FATIGUE ANALYSIS OF CONNECTING ROD FOR TWO WHEELER VEHICLE

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ABSTRACT:
The car engine connecting rod is a high volume production, vital factor. It connects reciprocating piston to rotating crankshaft, transmitting the thrust of the piston to the crankshaft. Each automobile that makes use of an internal combustion engine requires at the least one connecting rod depending upon the quantity of cylinders in the engine. Fatigue happens when the fabric subjected to the repeated load, as fatigue plays important function in the design and analysis of materials. In this paintings fatigue evaluation is finished on connecting rod of wheeler car to test out the conduct of the rod, strain, pressure, we're using the completely reversed loading circumstance (both in superb and negative) and we are taking the cycle of a hundred and five.

Keywords: *fatigue, stress, cycle, connecting rod, reversed cyclic load.*

I.INTRODUCTION

Connecting rods are extensively used in type of automobile engines. The function of connecting rod is to transmit the thrust of the piston to the crankshaft, and because the ends result the reciprocating movement of the piston is translated into rotational motion of the crankshaft. It includes a pin-quit, a shank section, and a crankend. pin-give up and crank-stop pin holes are machined to allow accurate becoming of bearings. One cease of the connecting rod is connected to the piston by way of the piston pin. The alternative give up revolves with the crankshaft and is split to permit it to be clamped around the crankshaft. The two elements are then connected by means of bolts. Connecting rods are subjected to forces generated through mass and gas combustion.

these forces outcomes in axial and bending stresses. Bending stresses seem due to eccentricities, crankshaft, case wall deformation, and rotational mass force. Therefore, a connecting rod must be capable of transmitting axial tension, axial compression, and bending stresses caused by the thrust and pull at the piston and by way of centrifugal pressure (afzal and fatemi, 2003). The connecting rod of the tractors is by and large made of solid iron through the forging or powder metallurgy. The primary cause for applying those strategies is to produce the additives integrally and to reach excessive productivity with the bottom value (whittaker, 2001; repgen, 2005). however, connecting rod design is complex due to the fact the engine is to work in variably complex conditions and the weight on the rod mechanism is produced now not best by means of strain however also inertia (augugliaro and biancolini, 2000). When the repetitive stresses occur in connecting rod it ends in fatigue phenomenon which could cause so risky ruptures and damages. An instance of the fatigue analysis and layout become presented in 2003 by means of a few researchers (biancolini et al., 2003). A rupture because of the fatigue and the technique of correcting the connecting rod layout changed into additionally stated (rabb, 1996). beretta et al. (1997) supplied a strengthening method for the connecting rod layout. Finite element (fem) method is a modern way for fatigue analysis and estimation of the component toughness which has the subsequent benefits in comparison to the other methods. via this approach, we are able to get admission to the strain/pressure distribution all through the complete component which permits us to discover the essential points authentically. This achievement appears so useful especially when the component does not have a geometrical form or the loading situations are sophisticated. The influential aspect elements are capable of exchange which includes fabric, go section conditions and so forth. Thing optimization against the fatigue is achieved easily and speedy.

II. OBJECTIVES

1. To Collect of data regarding the model of connecting rod.
2. To analyze the rod under the fatigue load by using the fully reversed loading condition.
3. To check out the behavior of rod below the fatigue load with goodman's criteria.
4. To check out the as much as what number of cycle it is able to paintings without failure.

III.METHDOLOGY

1. By using taking the 3-d version of connecting rod that's modeled in the catia software program.
2. By by using importing into the ansys software we have to carry out meshing, applying the boundary situations.
3. This paintings we are taken absolutely reversed loading situation at the side of the goodman's criteria.

IV. BOUNDARY CONDITION AND MATERIAL PROPERTY

As we are doing the fatigue analysis we are applying the load at both big end and small end. By automatic at the weaker section constraints are taken by the ANSYS. Here we apply the load of cyclic load of 677N.

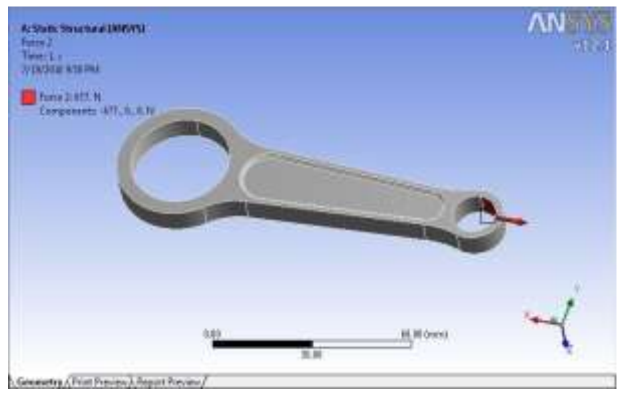

Fig 1: Boundary condition

MATERIAL PROPERTIES:

For the present analysis we are taken the structural steel for connecting rod. The following are the property of materials,

Sl.No	Property	values
1	Density	7850Kg/m^3
2	Young's modulus	2e5
3	Poisson's ratio	0.3
4	Tensile ultimate stress	250MPa

V. Results and Discussions

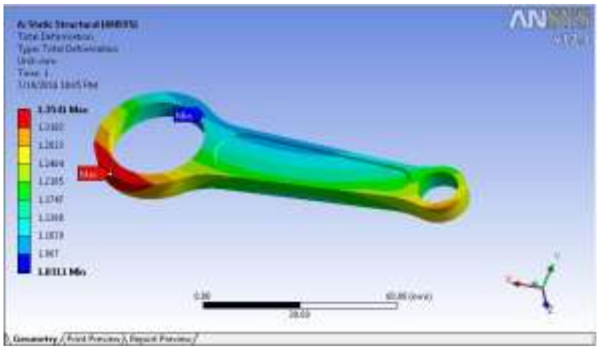

Fig 2: Deformation result

As we are seeing that from above results the maximum deformation taking place at big end of connecting rod i.e. 1.3541mm and minimum deformation is 1.0311mm.

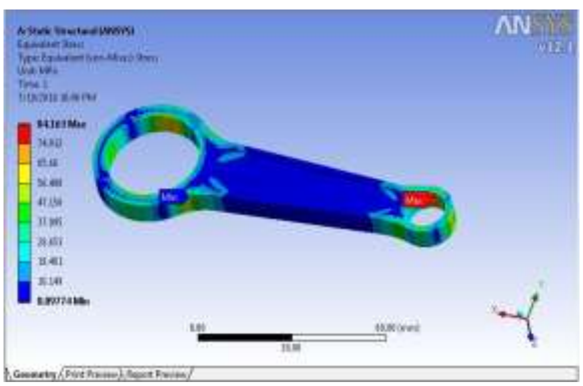

Fig 3: Equivalent stress

The equivalent stress is more at the small end of connecting rod i.e. 84.163MPa and less at the big end of rod i.e. 0.89774MPa.

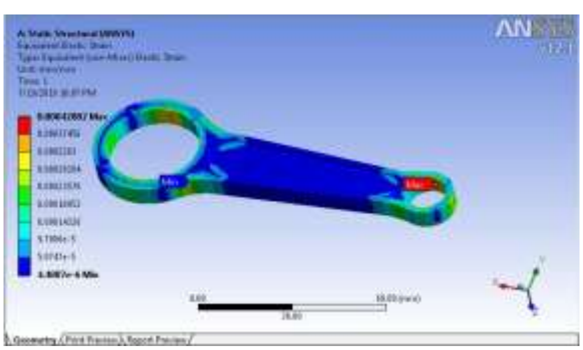

Fig 4: Equivalent strain

Strain is maximum at the small end of rod and minimum at the big end of rod.

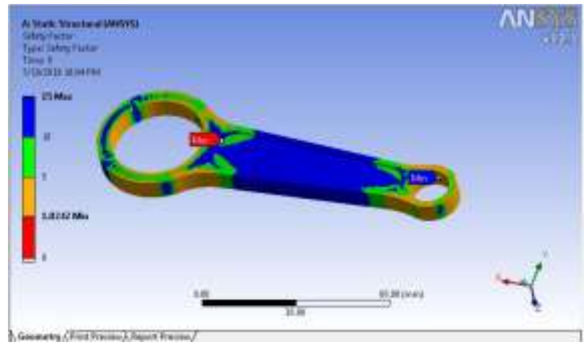

Fig 5: Safety Factor

By the analysis we got the safety factory value that 1.0242 as we consider it that safty value always sholud br greater than the 1.

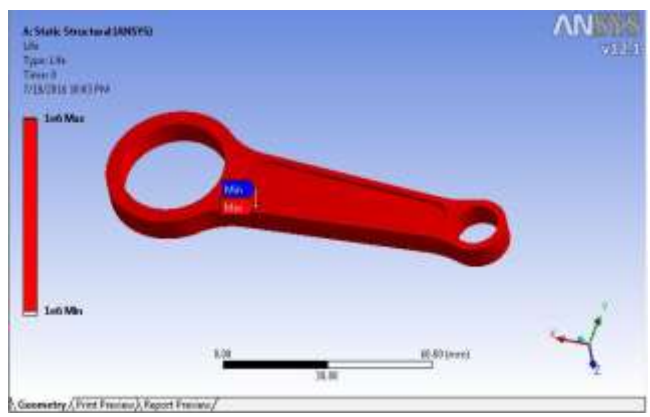

Fig 6: Life of rod

As we are taken cycle of order 10^5 it is working under the maximum cycle.

VI. CONCLUSIONS

Connecting rod is analysed under the fatigue load with fully reversed condtions and conclusions are drawn,

1. By the stress analysis it is clear that, maximum stress is at thesmall region.

2. From the Von misses stress analysis we can say that material is operating within the limiting value of stress so that the design under the stress is safe.

3. From the safty factory side as got the value above the one as it is indicate the design is safe.

4. The connecting rod is operating within the S-N curve of the structural steel so its never fail as it is working under the 10^5 cycles.

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