International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 02 | Feb 2019 www.irjet.net p-ISSN: 2395-0072

Design and Analysis of Connecting Rod under Static Loading

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Abstract - In This Study We Are Going To Accomplish Static Analysis Of A Connecting Rod. Different Material Are Used For The Study Like Steel Alloy And Cast Iron Connecting Rod Is One Of The Most Vital Part Of An Engine And Which Is Used To Transfer The Reciprocating Motion Of Piston Into The Rotator Motion Of Crankshaft. It Is Heavily Stressed During The Operation Subjected To Compressive Stress Due To The Gas Pressure And Tensile Stress Due To The Inertia Force. For The Different Materials To Be Used For Static Analysis.

KeyWords: Catia, Ansys, ConnectingRod, Strees analysis, Crank shaft.

1. INTRODUCTION

Connecting rod is an important component in an engine. Connecting rod used to connect between piston and crankshaft. The purpose of the project is to analysis connecting rod fracture using ANSYS software. The stress and thermal for connecting rod can analysed with this software. With this software, can analysis the stress and thermal for connecting rod. Before that, draw the connecting rod using Cre-o software, then exported to the ANSYS software. This project focused on analysis. Overall, this project will acquire the analysis of fracture connecting rod.

1.1 Static loading

- Static loads or forces are loads that do not change in size, position or direction.
- A good example of a static load is the weight of a building acting on the ground. Another example is a car parked at a car park.

1.2 Connecting Rod

IT CONSIST OF,

- A PIN END(SMALL)
- A SHANK SECTION (MIDDLE)
- CRANK END (BIGNEND) be used.

FUNCTIONS

A Rod Connecting Two Moving Parts in a Mechanism, especially that between the Piston and Crankpin. In An Engine. Generally There Are A Few Materials That Are Commonly Used In The Creation Of Connection Roads. Like Steel Alloy, aluminum And Titanium. The Connecting Roads Are Usually Made Of Steel Alloys Like 42crmo4,43crmo4,44csr4,c-70,En-8d,sae1141,etc.

TYPES OF CONNECTING ROD MATERIALS

STEEL ALLOY (The Most Common One)

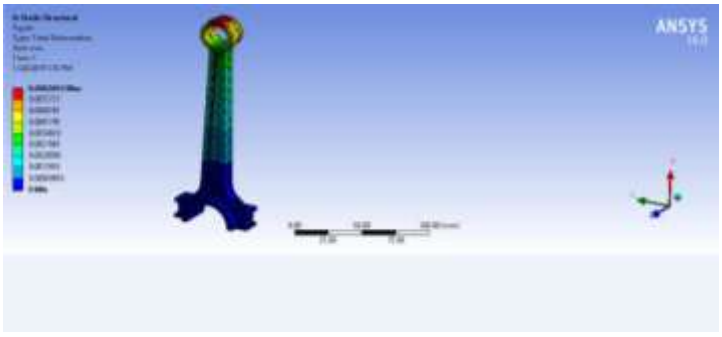
- Nickel
- Chromium
- Aluminum
- Titanium
- Tungsten
- cobalt
- Copper
- Vanadium
- Molybdenum etc…….

CAST IRON

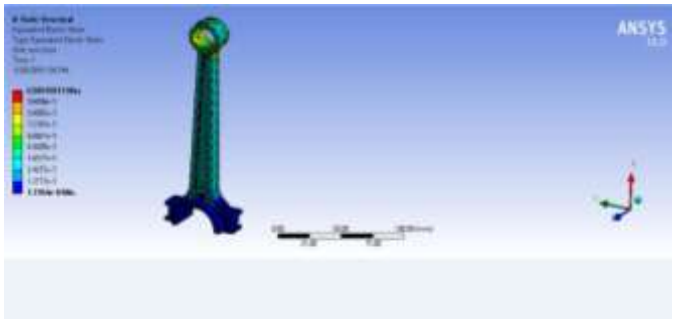
- Grey cast iron
- White cast iron
- Ductile cast iron
- Malleable cast iron

ANSYS MODEL:

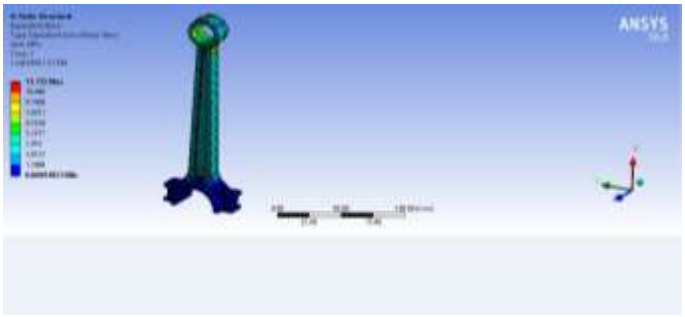
STATIC LOADING:



EQUIVALENT ELASTIC STRAIN



EQUIVALENT STRESS



3. CONCLUSION

Existing design of connecting rod is re-optimized by considering same boundary and loading conditions under static and fatigue loading. In this work, the weight of connecting rod is reduced and four models of connecting rod are modelled in CATIA. The results are compared with existing design for static and fatigue analysis. The stress is found maximum near the end of the shank or piston pin end. The weight of the connecting rod is also reduced by 0.005 kg which might not be significant but reduces the inertia forces and cost of material. Fatigue strength, which is the most important driving factor in the optimization of connecting rod, is improved significantly. Thus, the modified design assures weight reduction and improved life and manufacturability for the U650 connecting rod.

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