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DESIGN AND ANALYSIS OF HOLLOW AND SOLID SHAFT

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Abstract - *The Roadway vehicles like vehicle, buses, trucks and land movers goods many mechanic ability in common like Engine parts, Propeller shafts, Gearbox, Brakes, Clutches, Wheels, etc., To make the vehicle kindling capable which in result mate the transportation economical, the weight of that vehicle should be reduced. Since the composite materials are publicity weight with more puissance & hardness, inclusion of composite materials to conventional steel materials custom in auto parts will lessen the weight and better the machinelike properties of those components. In this thesis, deals with shaft of MARUTHI OMNI to design the shaft for its minimum dimensions to suffice authentic question specification and then replace accepted steel material with composite material. The design of the propeller shaft is first* theoretically designed for steel, aluminum allay, lose iron and kelvar composite essential for its safe dimensions. Then they can be created as a part shape for respective dimensions in CATIA software. After modeling, static analysis and Modal analysis can be carried out in the propeller shafts worn

Key Words: *Hallow Shaft, Solid Shaft, Propeller Shaft, Cad Software, Ansys.*

1. INTRODUCTION

SHAFT: Propeller shaft, now and then called a card a shaft, grants power from the gearbox to the back focus point. Dependably the shaft has a cylinder molded domain and is made in possibly a couple of piece improvement.

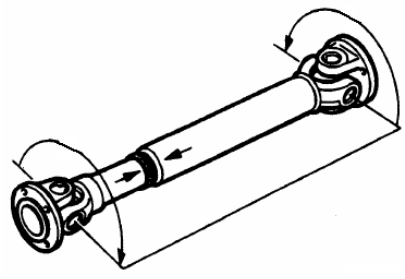

Fig-1.1: Propeller shaft

Requirements of Propeller Shaft: The propeller shaft moves motor capacity to the back turn through in any occasion one thorough joints.

- The splines on the terminations at the propeller shaft fit impeccably into the splines in the sleeve. This allows a length combination between the driving and the concluded unit to fluctuate intangibly without harming the yield and information course.
- The significant bearing helps and guides the propeller shaft.
- The spines associate the propeller shaft to the gearbox.

2. LITERATURE REVIEW

Plan and Analysis of Propeller Shaft[1] Acanth Vino, Dr. J. Hammed Hussain "Design and Analysis of Propeller Shaft" International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 4, Issue 8, August 2015.

Plan and Analysis of Composite Propeller Shaft [2] Rohan D. "Design and Analysis of Composite Propeller Shaft" Special Issue on International Journal on Theoretical and Applied Research in Mechanical Engineering V-1 No. 2 ISSN (Print): 2319-3182, For National Conference on Advances in Design and Thermal Engineering College of Engineering and Management, Chass, Ahmedanagar, Maharashtra seventeenth to eighteenth February 2016 Plan and upgrade

Of vehicle propeller shaft with composite materials using FEM Analysis [3] Atul Kumar, Prof. Jain and Rajkumari "Design and smoothing out

3. METHODOLOGY

Material modeling for the properties of nano composite, this has been Modeled using CATIA parametric software Modeling of propeller Shaft Model by using CATIA parametric software. Determination of stress, strain, deformation and frequencies. Modal analysis of the propeller shaft model.

4. INTRODUCTION TO CAD

PC helped design (CAD) is using PC developments (or workstations) to important resource inside the creation, change, appraisal or improvement of a plan. PC helped configuration writing computer programs is used to construct the productivity of the style draftsman, update the most stunning viewpoint setup, improve correspondences through documentation, and to make an informational index for gathering. PC supported plan yield is oftentimes inside the kind of mechanized reports for print, machining, or other creation undertakings. The time span CDAD (for Computer Aided Design and Drafting) is moreover used. Its usage in arranging progressed systems is suggested as electronic strategy robotization, or ERA.

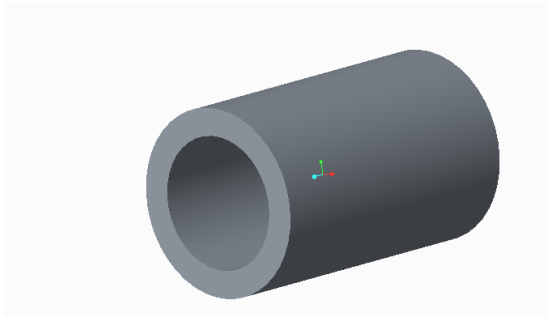

Fig-4.1: Hallow shaft

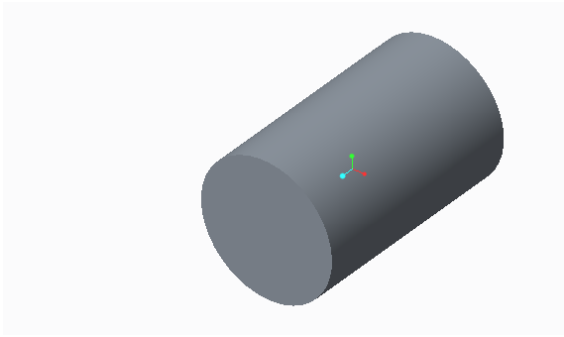

Fig-4.2: Solid shaft

5. ANSYS Software

ANSYS is an Engineering Simulation Software (computer relieve Engineering). Its bowl shelter Thermal, Static, Dynamic, and Fatigue finite element analysis along with other use all designed to help with the development of the fruit. The party was founded in 1970 by Dr. John A. Swanson as Swanson Analysis Systems, Inc. SASI. Its primary view was to develop and nundinal finite element analysis software for stextural physics that could simulate static (motionless), functioning (drifting) and ardor transfer (thermal column) problems. SASI developed its business in analogue with the growth in computer technology and engineering needs.

CASE 1 -SOLID SHAFT

Static Analysis

Material-aluminum alloy

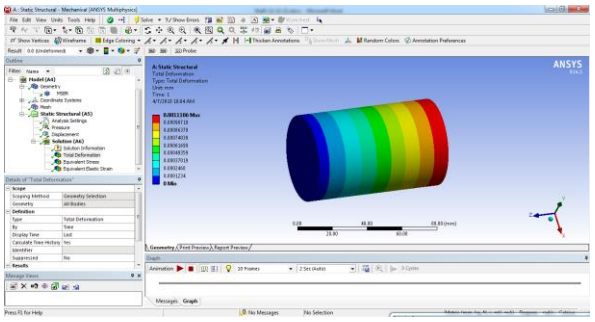

Fig-5.1: Deformation

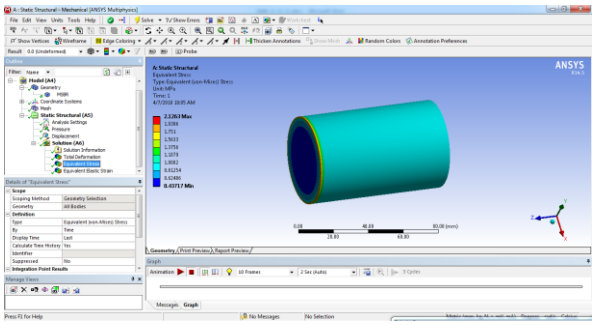

Fig-5.2: Stress

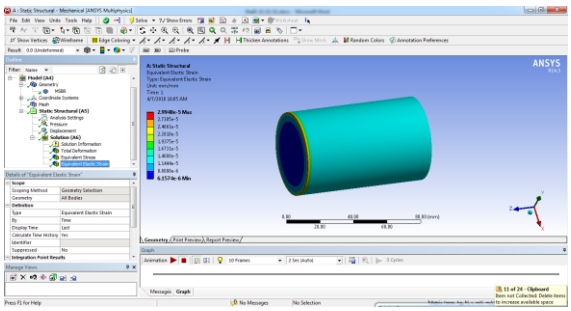

Fig-5.3: Strain

CASE-2 HOLLOW SHAFT

Material-aluminum alloy

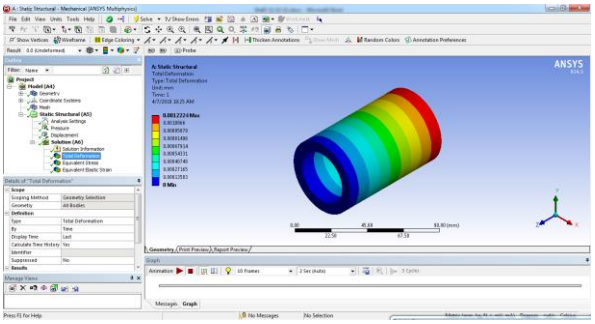

Fig-5.4: Deformation

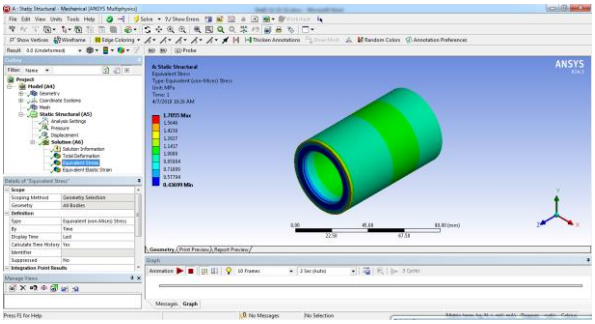

Fig-5.5: Stress

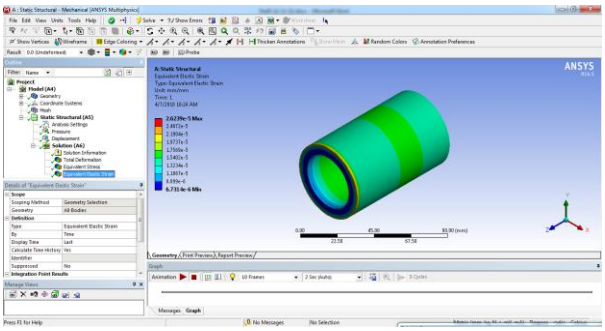

Fig-5.6: Strain

RESULT TABLES STATIC ANALYSIS RESULTS

Mode ls	Material	Deformation (mm)	Stress (N/mm²)	Strain
Solid	Aluminum	0.0011106	2.1263	2.9948e-5
	Aluminum with BLF	0.00011475	2.0117	2.9193e-5
Hollow	Aluminum	0.0012224	1.7055	2.639e-5
	Aluminum with BLF	0.0013249	1.6791	2.7984e-5

6. CONCLUSION

The aluminum with BLF composite solid and hollw shafts are intend to meet safe design requirements as the stipulated steel shaft. From the static analysis the deformation, ,VonMises distress and weight are determined. In overall similitude aluminum with BLF composite hollw pit is correct only in weight curtailment and that too only 1.16% lesser weight than aluminum fineness with BLF compounded shaft

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