

Stress Analysis of Crank Using Pro/E and Ansys

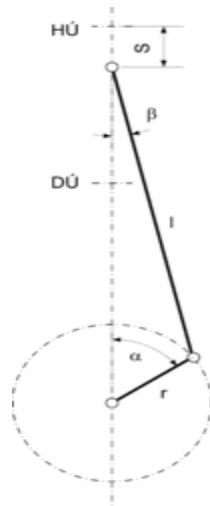
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Rajesh Purkayastha, Ravindra Kumar and Razi Ahmed

Abstract--- The project deals about the analysis of stresses induced in crank using PRO/E and ANSYS software. Initially theoretical analysis have been done to find out the stresses induced in the crank. Then the crank is modeled using PRO/E and is imported to ANSYS software. The model is then analyzed for different stresses and compared with the theoretical value obtained.

Keywords--- Crank, Bending Stress, Shear Stress and Principal Stress.

I. INTRODUCTION

A crank is an arm attached at right angles to a rotating shaft and is available in crankshaft of internal combustion engine. The crank has to be designed in such a way that the induced stresses and displacement produced must be within the permissible limit . The force produced due to combustion of fuel is transmitted to the crank through the connecting rod attached between piston and crank.



A Crank

The objectives of this paper are,

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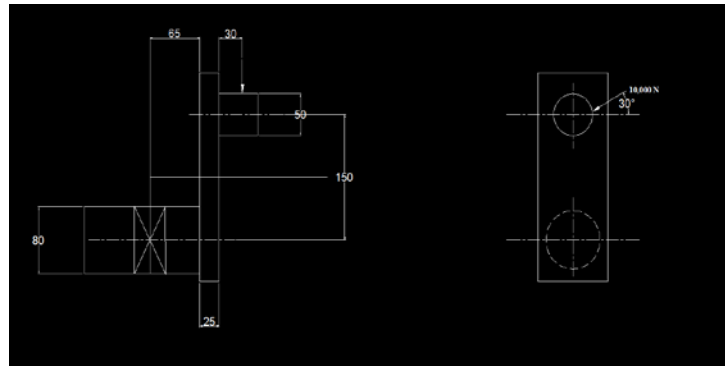
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To design and model the crank using PRO/E.

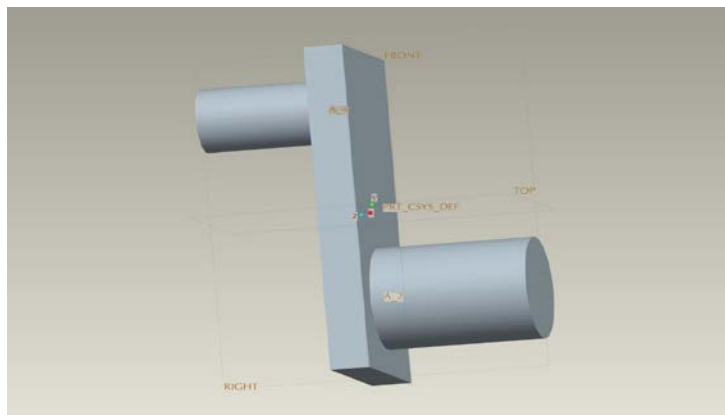
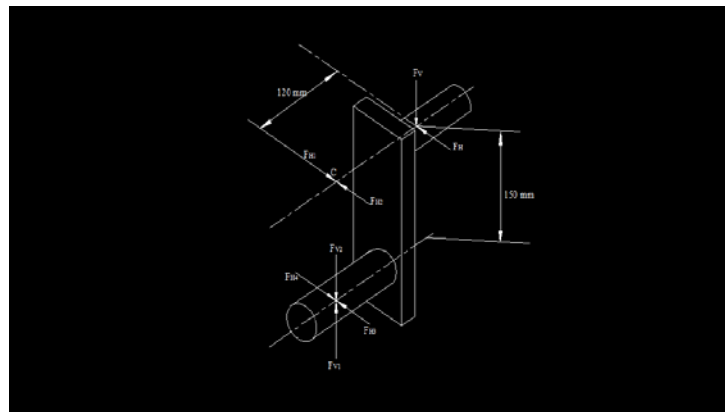
To analyze the modeled crank using ANSYS.

To determine the different stresses on the crank in ANSYS and then compare the values with the theoretical obtained values.

II. MODELING OF THE CRANK USING AUTOCAD



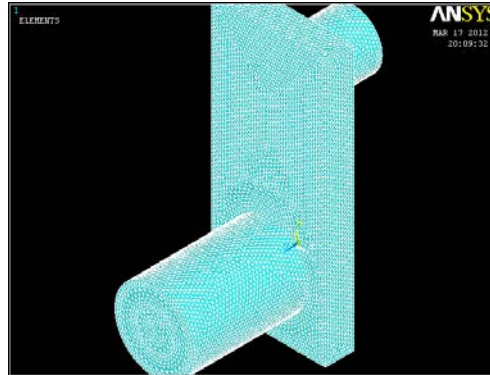
III. MODELING OF CRANK USING PRO-E



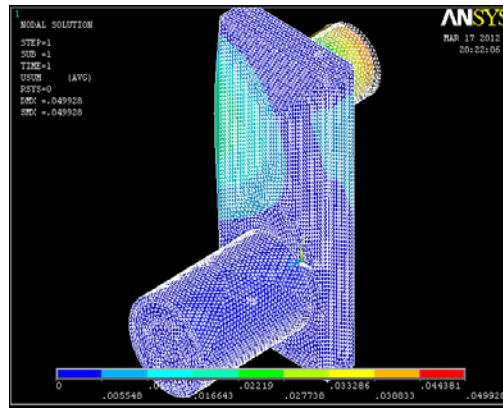
IV. A VIEW SHOWING THE CRANK MODEL

Finite Elements Analysis Of Crank

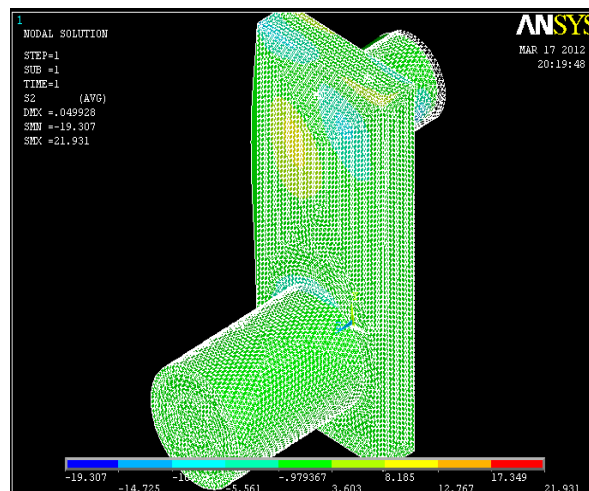
Meshed Model



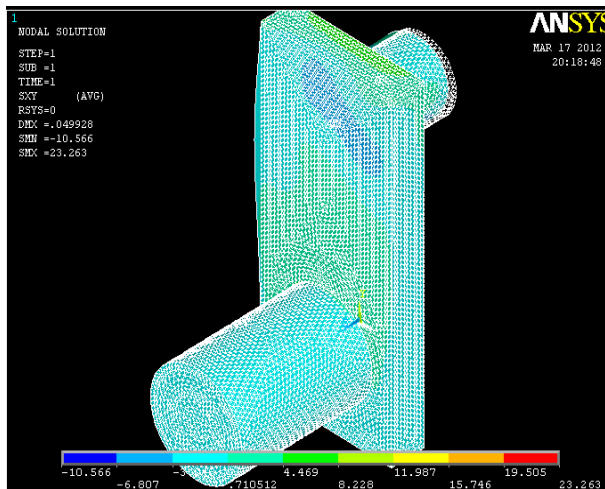
Displacement Produced



Maximum Shear Stress Induced



Maximum Principal (Normal) Stress Induced



Results

General Pre-Processor is used to reveal the results of the solution.

Results of the crank are as follows.

| Sl. No. | Type of Stress | Theoretical Value(N/mm ²) | Analysis Value(N/mm ²) |
|---------|-----------------------------------|---------------------------------------|------------------------------------|
| 1. | Maximum Shear Stress | 17.6 | 22 |
| 2. | Maximum Normal (Principal) Stress | 29.5 | 23 |

V. CONCLUSION

In this project a crank has been designed, modeled and analyzed and the stress distribution pattern and displacement pattern have been found. It has been noticed that the stresses induced and displacement produced are well within the permissible limit and are found to be lower than stresses calculated based on theoretical analysis.

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