

# Redesign of Stationary I.C. Engine Valve using Optimization and FEM

**Prof. A. M. Patil, Prof. K. K. Tarwade, Prof. Irfan Kasim Sayyad,  
Prof. Girish Narayanrao Wattamwar**

Department of Mechanical Engineering, K.B.P. Polytechnic Kopergaon, Maharashtra

**Abstract:** Intake and exhaust valves are very important engine components that are used to control the flow and exchange of gases in internal combustion engines. They are used to seal the working space inside the cylinder against the manifolds; and are opened and closed by means of what is known as the valve train mechanism. Such valves are loaded by spring forces and subjected to thermal loading due to high temperature and pressure inside the cylinder. This project deals with the stress induced in a valve due to high pressure inside the combustion chamber, spring force and cam force. For modeling CATIA is used and to analyze the valve ANSYS is used as the tool. Structural analyses performed on the valve. Optimization of valve radius is done and radius 9 mm is selected for improved design. In this case 41 % stresses are reduced with 9 mm fillet radius compared to zero radius. Further, Super Alloy 21-2N Valve Steel Material is suggested for new design having better results over other materials.

**Keywords:** I.C. Engine, Valve, Stress Analysis, Design of Valve, Valve Stem.

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