

Synthesis and Characterization of
Maraging Steel Fabricated
Through Powder Metallurgy to
Enhance its Applications in
various sectors

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INTRODUCTION

Maraging steels are a special class of steels with **8-25% Ni** and up to **28% other elements like Co, Mo, and Ti**. These steels find applications in a variety of industries including aerospace, nuclear, military, as well as general applications.

OBJECTIVES OF WORK

The objectives of the proposed work are briefly given below:

- 1) To fabricate specimens of maraging steels by two methods (conventional and PM)
- 2) To carry out the necessary heat treatment procedures on the specimens
- 3) To carry out mechanical, corrosion-related and metallographic tests on the specimens
- 4) To explore the possibility of computer simulation for prediction of properties of maraging steels produced by PM method knowing the properties of same steels produced by conventional method.
- 5) Simulation and fatigue analysis using ANSYS
- 6) Design of experiment using Taguchi's approach
- 7) To draw conclusions and make recommendations.

Areas of Applications of Maraging steels and its Components

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|-------------------------|---|
| AEROSPACE | Rocket motor casings Landing gear Explosive bolts Load cells Universal fixtures Helicopter flexible drive shafts Jet engine shafts Gimbal ring pivots Separation belts (Merman belt) |
| PRODUCTION TOOLS | Moulds Hot-forging dies Cold-forging dies Extrusion press rams, dies and containers Die casting dies for Al and Zn Gears in machine tools Pistons Clutch discs |

Expected Outcome

- A clear understanding of the mechanical, corrosion-related, and micro structural properties of maraging steels produced by PM technique.
- A possibility of determining the various properties of maraging steels produced by Powder Metallurgy technique knowing the properties of bulk-produced maraging steels. This could be used even for the maraging steels not studied under this work.
- Assistance in decision making as to in what applications the maraging steels produced by the PM technique can be used without lowering the safety factors