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A COMPREHENSIVE STUDY AND ENHANCEMENT IN DESIGN OF DRIVE SHAFT USING DIFFERENT MATERIALS


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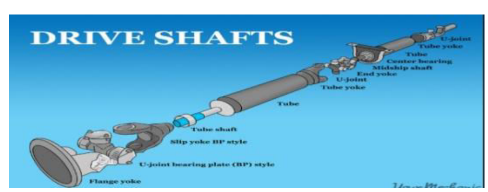
ABSTRACT:
Drive shaft is a mechanical component which is used in transmitting the torque and the rotation and can be used in for connecting the components of drive train which can be directly connected to allow a relative movement. The process done here is a drive shaft is designed by using CATIA and it is analyzed a in "Ansys", which is software that works on the basis of finite element method. For this process a design is created with some respected dimensions in CATIA software. After the completion of the design model the model is imported into Ansys and analyzed under some static load conditions, which were considered in designing it and then checked for the hardness and life time. The specifications required for the design are taken for the drafted design. The results obtained in the analysis of a driveshaft, the design is find out to produce more stresses and some modifications were done to the design and again it is analyzed and the stresses developed were lesser when compared to the previous design.
Key words: Drive shaft, CATIA, ANSYS.

1. INTRODUCTION

Drive shaft is a mechanical instrument which is utilized material that has better properties than those of its in vehicles. Most famously this drive shaft is known individual constituents. The constituent's territories the propeller shaft, while going to the development it consolidated at a naturally visible level as well as not solvent was long barrel shaped structure comprises of thee all inclusive in one another. The primary contrast between joints. Drive shaft is utilized to exchange the rotating movement to composite and an amalgam are constituent materials the differential by utilizing the helical rigging box. This revolving which are insoluble in one another and the individual movement is utilized to run the back wheels. Much of the time we constituents hold those properties on account of utilization tempered steel shaft for the manufacture of drive shaft. composites, while in combinations, constituent materials This drive shaft has wide applications in car are dissolvable in one another and shapes another material world, utilized in the vehicles like trucks, transports, aero planes.



A driveshaft is a pivoting shaft that transmits drive to wheels. Driveshaft must work through continually changing points between the

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transmission and pivot. Fantastic steel (SteelSM45) is a typical material for development. Power transmission can be enhanced through the decrease of inertial mass and light Hook's weight. In the outline of metallic shaft, knowing the torque and the passable shear worry for the material, the measure of the pole's cross segment can be resolved. These days there is a substantial necessity for lightweight materials in automotives. The traditional steel material is replaceable by cutting edge composite materials. Composite materials are supported by a large portion of the researcher in the plan of autos because of its higher particular quality and solidness. Composite materials can be custom-made to effectively meet the plan necessities of quality, solidness and composite drive shafts weightless than steel or aluminum of comparable quality. Likewise, composite materials normally have bring down modulus of flexibility. Subsequently, when torque tops happen in the driveline, the driveshaft can go about as a safeguard and decline weight on part of the drive prepare expanding life. Numerous analysts have been explored about mixture drive shafts and joining strategies for the half and half shafts to the burdens of all inclusive Joints.

1.1 History of drive shaft

The term drive shaft previously showed up amid the mid nineteenth century. In Stover's 1861 patent reissue for an arranging and coordinating machine, the term is utilized to allude to the belt-driven shaft by which the machine is driven. The term isn't utilized in his unique patent. Another early utilization of the term happens in the 1861 patent reissue for the Watkins and Bryson horse-drawn cutting machine. Here, the term alludes to the pole transmitting power from the machine's wheels to the apparatus prepare that works the cutting component.

In the 1890s, the term started to be utilized in a way nearer to the cutting edge sense. In 1891, for instance, Battles alluded to the pole between the transmission and driving trucks of his Climax train as the drive shaft, and Stillman alluded to the pole connecting the crankshaft to the back hub of his pole driven bike as a drive shaft.In 1899, Bukey utilized the term to depict the pole transmitting power from the wheel to the determined hardware by a widespread joint in his Horse-Power. Around the same time, Clark depicted his Marine Velocipede utilizing the term to allude to the apparatus driven shaft transmitting power through an all inclusive joint to the propeller shaft. Crompton utilized the term to allude to the pole between the transmission of his steam-controlled Motor Vehicle of 1903 and the determined pivot.

The spearheading car industry organization, Autocar, was the first to utilize a drive shaft in a gas fueled auto. Worked in 1901, today this vehicle is in the gathering of the Smithsonian Institution.

1.2 Types of Drive Shaft:

There are different sort of Transmission shaft among them following are imperative

1. Transmission shaft.
2. Machine shaft.
3. Shaft.
4. Car drive shaft.
5. Ship propeller shaft.
6. Helicopter tail rotor shaft.

1.3 Functions of the Drive Shaft:

- First, it must transmit torque from the transmission to the differential apparatus box.
- During the task, it is important to transmit greatest low-adapt torque created by the motor.
- The drive shaft should likewise work through always showing signs of change edges between the transmission, the differential and the axles. As the back wheels move over obstructions, the differential and the pivot climb and down. This development changes the edge between the transmission and the differential.
- The length of the drive shaft should likewise be fit for changing while at the same time transmitting torque. Length changes are caused by pivot development because of torque

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response, street redirections, braking load et cetera. A slip joint is utilized to composite for this movement. The slip joint is typically made of an inside and outer spline. It islocated on front end of the drive shaft and is 3 Shear quality Ss Mpa 420 associated with the transmission.

STANDARD SIZES OF TRANSMISSION SHAFTS

The standard sizes of transmission shafts are :
25 mm to 60 mm with 5 mm steps; 60 mm to 110 mm with 10 mm steps ; 110 mm to 140 mm with 15 mm steps ; and 140 mm to 500 mm with 20 mm steps.
The standard length of the poles are 5 m, 6 m and 7 m.

1.4 Advantages

•Drive framework is less inclined to wind up stuck, a typical issue with chain-driven bikes
• The rider can't progress toward becoming dirtied from chain oil or harmed by "Chain nibble" when apparel or a body part gets between an unguarded chain and a sprocket

• Lower upkeep than a chain framework when the drive shaft is encased in a tube
• More predictable execution. Dynamic Bicycles asserts that a drive shaft bike can convey 94% effectiveness, while a chain-driven bicycle can convey somewhere in the range of 75-97% proficiency in view of condition
• Greater ground freedom: without a derailleur or other low-hanging hardware, the bike has almost double the ground leeway

1.5 Disadvantages:

• They have less particular modulus and quality.
• Increased weight.
• Conventional steel drive shafts are normally Manufactured in two pieces to build the crucial bowing regular recurrence on the grounds that the twisting common recurrence of a pole is conversely relative to the square of pillar length and corresponding to the square foundation of particular modulus.
• Therefore the steel drive shaft is made in two areas associated by a help structure, bearing sand U-joints and consequently generally speaking weight of gathering will be more.
• Its erosion obstruction is less as contrasted and composite materials.
• Steel drive shafts have less damping limit.

2. LITERATURE REVIEW

A.R. Abu Talib, Aidy Ali, Mohamed A. Badie , NurAzidaCheLah, A.F. Golestaneh explored about crossover, carbon/glass fiber-strengthened, epoxy composite car drive shaft. They found that changing carbon filaments twisting point from 0^0 to 90^0, the misfortune in the regular recurrence of the pole is 44.5%, while, moving from the best to the most exceedingly terrible stacking succession, the drive shaft causes lost 46.07% in its clasping quality. The best fiber introduction plot for greatest clasping quality is 90^0. Normal recurrence is most extreme at 0^0 and diminishes as the fiber edge shifts towards 90^0 [1].
Shaw D, Simitses DJ, Sheinman I researched about Imperfection affectability of covered tube shaped shells in torsion and hub pressure. They found that the straight examination is viewed as agreeable in correlation with nonlinear investigation because of the way that barrel shaped shells under torsion are less delicate to blemishes [2].
H.B.H. Gubran explored about Dynamics of half breed shafts and he found that Depending on E1/q proportion for metals and fiber plot for composites, the normal frequencies of crossover shafts can be ideally put [3].
ErcanSevkat, HikmetTumer, explored about Residual torsional properties of composite shafts subjected to affect Loadings. They found that the Carbon fortified composite shaft had the most noteworthy; glass strengthened composite had the least protection from affect. Opposition

of mixture composite shafts was between that of glass and carbon [4].

H. Bayrakceken, S. Tasgetiren, I. Yavuz, examined around two instances of disappointment in the power transmission framework on vehicles: An all inclusive joint burden and a drive shaft, they reasoned that disappointments are happened because of weakness process [5].

R. SrinivasaMoorthy, YonasMitiku and K. Sridhar examined about Design of Automobile Driveshaft utilizing Carbon/Epoxy and Kevlar/Epoxy Composites. They found that utilization of Carbon/Epoxy results in a mass sparing of 89.756% when contrasted with the customary SM45C steel driveshaft, though Kevlar/Epoxy results in 72.53%. Clearly, the quantity of handles required for Carbon/Epoxy is 14 with 1.82 mm divider thickness when contrasted with 44 utilizes with 5.72 mm divider thickness on account of Kevlar/Epoxy. Additionally, the torsional clasping limit and bowing characteristic recurrence are sufficiently satisfactory to meet the outline prerequisites on account of Carbon/Epoxy driveshaft [6].

AmitAherwar, (2012) The composite material is for the most part used to lessen the weight and increment the quality, solidness and so on… Stir throwing process is for the most part used to assembling of fortified with metal grid composite. The assembling of aluminum combination in view of mix throwing strategy its used to a standout amongst the most efficient technique for preparing MMC. The principle venture the working parameter of the composite as its control the properties of the composite material. The drive shaft is builds the length of the pole in light of the fact that to decrease the spinning vibration. This paper present diagram of mix throwing process, parameter and planning of MMC ponder on mechanical conduct of metal framework composite with shifts structure of fortification particles of graphite or Nano molecule Sic and Al2O3 composite created by the mix throwing system. Diverse level of support is utilized. Ductile, Hardness properties and torsion investigation. The pole is displayed utilizing CERIO demonstrating and limited component examination is improved the situation same model using ANSYS 15.0 programming for Aluminum (Al-SiC) and the outcomes were talked about.

3. METHODOLOGY

- Modeling and investigation of 3-Dimensional models of the drive shaft were done utilizing CREO and examination is done utilizing Ansys programming basic investigation of composite drive shaft and steel drive shaft are done. The outcomes are contrasted with steel shaft with approve our undertaking.
- Study of reason for disappointments in drive shaft
- Selection of composite materials
- Preparation of CAD show
- Analysis the CAD show with existing material with Ansys
- Analysis of drive shaft by utilizing distinctive composite materials
- The results are contrasted and approve our venture

Dimensions of Drive Shaft:

S. No	Description	Notations	Value
1	Outer diameter	D	70mm
2	Inner diameter	D	56mm
3	Thickness of the shaft	T	7mm
4	Length of the shaft	L	1800 mm
5	Radius of the shaft	R	31.5 mm

Design Calculation of Drive Shaft

Engine Specification

H-Series Ashokleyland Engine, Truck model - 6DT120:

Max. power (P) =132kW

Max.Torque (T) = 660N-mm

Speed (N) =1200-1600rpm

Length (L) =1800mm
Steel Drive Shaft [10]:
Power P=2 π NT/60
T=p×60/2 π N
$T=132\times10^3\times60/2\pi\times1200=1050.42$N-m
$T=1050.42\times10^3$ N-mm
Assume that, Using PSG Design data book
D/d=1.25
D=1.25d
$T=\pi/16\times\tau\times(D^4-d^4/D)$
Taking,
Hear τ =50N/mm2 for steel
$1050.42\times10^3=\pi/16\times50\times((1.25d)^4-d^4)/(1.25d)$
$1050.42\times10^3=\pi/16\times50\times1.153d^3$
=45.26mm
d=46mm
D=1.25d=1.25×46=58
D=58mm
Stiffness of shaft
L=length of the shaft
L=1800mm
=Angle of twist 1°to1.5°
ϴ=1°× π /180
ϴ =0.01745rad
T/J=G ϴ /L
Where,
T= maximum torque applied in drive shaft(N-mm)
J = polar moment of inertia (mm4)
$J=\pi/32(D^4-d^4)$
$J=\pi/32((1.25d^4)-d^4)$
$J=0.141d^4mm^4$
$1050.42\times10^3/0.141d^4=80\times10^3\times0.0174/1800$
d=56mm
D=1.25×56=70mm
D=70mm
Larger diameter satisfies both strength and stiffness
Torsional buckling:
Where,
t= thickness of the hollow steel shaft
$t=r_o-r_i=35-28$
t=7mm
Radius of the shaft
$r=r_o+r_i/2=35+28/2=r=31.5$mm
For long shaft the torsional buckling capacity
$T_b=\tau cr\ (2\pi r^2 t)$

Where critical stress is given by,
$\tau cr=[E/3\sqrt{2}(1-\upsilon^2)^{3/4}]\ (t/r)^{3/2}$
$[207\times10^3/3v2\ (1-0.3^2)^{3/4}]\ (7/31.5)^{3/2}$
$\tau cr=5482.76N/mm^2$
$T_b=5482.76(2\pi\times31.5.5^2\times7)$
$T_b=239.27$KN-m
Natural Frequency:
$fnb=\pi/2\ \sqrt{EI/mL^4}$
where,
E = Young's modulus of elasticity (Pa)
m = mass per unit length (kg/m)
L = length of drive shaft (mm)
I = moment of inertia (m^4)
$I=\pi/64\ (D^4-d^4)$
$=\pi/64\ (0.074-0.0564)$
$I=6.958\times10^{-7}m^4$
m=mass per unit length of shaft is given by
$m=\rho\ (\pi/4)\ [D^2-d^2]$
$=7850\times(\pi/4)\ [0.072^2-0.0562^2]$
m=12.48kg/m
$fnb=\pi/2\ \sqrt{207\times10^9\times6.958\times10^{-7}/10.529\times1.8^4}$
fnb=52.08Hz

DESIGN REQUIREMENTS FOR DRIVE SHAFT:

Parameter of Shaft	Symbol	Value	Unit
Outer Diameter	do	90	mm
Inner Diameter	di	83.36	mm
Length of the Shaft	L	1250	mm
Thickness of shaft	T	3.32	mm

Assumptions:

- The shaft pivots at a steady speed about its longitudinal hub.
- The shaft has a uniform, round cross area.
- The shaft is impeccably adjusted, i.e., at each cross area, the mass focus concurs with the geometric focus.

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- All damping and nonlinear impacts are avoided.
- The stretch strain relationship for composite material is direct and flexible; consequently, Hooke's law is appropriate for composite materials.
- Acoustical liquid cooperations are dismissed, i.e., the pole is thought to act in a vacuum.

Determination OF CROSS-SECTION:

The drive shaft can be strong round or empty roundabout. Here empty round cross-area was picked on the grounds that:

- The empty roundabout shafts are more grounded in per kg weight than strong round.
- The push dispersion in the event of strong shaft is zero at the inside and most extreme at the external surface while in empty shaft pressure variety is littler. In strong shafts the material near the inside are not completely used.

4. RESULTS

Limited ELEMENT ANALYSIS OF DRIVE SHAFT ANSYS WORKBENCH

The model of suspension is spared in IGES organize which can be specifically foreign made into ANSYS workbench. The model imported to ANSYS workbench Imported model.

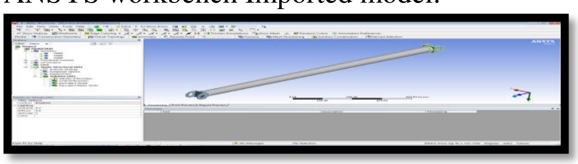


Fig: Imported model

Meshing and Boundary Conditions

The meshing is done on the model with 10075 number of nodes and 2393 numbers of tetrahedral elements.

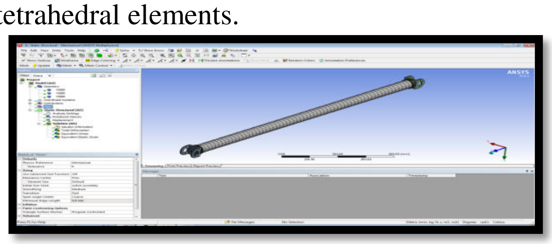


Fig: meshed model

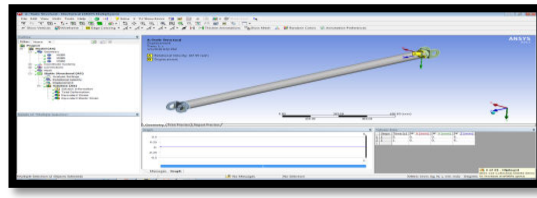
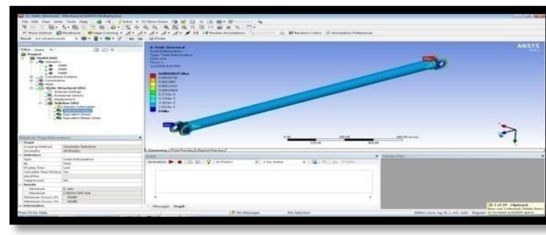


Fig : Boundary condition

Material: Mild Steel

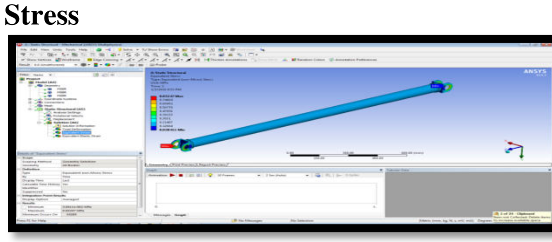
Total deformation



According to the counter plot, the maximum deformation at fixed yoke because of to the fix the holes and the minimum deformation at propeller shaft .

The maximum deformation is 0.0001185mm and minimum deformation is 2.0928e-5 .

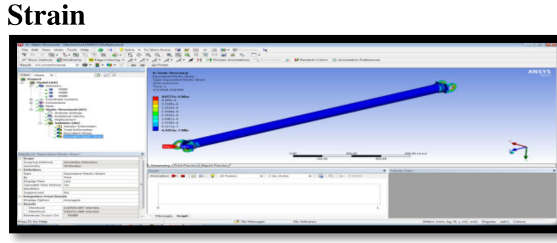
Stress



According to the counter plot, the maximum stress at fixed yoke because of to applied rotational speed on propeller shaft and the minimum stress at yoke.

The maximum stress is 0.83247N/mm^2 and minimum stress is 0038421 N/mm^2 .

Strain



According to the counter plot, the maximum strain at fixed yoke because of to applied rotational speed on propeller shaft and the minimum strain at yoke.

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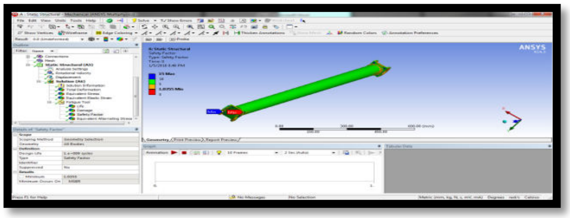
The maximum strain is 4.6751e-6 and minimum strain is 4.4353e-7.

Safety factor

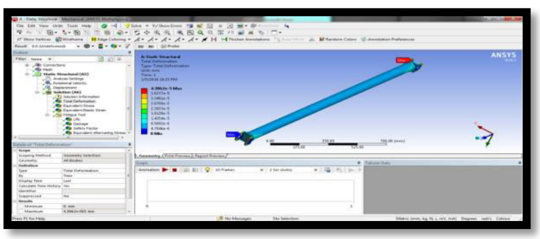


According to the counter plot, the maximum safety factor at fixed yoke because of to applied rotational speed on propeller shaft and the minimum safety factor at yoke holes.

The maximum safety factor is 15 and minimum strain is 1.0355.

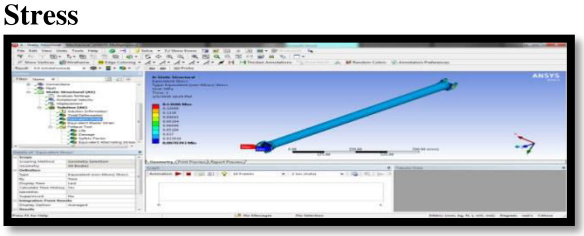
Material –Glass fiber

Total deformation



According to the counter plot, the maximum deformation at fixed yoke because of to the fix the holes and the minimum deformation at propeller shaft .The maximum deformation is 4.3052e-5mm and minimum deformation is 4.75e-6mm .

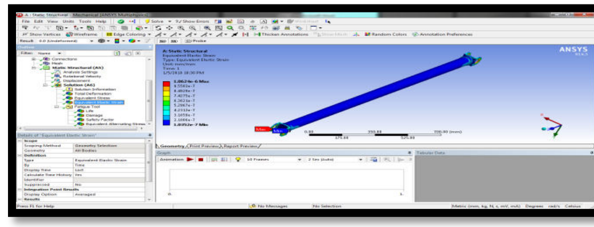
Stress



According to the counter plot, the maximum stress at fixed yoke because of to applied rotational speed on propeller shaft and the minimum stress at yoke.

The maximum stress is 0.14186N/mm^2 and minimum stress is 0.02245 N/mm^2 .

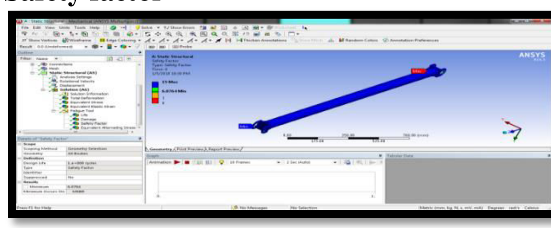
Strain



According to the counter plot, the maximum strain at fixed yoke because of to applied rotational speed on propeller shaft and the minimum strain at yoke.

The maximum strain is 1.0624e-6 and minimum strain is 1.053e-7.

Safety factor

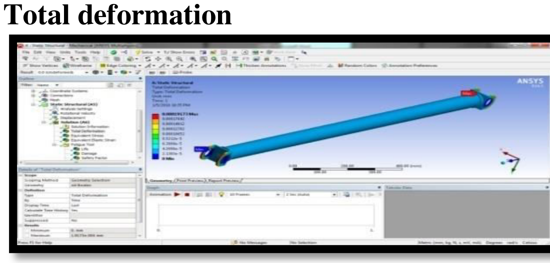


According to the counter plot, the maximum safety factor at fixed yoke because of to applied rotational speed on propeller shaft and the minimum safety factor at yoke holes.

The maximum safety factor is 15 and minimum strain is 6.0764.

Material –Al6061

Total deformation



According to the counter plot, the maximum deformation at fixed yoke because of to the fix the holes and the minimum deformation at propeller shaft .

The maximum deformation is 0.0001917mm and minimum deformation is 2.1393e-5 .

Stress

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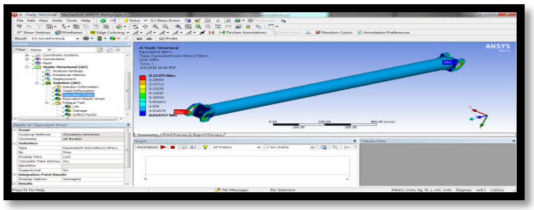
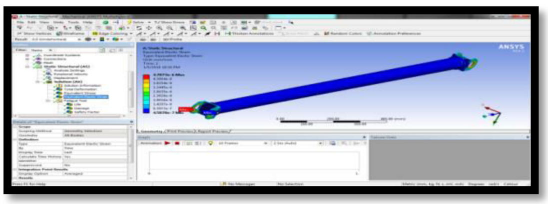


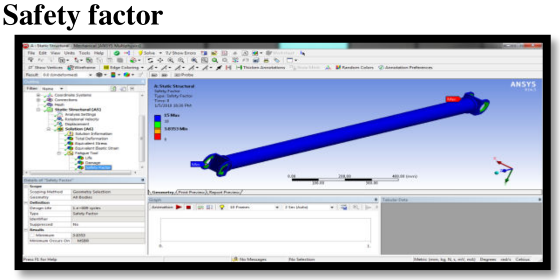
According to the counter plot, the maximum stress at fixed yoke because of to applied rotational speed on propeller shaft and the minimum stress at yoke.
The maximum stress is $0.22475 N/mm^2$ and minimum stress is $0.010357\ N/mm^2$.

Strain



According to the counter plot, the maximum strain at fixed yoke because of to applied rotational speed on propeller shaft and the minimum strain at yoke.
The maximum strain is 4.7873e-6 and minimum strain is 4.5878e-7.

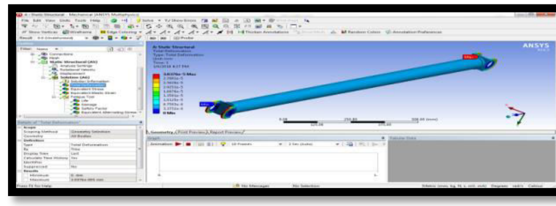
Safety factor



According to the counter plot, the maximum safety factor at fixed yoke because of to applied rotational speed on propeller shaft and the minimum safety factor at yoke holes.
The maximum safety factor is 15 and minimum strain is 3.8353.

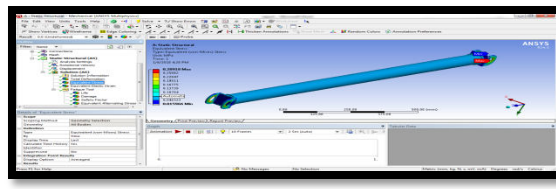
Material: Boron

Total deformation



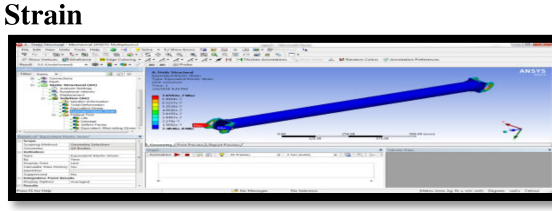
According to the counter plot, the maximum deformation at fixed yoke because of to the fix the holes and the minimum deformation at propeller shaft .
The maximum deformation is 3.0337e-5mm and minimum deformation is 3.337e-6 .

Stress



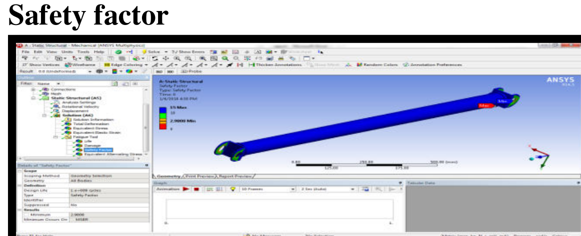
According to the counter plot, the maximum stress at fixed yoke because of to applied rotational speed on propeller shaft and the minimum stress at yoke.
The maximum stress is $0.28918 N/mm^2$ and minimum stress is $0.015966\ N/mm^2$.

Strain



According to the counter plot, the maximum strain at fixed yoke because of to applied rotational speed on propeller shaft and the minimum strain at yoke.
The maximum strain is 7.6592e-7 and minimum strain is 7.40e-8.

Safety factor



According to the counter plot, the maximum safety factor at fixed yoke because of to applied

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rotational speed on propeller shaft and the minimum safety factor at yoke holes.

The maximum safety factor is 15 and minimum strain is 2.9808.

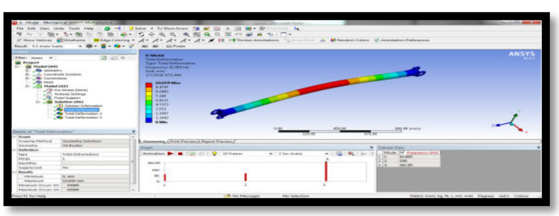
STATIC ANALYSIS RESULTS TABLE

Material	Deformation (mm)	Stress (N/mm^2)	Strain	Safety factor	
				Min	Max
MS	0.0001835	0.83247	4.6571e-6	1.0355	15
Glass fiber	4.3062e-5	0.14186	1.0624e-6	6.7641	15
Al6061	0.0019173	0.22475	4.7873e-6	3.8353	15
Boron	3.0376e-5	0.28918	7.6592e-7	2.9808	15

Here, from examination of steel drive shaft with composite drive shaft as appeared in above table, it tends to be seen that the most extreme disfigurement 0.0001835 mm at MS material and relating distortion in Glass fiber, Al6061 and boron are 4.3062e-5 mm, 0.0019173mm,3.0376e-5. Likewise the von-misses worry in the drive shaft for steel 0.83247 MPa while in Kevlar, E glass and boron the von-misses stresses are 0.14186 MPa, 0.22475 MPa and 0.28918Mpa individually.

MATERIAL –MS

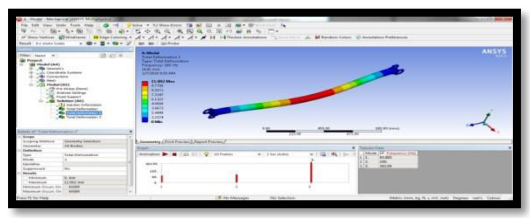
Total deformation 1



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.

The maximum deformation is 10.659 mm at frequency 93.885Hz.

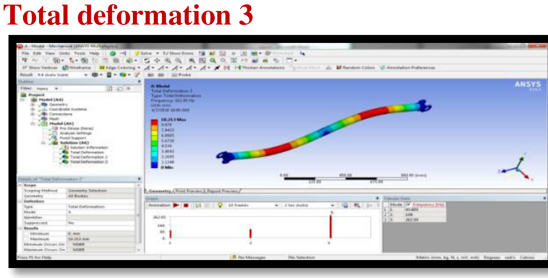
Total deformation 2



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.

The maximum deformation is 11.002 mm at frequency 109 Hz.

Total deformation 3



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.

The maximum deformation is 10.213 mm at frequency 262.95Hz.

MATERIAL –Glass Fiber

Total deformation 1

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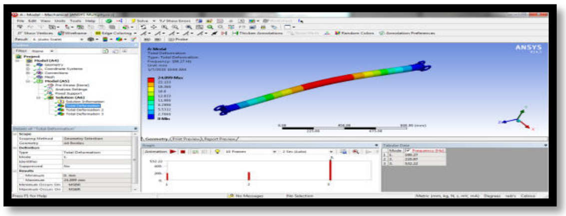
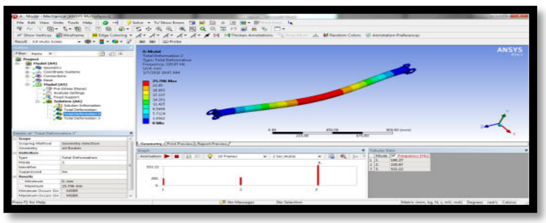


According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 24.899 mm at frequency 190.27Hz.

Total deformation 2



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 25.706 mm at frequency 220.97Hz.

Total deformation 3

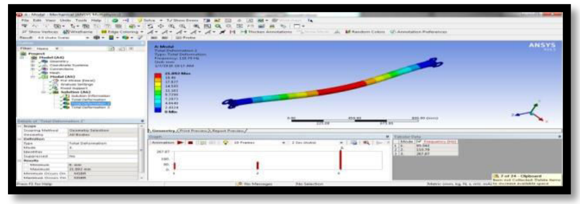
According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 23.853 mm at frequency 532.33Hz.

MATERIAL –Al6061

Total deformation 1

According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 21.217 mm at frequency 95.542Hz.

Total deformation 2



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 21.892 mm at frequency 110.79Hz.

Total deformation 3

According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 20.326 mm at frequency 267.87Hz.

MATERIAL –BORON

Total deformation 1

According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.
The maximum deformation is 19.072 mm at frequency 243.25Hz.

Total deformation 2

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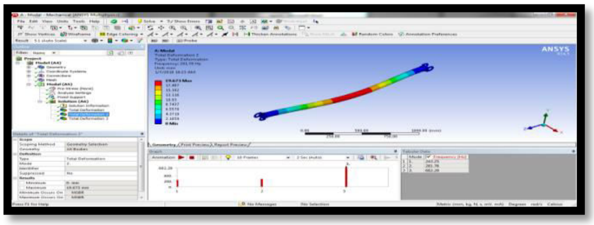
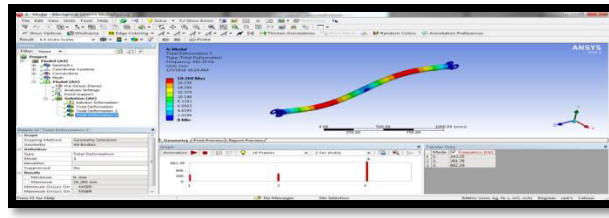


According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.

The maximum deformation is 19.673 mm at frequency 281.78Hz.

Total deformation 3



According to the contour plot, the maximum deformation at propeller shaft because of to fixed the yokes.

The maximum deformation is 18.268 mm at frequency 682.29 Hz.

MODAL ANALYSIS RESULTS TABLE

Material	Mode 1	Frequency (Hz)	Mode 2	Frequency (Hz)	Mode 3	Frequency (Hz)
Mild Steel	10.659	93.885	11.002	109	10.213	262.95
Glass fiber	24.899	190.27	25.706	220.97	23.853	532.22
Al6061	21.217	95.142	21.892	110.79	20.326	267.87
Boron	19.072	243.25	19.673	281.78	18.268	682.29

BUCKLING ANALYSIS OF DRIVE SHAFT

Meaning of Buckling Analysis

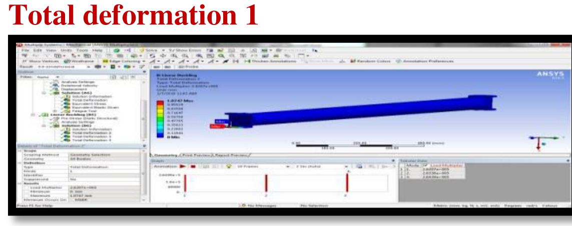
Clasping examination is a system used to decide clasping loads-basic burdens at which a structure winds up shaky and clasped mode shapes-the trademark shape related with a structure's clasped reaction.

Sorts of Buckling Analyses

Two methods are accessible in the ANSYS/Multiphysics, ANSYS/Mechanical, ANSYS/Structural, and ANSYS/LinearPlus programs for foreseeing the clasping load and clasping mode state of a structure: nonlinearbuckling examination, and eigenvalue (or direct) clasping investigation. Since these two strategies as often as possible yield very extraordinary outcomes, we should look at the contrasts between them before examining the subtle elements of their execute.

MATERIAL – MILD STEEL

Total deformation 1



According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.0747 mm at load multiplier2.6207e+05 .

Total deformation 2

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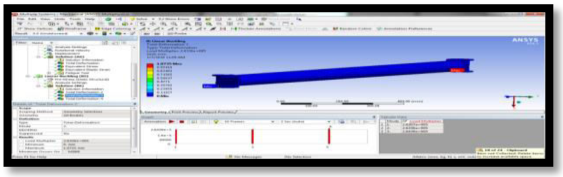
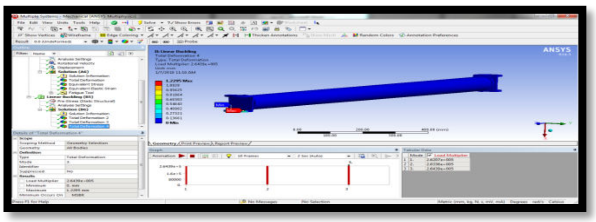


According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.0735 mm at load multiplier2.636e+05 .

Total deformation 3

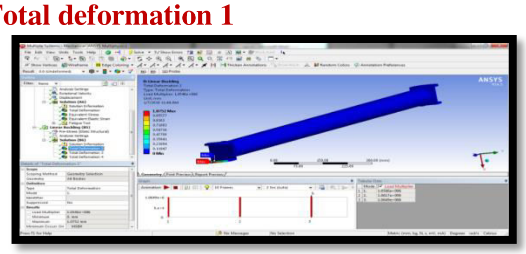


According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.2295 mm at load multiplier2.6439e+05 .

MATERIAL –GLASS FIBER

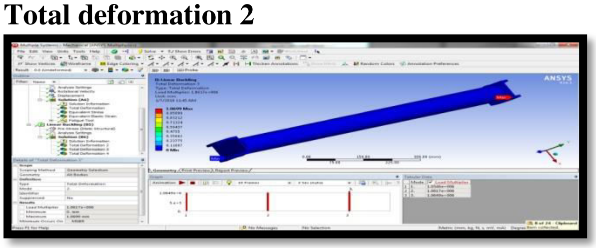
Total deformation 1



According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.0752 mm at load multiplier1.0564e+06 .

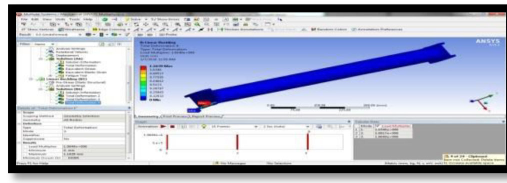
Total deformation 2



According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.0699 mm at load multiplier1.0617e+006 .

Total deformation 3

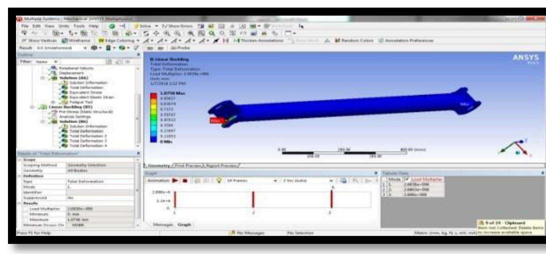


According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.1639 mm at load multiplier1.0649e+06.

MATERIAL –Al6061

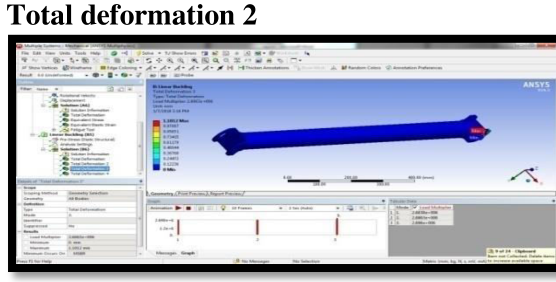
Total deformation 1



According to the contour plot, the maximum deformation at fixed yokes because of to fixed the yokes and minimum deformation at propeller shaft.

The maximum deformation is 1.0758 mm at load multiplier2.683e+06 .

Total deformation 2



As indicated by the shape plot, the greatest disfigurement at settled burdens due to settled the burdens and least twisting at propeller shaft. The most extreme twisting is 1.1012mm at stack multiplier2.6863e+06 .

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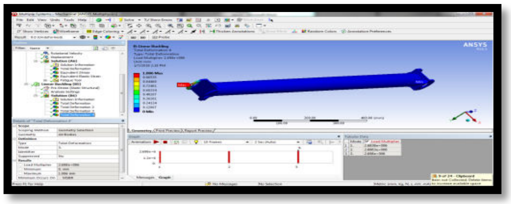
Total deformation 3

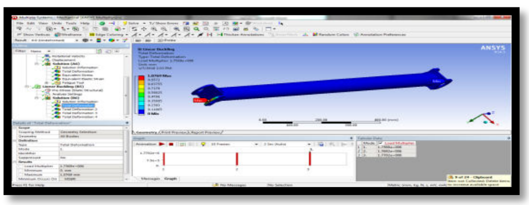


As indicated by the shape plot, the most extreme twisting at settled burdens as a result of to settled the burdens and least distortion at propeller shaft.

The greatest twisting is 1.086 mm at stack multiplier2.698e+06 .

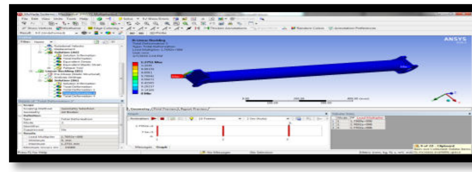
MATERIAL –BORON

Total deformation 1



As indicated by the shape plot, the greatest misshapening at settled burdens due to settled the burdens and least distortion at propeller shaft.

The greatest disfigurement is 1.0769mm at stack multiplier1.756e+06 .**Total deformation 2**



As per the shape plot, the most extreme twisting at settled burdens due to settled the burdens and least misshapening at propeller shaft.

The greatest distortion is 1.2751 mm at stack multiplier1.7692e+06 .

BUCKLING ANALYSIS RESULTS TABLE

Material	Mode 1	Load multiplier	Mode 2	Load multiplier	Mode 3	Load multiplier
Mild Steel	1.0747	2.6207e+05	1.0735	2.633e+05	1.2295	2.6439e+05
Glass fiber	1.0752	1.054e+06	1.0699	1.0617e+06	1.1639	1.649e+06
Al6061	1.0758	2.6838e+06	1.1012	2.6863e+06	1.086	2.698e+06
Boron	1.0769	1.7569e+06	1.2751	1.7692e+06	1.1250	1.7702e+06

CONCLUSION

The driveshaft with adjusted measurements is contrasted with the first measurements and it is discovered that the driveshaft with changed measurements is giving preferred outcomes over the first one. The twisting of the outline is lesser than the first model. Planned drive shaft utilizing stain less steel and chromium materials connected we recommend the altered model for the required motor.

At the point when contrasted with regular mellow steel shaft The introduced work was expected to diminish the Fuel utilization of the car in the specific or any machine By taking into contemplations the weight sparing, misshapening, composite has the most promising properties to go about as substitution for steel out of the considered three materials glass fiber, Al6061 and Boran The gave work likewise bargains plan and distinctive static

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conditions under various modes and load conditions.

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