

ABSTRACT

The use of Fibre Reinforced Polymer (FRP) to strengthen and improve the structure of reinforced concrete damaged have been an option around the world because the mechanical ability and anti corrosion of FRP. In this research, a method of Prestressed CFRP Strip will be developed. Previously, service providers only provide a Non Prestressed CFRP Strip. The purpose of this research is to know the enhancement capacity of the structure strengthened with Non Prestressed CFRP Strip and Prestressed CFRP Strip and applying the mechanical anchorage. There are three type rectangular beams used in this research those are rectangular beam without strengthening as control beam, rectangular beam with Non Prestressed CFRP Strip and rectangular beam with Prestressed CFRP Strip. Each specimen were two rectangular beam, that is reinforced concrete rectangular beam with b (width of beam) 150 mm and h (depth of beam) 220 mm. The length of beam is 4000mm. The material that used in this research is CFRP Strip and the type of material is laminate strip. The failure mechanism of the beam that strengthened with Prestressed CFRP strip occurs when the the beam had been loaded, it has the initial crack. Then, concrete and reinforcement working together forming the linier charts. At the next loading, the reinforcement was yield. The next additional loading shows that the FRP was worked and reached the ultimate point and the reinforcement was in plastic condition. The loading applied up to ultimate load until the CFRP and concrete no longer work. The comparison between the results of the analysis calculation and testing laboratory of Non-Prestressed beam strengthening included the capacity ultimate, moment and elastic deflection. The comparison of laboratory testing result to analysis calculation successively 15.93%, 15.92%, 50.87% for first specimen, and 9.32%, 9.32%, 39.57% for second specimen. The moment comparison of laboratory test to calculation analysis for Prestressed CFRP is 6.44%. Based on ACI 440 the reduction factor of CFRP is 0.9. The analysis result should be lower than the laboratory result, therefore the reduction factor that should have used in the calculation of analysis is 0.8.

Keywords : *Fibre Reinforced Polymer, Rectangular beam strengthening, Non Prestressed CFRP strip, Prestressed CFRP strip, mechanical anchorage, specimen.*