



Study on Retrofitting of RC Column Using Ferrocement Full and Strip Wrapping

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Abstract

Ferrocement is one of the cement-based composites used for retrofitting and rehabilitation among many applications. Ferrocement is one of the reinforced concrete form with lightweight and thin composite with durability and environmental resistant that strengthen the conventional RC columns to increase its strength and serviceability. This paper examines the performance of the ferrocement wrapping in RC columns experimentally with numerical simulation using ANSYS19. Totally sixteen number of RC column of size 150 mm × 150 mm in cross section and 450 mm in length were cast and tested in laboratory. Twelve are retrofitted columns with respect to volume fraction and wrapping technique. Six columns were retrofitted by full wrapping technique and six columns of strip wrapping technique. The remaining four columns are control columns in virgin condition to compare with the retrofitted columns. Concerning the volume fraction of each specimen, the number of pre-woven mesh layers were single layer, double layer and three layers. C30 concrete grade adopted in all specimens as per ACI Committee 211-1.91 with 4H8 longitudinal reinforcement and H6 of 75mm c/c ties. As the previous researchers examined the ferrocement and proved its efficiency. This study aims to examine the ferrocement in full and strip wrapping technique to compare their efficiency to increase the strength. Finite element analysis using ANSYS19 adopted to compare the experimental data with the numerical simulation. The results are analyzed and observed that the ferrocement has increased the confinement and strength of the RC columns.

Keywords: Ferrocement; Reinforced Concrete Column; Full Wrapping; Strip Wrapping; ANSYS.

1. Introduction

1.1. Retrofitting

Generally, the retrofitting term indicates or refers to a new technology, system, or feature added to an older existing system in which it affects its properties and efficiency positively. This term retrofitting is common in the built and construction sectors, in which this technique is used in the strengthening and repairing of old structural members and finally achieving load enhancement. Also, used for the protection against the earthquakes. The retrofitting is categorized into two techniques global and local. The global technique of the retrofitting is completed by adding wing walls, shear walls, infill walls, wall thickening, mass reduction, bracing, and base isolation. The seismic retrofitting method using elastoplastic steel dampers at an existing reinforced concrete building is an effective method since the conventional

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