

Effect of the Truss System to the Flexural Behavior of the External Reinforced Concrete Beams

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Abstract : The aesthetic qualities and the versatility of reinforced concrete have made it a popular choice for many architects and structural engineers. Therefore, the exploration of natural materials such as gravels and sands as well as lime-stone for cement production is increasing to produce a concrete material. The exploration must affect to the environment. Therefore, the using of the concrete materials should be as efficient as possible. According to its natural behavior of the concrete material, it is strong in compression and weak in tension. Therefore the contribution of the tensile stresses of the concrete to the flexural capacity of the beams is neglected. However, removing of concrete on tension zone affects to the decreasing of flexural capacity. Introduce the strut action of truss structures may an alternative to solve the decreasing of flexural capacity. A series of specimens were prepared to clarify the effect of the truss structures in the concrete beams without concrete on the tension zone. Results indicated that the truss system is necessary for the external reinforced concrete beams. The truss system of concrete beam without concrete on tension zone (BR) could develop almost same capacity to the normal beam (BN). It can be observed also that specimens BR has lower number of cracks than specimen BN. This may be caused by the fact that there was no bonding effect on the tensile reinforcement on specimen BR to distribute the cracks.

Keywords : external reinforcement, truss, concrete beams, flexural behavior

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