SHAPE OPTIMIZATION
OF
CANTILEVER BEAM

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"I declared that this thesis is the result of my own work except the ideas and summaries which I have clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree"

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ABSTRACT

Shape optimization is the determination of the boundary which best meets the design criteria, while simultaneously satisfying design constraints. In this research, shape optimization of a cantilever beam is a process to obtain the optimum shape of the beam while the stress and deflection are within the design constraints (design requirement). For shape optimization of a cantilever beam the objective function to be minimized is its total volume, the design variable is its thickness and the state variable to be constrained is stress and deflection. ANSYS software was used for conducting shape optimization process. During optimization, stresses and displacements were obtained using ANSYS finite element model. For that purpose finite element module was set up together with the optimization parameters. The final result of shape optimization from ANSYS were obtained using the Subproblem Method and First Order Method. For Subproblem Method the optimum total volume value is 3.6156 in^3 at the iteration number twelve and for First Order Method the optimum total volume is 3.609 in^3 at the iteration number fifteen.

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