

# Structural Analysis of a diesel engine connecting rod using four different materials

**Aisha Muhammad**

Faculty of Manufacturing  
Engineering  
Universiti Malaysia Pahang  
26600 Pekan-Pahang, Malaysia  
Department of Mechatronics,  
Faculty of the Engineering  
Bayero University Kano  
Kano, Nigeria  
[ayshermuhd@gmail.com](mailto:ayshermuhd@gmail.com)

**Mohammed A. H. Ali**

Faculty of Manufacturing  
Engineering  
Universiti Malaysia Pahang  
26600 Pekan-Pahang, Malaysia  
[hashem@ump.edu.my](mailto:hashem@ump.edu.my)

**Ibrahim Haruna Shanono**

Department of Electrical,  
Faculty of Engineering  
Bayero University Kano  
Kano, Nigeria  
[snnibrahim01@gmail.com](mailto:snnibrahim01@gmail.com)

## **Abstract:**

Connecting rods are mechanical components used for generating motion from a crankshaft's piston alternating motion. There have been numerous reported cases of connecting rod failure based on the structural design, loading type and the type of materials used. The main aim of this paper is to explore strength analysis investigation of a connecting rod using different materials (structural steel, aluminum alloy, titanium, and Magnesium alloy). The results obtained were compared and analyzed in terms of strength, deformation, Von-misses stress, strain and the safety factor to identify the best material capable of withstanding the subjected force. The model was first design with SolidWorks software and subsequently imported into the ANSYS workbench. Result from the analysis shows that structural steel has the highest strength compared to the other materials.

**Keywords:** ANSYS, connecting rod, Finite Element Analysis, Deformation, stress analysis