

# Parametric Study of the Load Carrying Capacity of Functionally Graded Concrete of Flexural Members

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## Abstract

Steel reinforced concrete members in bending acquire their load carrying capacity from the integration between concrete compression and steel tensile strength. The codes neglect the concrete tensile capacity since it is relatively small compared to the compressive strength. Hypothetically, if a low concrete strength is assigned to the layers in tension, it leads to economical and environmental advantages. A method for producing functionally graded concrete (FGC) having a gradation in compressive strength and stiffness throughout the depth of a member was developed. Uniaxial compression tests on cylindrical FGC specimens were conducted and verified numerically using finite element models. We suggest that the compressive strength of FGC approaches the lower grade concrete layers while the stiffness properties follow the higher grade concrete layers. This potential could be exploited for the flexural member, through optimising of material use while improving the serviceability of the member.

**Keywords:** Functionally Graded Concrete, Load Carrying Capacity, Flexural Member, Finite Element Analysis

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