

STUDY ON THE APPLICATION OF CONTINUOUS FIBER REINFORCEMENT TO CONCRETE STRUCTURE MEMBERS

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The purpose of this study is to apply the continuous fiber reinforcement to the existing and the new concrete structure as an alternative material of the reinforcement.

Recently, the necessity of repair and strengthening of the existing concrete structure increases. The method of strengthening concrete structures with continuous fiber reinforcement externally bonded on their tension zone has been gradually accepted as the practical use due to its beneficial characteristics. This study was focused on investigating the method of flexural strengthening and the static and fatigue behaviors of reinforced concrete (RC) beam strengthening by using carbon fiber sheet and plate. From this investigation, by strengthening with carbon fiber reinforcement, the flexural capacity of RC beam was improved largely and the sufficient fatigue performance was obtained. The use of high-strength type of plate for RC beams strengthened with tensioned carbon fiber reinforcement and the use of middle high-elasticity type of carbon fiber reinforcement for RC beams strengthened with adhesion resin were more effective.

On one hand, the concrete member reinforced by cylindrical continuous fiber reinforcement, to which high amount of chemical prestress was introduced by expansive mortar, was developed. The fabrication of high-strength mortar member was possible by the use of cylindrical continuous fiber reinforcement and expansive mortar. It was clarified that the high-strength member worked well as compression and tension diagonals of PC truss beam until the maximum load.

The thin plate member introduced by using 3-dimensional hollow structure glass fabric and expansive paste was also developed, and this member was used as highly durable permanent formwork of RC beam. The member had high-strength and high-durability. The ultimate load and stiffness of RC beam which applied the member as permanent formwork was improved.

By the above results, it were clarified that concrete member using continuous fiber reinforcement had high performance and the possibility of the application to concrete structure. Continuous fiber reinforcement has the possibility of the new application which utilized the characteristics effectively.