTURE USING CARBON FIBRE REINFORCED POLYMER (CFRP)

MAZLATHER BIN MAHMUD AKHIR

2001467412

BACHELOR OF BUILDING SURVEYING (HONS)

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ABSTRACT

Carbon Fibre Reinforced Polymer, CFRP, is being increasingly used for strengthening the existing concrete structures, the material has been extensively tried in concrete beams for enhancement in flexure, and in shear. In masonry structures, attempts have been made to strengthen shear walls.

This dissertation reports the purpose, procedure and result of the load test carried out on bridge FT 009/035/80 in Kuala Pilah before and after installation of Carbon Fibre Reinforced Polymer (CFRP). The result showed that bonding of CFRP sheets or laminates to the underside of the R.C beams would increase the stiffness of the beams. Flexural capacity of the beams would thus be enhanced. General conclusion that can be made from the load study is CFRP bonding has a potential to become an effective technique of structure strengthening.

The purpose of this report is to explore the techniques used in applying CFRP for strengthening beams and floors and to determine the problems, which may arise during the application work. The system can easily be handled on-site and was tested successfully at Mimos in Ipoh and PLBS UiTM Shah Alam.

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CHAPTER ONE

1.0 Introduction

Existing concrete structures are strengthened for reasons such as to make good any inadequacies of the structure arising from the design or construction errors or to increase the capacity of the structure to support the higher load from a proposed adaptive reuse or additions and alterations.

Structural investigation, design philosophy and choice of the method of strengthening are factors that decide the effectiveness and economy of strengthening works. Recommendations in the code of practices for the design of new structures are not always applicable in their entirety to the design of strengthening works to existing structure.

Design philosophy for the strengthening of existing structures should take into account the present condition of the structure and its performance over the period of time that it has existed. Choice of the method of strengthening should be such that the strengthening can be carried out effectively and economically with minimum inconvenience to the occupant s of the building.