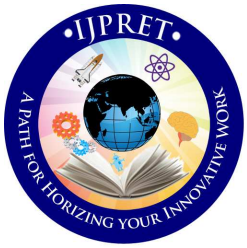
Research Article *ISSN: 2319-507X*
Akshay Punde, IJPRET, 2013; Volume 1(8): 245-249 *IJPRET*



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

ANALYSIS OF FLYWHEEL

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Accepted Date:

27/02/2013

Publish Date:

01/04/2013

Keywords

Flywheel,
Stress analysis,
FE analysis

Abstract

In present investigation, to counter the requirement of smoothing out the large oscillations in velocity during a cycle of a I.C. Engine, a flywheel is designed, and analyzed. By using analysis both analytical and Finite Element Analysis are used to calculate the stresses inside the flywheel, we can compare the Design and analysis result with existing flywheel

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INTRODUCTION

A flywheel is an inertial energy-storage device. It absorbs mechanical energy and serves as a reservoir, storing energy during the period when the supply of energy is more than the requirement and releases it during the period when the requirement of energy is more than the supply

A flywheel used in machines serves as a reservoir which stores energy during the period when the supply of energy is more than the requirement and releases it during the period when the requirement of energy is more than supply.

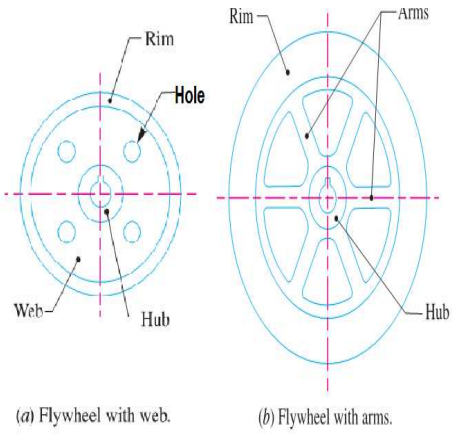

Fig-1 Types of flywheel

LITERATURE REVIEW

Literature review is an assignment of previous task done by some authors and collection of information or data from research papers published in journals to progress our task. It is a way through which we can find new ideas, concept. There are lots of literatures published before on the same task; some papers are taken into consideration from which idea of the project is taken.

In 2005 JohnA.Akpobi & ImafidonA.Lawani [1] have proposed, a computer-aided-designs of software for flywheels using object-oriented programming approach of Visual Basic. The various configurations of flywheels (rimmed or solid) formed the basis for the development of the software.The software's graphical features were used to give avisual interpretation of the solutions. The software's effectiveness was tested on a number of numerical examples,some of which are outlined in this work.

In 2012 Sushama G Bawane, A P Ninawe and S K Choudhary had proposed [2] flywheel design, and analysis the material selection process. The FEA model is described to achieve a better understanding of the mesh type, mesh size and boundary conditions applied to complete an effective FEA model.

Saeed Shojaei , Seyyed Mostafa Hossein Ali Pour Mehdi Tajdari Hamid Reza Chamani [3] have proposed algorithms based on dynamic analysis of crank shaft for designing flywheel for I.C.engine , torsional vibrasion analysis result by AVL\EXCITE is compared with the angular displacement of a desire free haed of crank shaft ,also consideration of fatigue for fatigue analysis of flywheel are given.

Sudipta Saha, Abhik Bose, G. SaiTejesh, S.P. Srikanth have propose [4] the importance of the flywheel geometry design selection and its contribution in the energy storage performance. This contribution is demonstrated on example cross-sections using computer aided analysis and optimization procedure. Proposed Computer aided analysis and optimization procedure results show that smart design of flywheel geometry could both have a significant effect on the Specific Energy performance and reduce the operational loads exerted on the shaft/bearings due to reduced mass at high rotational speeds.

Bedier B. EL-Naggar and Ismail A. Kholeif [5] had is suggested the disk-rim flywheel for light weight. The mass of the flywheel is minimized subject to constraints of required moment of inertia and admissible stresses. The theory of the rotating disks of uniform thickness and density is applied to each the disk and the rim independently with suitable matching condition at the junction. Suitable boundary conditions on the centrifugal stresses are applied and the dimensional ratios are obtained for minimum weight. It is proved that the required design is very close to the disk with uniform thickness.

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PROPOSED MODEL

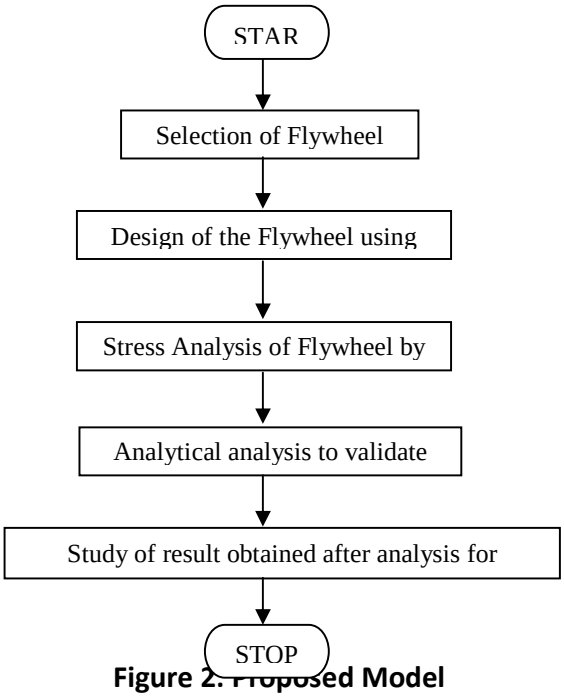

Figure 2. Proposed Model

DEVELOPMENT TOOLS

4.1 CATIA (Computer Aided Three-dimensional Interactive Application):

It is a multi-platform CAD/CAM/CAE commercial software suite developed by the French company Dassault Systemes. Written in the C++programming language, CATIA is the cornerstone of the Dassault Systemes Commonly referred to as a 3DProduct Lifecycle Management software suite, CATIA supports multiple stages of product development from conceptualization, design (CAD), manufacturing (CAM), and engineering (CAE). CATIA facilitates collaborative engineering across disciplines, including surfacing & shape design, mechanical engineering, equipment and systems engineering.

CATIA started as an in-house development in 1977 by French aircraft manufacturer Avions Marcel Dassault, at that time customer of the CAD/CAMCAD software CATIA offers a solution to model complex and intelligent products through the systems engineering approach. It covers the requirements definition, the systems architecture, the behavior modeling.

CATIA can be applied to a wide variety of industries, from aerospace and defense, automotive, and industrial equipment, to high tech, shipbuilding, consumer goods, plant design, consumer packaged goods, life sciences, architecture and construction, process power and petroleum, and services.

4.2ANSYS

The ANSYS Workbench environment is an intuitive up-front finite element analysis tool that is used in conjunction with CAD systems and/or Design Modeler. ANSYS Workbench is a software environment for performing structural, thermal, and electromagnetic analyses. The class focuses on attaching existing geometry, setting up the finite element model, solving, and reviewing results. The class will describe how to use the code as well as basic finite element simulation concepts and results interpretation. The finite element method (FEM) is a method for dividing up a very complicated problem into small elements that can be solved in relation to each other. Its practical application is often known as finite element analysis (FEA)

CONCLUSION

Based on the above study of flywheel and its optimization methods the following conclusion can be drawnThere are many causes of flywheel failure. Among them, maximum tensile and bending stresses induced in the rim and tensile stresses induced in the arm under the action of centrifugal forces are the main causes of flywheel failure. Hence evaluation of stresses in the rim and arm (web) should be studied using finite element method and results should be validated by analytical calculations.

Different material will be tested by above proposed model for minimum stress inside the flywheel by using FEA.

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