

# **PARAMETRIC STUDY ON HYBRID BEAMS**

**THESIS**

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## ABSTRACT

Almost all the structures in case of industrial, commercial or housing are constructed of RCC. Corrosion of steel bars, overloading or faulty construction, etc is the main reasons due to which the concept of strengthening of RCC structures came into existence. For providing strengthening to these structures, there are several strengthening materials like Fibre reinforcement polymer, Ferrocement or steel plates. The flexural behaviour of RC beams is analyzed by strengthening them with Ferrocement and Fibre reinforced polymer using ANSYS. To study the effect in the flexural behaviour of RC beams with the change in tensile steel and number of layers of Glass Fibre Reinforced Polymer, a parametric study is also done. The effect of the combination of ferrocement and GFRP laminate on flexural strength is also studied. The numerical modelling of these hybrid beams using ANSYS compensates for the time invested in experimental flexural study and also save the material required for experimental investigation.

In the present investigation, twenty-seven beams are modelled. One control beam and one wire mesh epoxy composite beam are modelled and their numerical results are compared with experimental results. Then a comparison is carried out between ferrocement beam and wire mesh epoxy composite beam. After this comparison, the remaining twenty-four hybrid beams are modelled, in which first three ferrocement beams are modelled by using single U wrap ferrocement layer and varying diameter of tensile reinforcement (12mm, 10mm and 8mm). Then nine GFRP beams are modelled in which numbers of GFRP layers are varied and tensile reinforcement is varied. After this analysis, next nine beams are modelled in which combination of ferrocement and GFRP layers are used and the size of tensile reinforcement is varied. The numerical analysis using ANSYS revealed that a combination of ferrocement and GFRP layers shows better results as compared to their individual use.