

A Study of Cracking Behavior in Concrete Beams Reinforced With Two Different Grades of Steel

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Abstract : Crack evaluation of flexure reinforced concrete (RC) member is considered an important step in the design process, since the formation of concrete cracks depends on the possibility of exposure to various conditions (pollution, humidity, ..etc.). Because of the disparity between different grades of steel in the service load stresses, this affects the cracking behavior. This paper is concerned with the crack pattern and cracking load for concrete beams with T-section reinforced with two different grades of steel at the service load levels stages up to ultimate load. A practical program has been put up to investigate the difference between reinforced steel bars with yield strength 420 N/mm² and 500 N/mm² through six T-section reinforced beams. The beams were tested under static- monotonic two- point service loading up to ultimate failure under flexural stresses. The influence of parameters such as clear concrete cover and concrete compressive strength are considered for each of the two grades of steel used. Cracking load, spacing and width were determined. The experimental results demonstrated that increasing the concrete strength results in both of cracking and ultimate load increase, while no significant difference in yield load for the two steel grades used. It has also become obvious, that the number of cracks was more for the lower steel strength, which is followed by decrease in crack width and spacing.

Keywords : RC beams, cracking behavior, steel stress, crack width, crack spacing

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