

Parameters Affecting Load Capacity of Reinforced Concrete Ring Deep Beams

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Abstract : Most codes of practice, like ACI 318-14, require the use of strut-and-tie modeling to analyze and design reinforced concrete deep beams. Though, investigations that conducted on deep beams do not include ring deep beams of influential parameters. This work presents an analytical parametric study using strut-and-tie modeling stated by ACI 318-14 to predict load capacity of 20 reinforced concrete ring deep beam specimens with different parameters. The parameters that were under consideration in the current work are ring diameter (D_c), number of supports (NS), width of ring beam (b_w), concrete compressive strength (f_c) and width of bearing plate (B_p). It is found that the load capacity decreases by about 14-36% when ring diameter increases by about 25-75%. It is also found that load capacity increases by about 62-189% when number of supports increases by about 33-100%, while the load capacity increases by about 25-75% when the beam ring width increases by about 25-75%. Finally, it is found that load capacity increases by about 24-76% when compressive strength increases by about 24-76%, while the load capacity increases by about 5-16% when B_p increases by about 25-75%.

Keywords : load parameters, reinforced concrete, ring deep beam, strut and tie

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