

Performance of Modified Wedge Anchorage System for Pre-Stressed FRP Bars

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Abstract : Fiber Reinforced Polymers (FRP) is a composite material with exceptional properties that are capable of replacing conventional steel reinforcement in reinforced and pre-stressed concrete structures. However, the main obstacle for their wide use in the pre-stressed concrete application is the anchorage system. Due to the weakness of FRP in the transverse direction, the pre-stressing capacity of FRP bars is limited. This paper investigates the modification of the conventional wedge anchorage system to be used for stressing of FRP bars in pre-stressed applications. Epoxy adhesive material with glass FRP (GFRP) bars and conventional steel wedge were used in this paper. The GFRP bars are encased with epoxy at the anchor zone and the wedge system was used in the pull-out test. The results showed a loading capacity of 47.6 kN which is 69% of the bar ultimate capacity. Additionally, nylon wedge was made with the same dimensions of the steel wedge and tested for GFRP bars without epoxy layer. The nylon wedge showed a loading capacity of 19.7 kN which is only 28.5% of the ultimate bar capacity.

Keywords : anchorage, concrete, epoxy, frp, pre-stressed

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