

# Modelling and Analysis of Chain Drive with Different Materials

B.A.V.L.Sainadh<sup>1</sup> | A.LalithKanth<sup>1</sup> | A.V.K.Sri Harsha<sup>1</sup> | A.Sidhardha<sup>1</sup>

<sup>1</sup>Department of Mechanical Engineering, Godavari Institute of Engineering and Technology (A), Rajahmundry

**Abstract:** Chain drive is a way of transmitting mechanical from one place to another to guarantee effectual power transmission ,chain sprocket ought to be apprapratiely planned and made Number of Teeth,Material,dimensions,varies in each and every sprocket which utilized in automobiles and machining .The project involves the fundamentally of chain drive modelling through reverse engineering .In this journal chain drive is broke down utilizing FINITE ELEMENT ANALYSIS for well being and dependability.The materials used for chain sprocket are AISI 1050 STEEL ,EN8 STEEL,EN 32 STEEL,EN 19 STEEL ,C45 STEEL At different vechile speed [40,60,80,km/hr] Von-missiles ,Total deformation,Equivalent have been compared in results

**KEYWORDS:**Chain drive, chain sprocket,Totaldeformation,equivalentstress,steel alloys.



Check for updates

DOI of the Article: <https://doi.org/10.46501/GIETME01>



Available online at: <http://ijmtst.com/vol7si05.html>



As per **UGC guidelines** an electronic bar code is provided to seure your paper

To Cite this Article:

B.A.V.L.Sainadh; A.LalithKanth; A.V.K.Sri Harsha and A.Sidhardha. Modelling and Analysis of Chain Drive with Different Materials. *International Journal for Modern Trends in Science and Technology* 2021, 7, pp. 1-4. <https://doi.org/10.46501/GIETME01>

Article Info.

Received: 12 June 2021; Accepted: 16 July 2021; Published: 20 July 2021

## INTRODUCTION

Chain drive is a way of transmitting mechanical power from one place to another .it is often used to convey power to the wheels of a vehicle, particularly bicycles, and motor cycles .it is also used in a wide variety of machines besides vehicles most often ,the power is conveyed by a roller chain, known as the drive chain or transmission chain, passing over a sprocket gear ,with the teeth of the gear meshing with the holes in the links of the chain .The gear is turned, and this pulls the chain putting mechanical force into the system .Another type of drive chain is the morse chain invented by the morse chain company of Ithaca ,new York, united states. This has invented teeth.

## STRUCTURE OF PAPER

The paper is organized as follows: In Section 1, the introduction of the paper is provided along with the Chain drive, sprockets structure, important terms, objectives and overall description. In Section 2 Related work on previous research on chain drive are given related work. In Section 3 Methodology have the complete information about Design of analysis and design of catia. Section 4 Result –stress, strain, deformation are discussed. 5 Conclusion –conclusion of project has and references.

## OBJECTIVES

In this paper The Bajaj chain drive dimensions have are used To design a chain drive in catia and different materials are applied to chain drive in ansys .

Von –missiles stress total deformation and strain (or) compared among those material

## RELATED WORK

Tushar D. Bhoite et al [1] Studied into various application aspects to formulate an idea of the system finally finite element analysis has been used to conduct shape optimization. In this work the focus has been narrowed down to specific component of outer link. Shoji NOGUCHI et al [2] suggested some approaches for reducing stresses and weight saving in the line plate of roller chain. Sagar N. Vasoya, P.L. Koradiya and B.J. Patel [3] Developed the

sprocket to improve the torque for off road drive in this paper the process of development in sprocket was studied gear ratio between them was investigated . Pooja R Phule and Shyam P. MOGAL [4] Design and evaluation of chain drive by bicycle using alternate material. XU LIXIN et al [5] Developed a mathematical model to calculate dynamic response of a roller chain drive NIKHILP. Ambale and prof. P.R. Kale, [6] library. “Design and Analysis of carbon fiber sprocket “. In this research carbon fiber was introduced as a replacement for conventional mild steel. M .Koray KESIKCI [7] Widely investigated in literature the theoretical differences and the superiorities of the technique over each other.

## METHODOLOGY

### 3.1.1 DESIGN IN CATIA

CATIA (computer aided three dimensional interactive application) is imposed with computations of sprocket to get 3D model. Hence the conventional sprocket is converted to cad model using catia.

Information –

SPECIFICATIONS -Bajaj pulsar 180 sprocket

Sprocket diameter – 170mm

Number of teeth – 42

Chain pitch – 12.7 mm

Sprocket width – 8.51mm

Roller thickness – 7.22mm

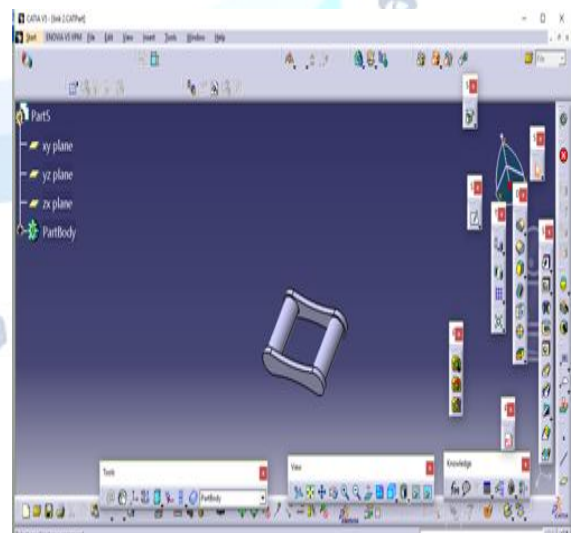


FIG 1 Draw the sketch apply pad then app mirror.

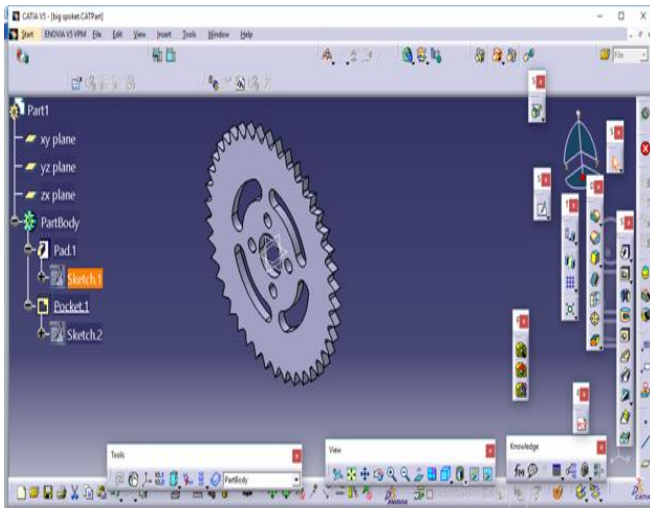


FIG 2 :Apply pad and draw the sketch apply pocket.

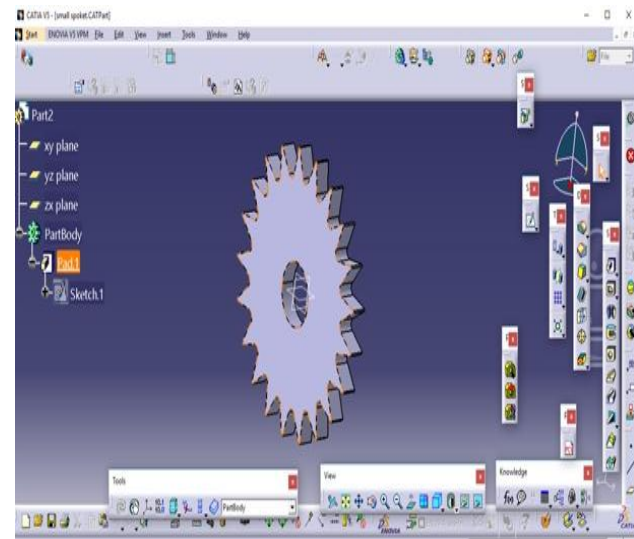


FIG 3: Draw the sketch as shown in the fig by using rotate option

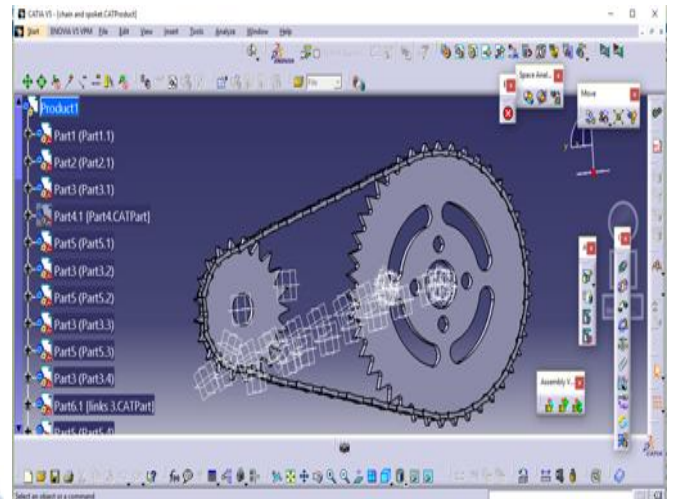
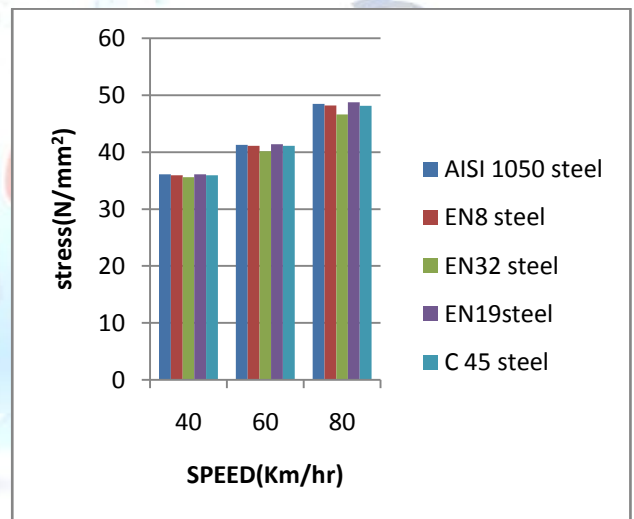
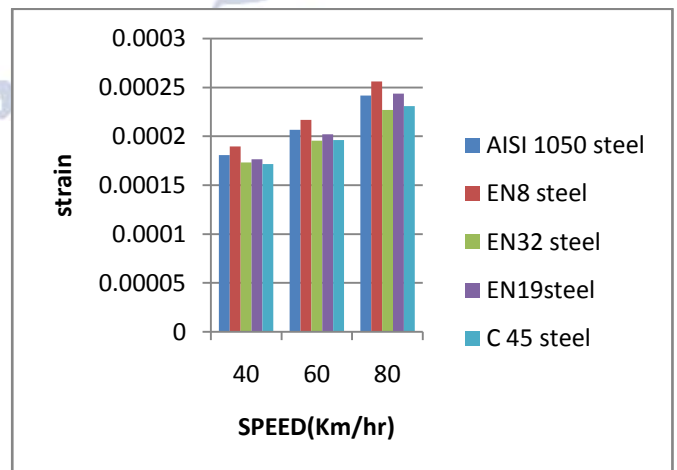


FIG 4: ANSYS workbench for select two different fields

RESULTS:



PLOT 1: shows comparison of materials and speed versus stress .



PLOT 2: shows comparison of materials and speed Versus strain.

3.2 ANALYSIS

In the Analysis process which has been imported from IGES. When the work bench started by step by step procedure 1. Static structural – where the structural designing takes place in ansys .2. Engineering data –material properties of geometry.

3. Geometry –IGES which has been imports from catia to designing objects .4. Model –a.)Material Assingment b.)Meshing c.)Results –the final output of analysis has been done

Meshing: Meshing is an integral part of the computer –aided engineering (CAE) simulation process. The mesh influences the accuracy, convergence and speed of the solution. The types of meshing are a.) Easy meshing b.) Automatic meshing c.) Highly crafted mesh. To divide small elements to design accurately and perfectly with dimensions.

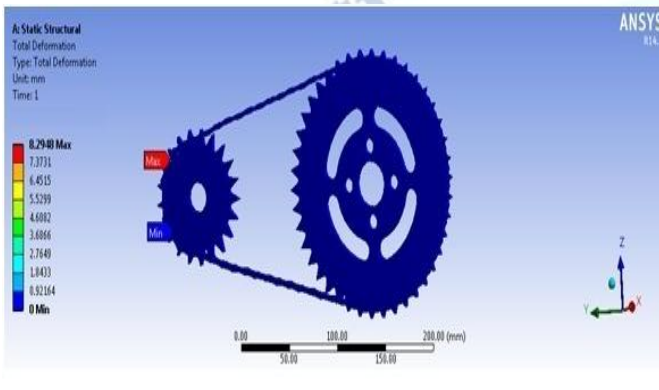
## CONCLUSION

The conclusion of the project work in this project they are five materials are used

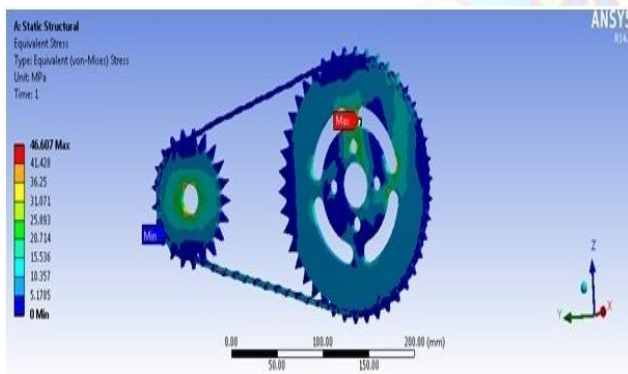
- a.) AISI 1050 STEEL
- b.) EN 8 STEEL
- c.) EN32 STEEL
- d.) EN19 STEEL
- e.) C45 STEEL

at different vehicle speed (40,60,80 km/hr) values for VON-MISSES, total deformation, equivalent strains and stresses has been compared from finite element analysis of above materials stress values of EN32 STEEL, C45 STEEL are permissible limits

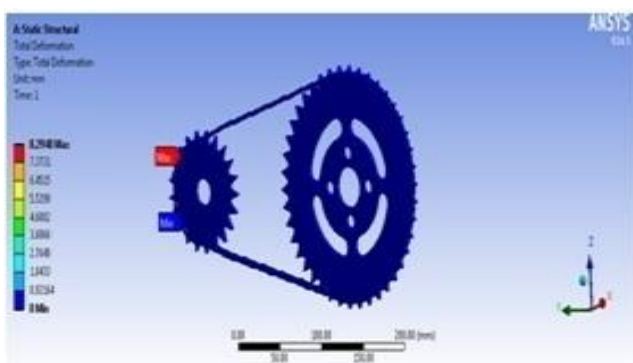
For safer design.



STRESS



STRAIN



DEFORMATION

## REFERENCES

1. "Fea Based Study of Effect of Radial Variation of Outer Link in A Typical Roller Chain Link Assembly" by Tushar D. Bhoite, Prashant M. Pawar & Bhaskar D. Gaikwad at International Journal of Mechanical and Industrial Engineering (IJMIE), ISSN No. 2231-6477, Vol-1, Issue -4, 2012.
2. "Stress Distribution of The Chain Link By Means Of Boundary Element and Finite Element Methods " by M. Koray KESIKCI, M. Cuneyt FETVACI, C. Erdem IMRAK at Journal of Engineering and Natural Sciences, Received : 30.06.2004 Accepted : 04.11.2004.
3. "Static Stress analysis of link plate of roller chain using Finite element method and some design proposals for weight saving " by Shoji NOGUCHI, Kohta NAGASAKI, Satoshi NAGAKAYAMA at Journal of Advance Mechanical Design, Systems and Manufacturing, Volume 2, No-22009.
4. Nikhil P. Ambole and Prof. P. R. Kale, "Finite Element Analysis Carbon Fiber Sprocket using ANSYS", International Journal for Scientific Research & Development, Vol. 4, Issue 05, August 2016, ISSN (online) : 2321-0613
5. Tushar S. Hingve, Dr. A. V. Vanalkar, "Faults Detection and Diagnosis of the Sprockets Failure", IJSRD - International Journal for Scientific Research & Development, Vol. 3, Issue 05, 2015, ISSN (online): 2321-0613
6. Pooja R Phule and Shyam P. Mogal, "Design and Performance Evaluation of Chain Wheel Drive of Bicycle by Using Alternate Material", International Engineering Research Journal, Page No 105-110