

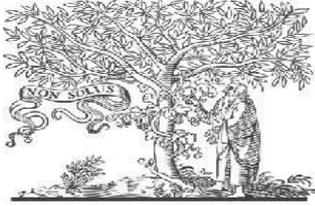


International Journal for Innovative Engineering and Management Research

A Peer Reviewed Open Access International Journal

www.ijiemr.org

COPY RIGHT



ELSEVIER
SSRN

2018IJIEMR. Personal use of this material is permitted. Permission from IJIEMR must be obtained for all other uses, in any current or future media, including reprinting/republishing this material for advertising or promotional purposes, creating new collective works, for resale or redistribution to servers or lists, or reuse of any copyrighted component of this work in other works. No Reprint should be done to this paper, all copy right is authenticated to Paper Authors

IJIEMR Transactions, online available on 30^h Nov 2018. Link

[:http://www.ijiemr.org/downloads.php?vol=Volume-07&issue=ISSUE-12](http://www.ijiemr.org/downloads.php?vol=Volume-07&issue=ISSUE-12)

Title: **HYDRO PNEUMATIC SUSPENSION SYSTEM FOR TRACTOR IMPLEMENT**

Volume 07, Issue 12, Pages: 596–602.

Paper Authors

MR. MD LATEEF, MR . KONDALA RAO

Farah Institute Of Technology(TS),INDIA



USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per **UGC Guidelines** We Are Providing A Electronic Bar Code

HYDRO PNEUMATIC SUSPENSION SYSTEM FOR TRACTOR IMPLEMENT

¹MR. MD LATEEF, ²MR . KONDALA RAO(P.HD)

PG Scholar, Dept of Mechanical, Farah Institute Of Technology(TS),INDIA. Email: Assistant Professor, Head of the Department of Mechanical, Farah Institute Of Technology(TS),INDIA. ¹mdlateef003@gmail.com,²mech.hodvvit@gmail.com.

ABSTRACT:During the tractor motion, with being associated with the hitch-tool running device over Rough avenue surfaces oscillation of the device take location. These oscillations are a cause of pressure pulsations in the hydraulic hitch-tool. The pressure pulse good buy within the tractor Hitch-device is important for growing of the tool components lifetime. Pressure oscillation damping in the tractor hydraulic hitch-tool can lessen average device oscillations and enhance the the usage of control.The format of spring in suspension machine may be very crucial. In this task a marvel absorber is designed and a 3-D model is created using Solid works. The model is also modified with the useful resource of using changing the thickness of the spring.Structural evaluation and modal evaluation are finished on the suspension tool thru the usage of numerous material for spring, Spring Steel and Beryllium Copper. The assessment is accomplished with the beneficial useful resource of thinking about hundreds, motorbike weight, single man or woman and multiple humans. Structural evaluation is performed to validate the power and modal evaluation is accomplished to decide the displacements for extraordinary frequencies for huge form of modes. Comparison is finished for two materials to verify terrific cloth for spring in suspension tool. Analysis completed in ANSYS

Keywords ANSYS; 3D Models; Damping; Material; Weight; Comparison; Pressure; Copper;

I INTRODUCTION

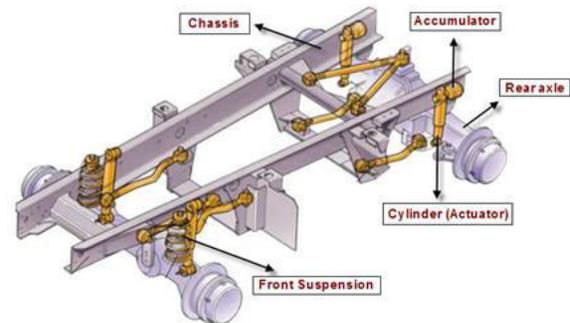
During the tractor movement, with being associated with the hitch-tool walking tool over tough street surfaces oscillation of the tool take place. These oscillations are a reason of stress pulsations in the hydraulic hitch-gadget. The stress pulse cut price inside the tractor hitch-device is essential for developing of the device components lifetime. Pressure oscillation damping within the tractor hydraulic hitch-device can reduce everyday device oscillations and decorate

the the usage of manipulate. The present day-day tractor linkage tool is equipped with the oscillation damper that reduces the hydraulic hitch-machine pressure oscillations. Equipped hydraulic hitch-device with hydropneumatic accumulators permits adjusting the stiffness and damping dispositions of the hydraulic cylinder, proscribing the strain oscillation amplitude. In order to create major changes inside the diploma of stiffness, more accumulators can

be used. The cause of the studies is to decide the pressure pulse reduce rate opportunity in the tractor hitch-tool adjusting the stiffness and damping the traits of the hydraulic cylinder. The experiments gift the effects of pressure oscillation studies within the hydraulic hitchsystem of the tractor Claas Ares ATX 557 inside the direction of the movement spherical synthetic roughness check road. During the experiments oscillations at considered one of a kind the usage of tempo, tire pressure, weight position on the positioned into impact increase and hitch-device oscillation damping (grew to turn out to be on/off) had been investigated. The studies of the physical tractor put into impact model allowed simplifying simulation of the put into effect oscillation in some unspecified time in the future of transportation.

HYDRO PNEUMATIC SUSPENSION:

Hydropneumatic suspension is a kind of motor vehicle suspension device, designed by using the usage of Paul Magès, invented with the beneficial resource of Citroën, and right for Citroën automobiles, further to getting used under licence through particular vehicle manufacturers, extensively Rolls-Royce (Silver Shadow), Maserati (Quattroporte II) and Peugeot. It have end up appreciably carried out on Berliet cars and has greater currently been used on Mercedes-Benz vehicles. Similar systems also are used on a few navy vehicles. The suspension become called oléopneumatique in early literature, pointing to oil and air as its vital components.



1.1 Hydropneumatic suspension

REQUIREMENTS FOR SUSPENSION SYSTEMS:

Suspension structures have a huge variety of applications in our every day lives. Usually human beings do not even remember the fact that they exist, but they'll be doing a hard hobby in masses of instances. If they malfunction it's miles regularly the primary time that one starts offevolved offevolved thinking about them. For example, everybody who has ridden a bicycle with too low tire strain will possibly recollect how mild and wobbly the motorcycle felt on easy roads and the manner badly he felt the bumps at the same time as there was even the slightest unevenness. A experience conduct this is risky and uncomfortable. In this case the spring charge of the suspension machine (i.E. The tire) have end up too low and the to be had suspension tour emerge as too small. Therefore the suspension reached the limit of its stroke and ran carefully into the give up prevent – rim and street floor with the rubber of the tire in among. On the opportunity hand, a too immoderate tire pressure and an therefore too immoderate spring rate can also bring about ache at the motorbike. Without sufficient tire elasticity the roughness of the road is transferred right

away into the motorcycle body and furthermore into the rider. This all once more has a horrible effect on the comfort of the rider. It is plain that it's miles vital to discover a appropriate diploma of tire pressure and because of this spring charge which fits mainly to the burden of the rider.



1.2 Suspension structure

II WORKING PRINCIPLE

The simplest hydro-aeroplane gaseous stop system consist of of only three components: a hydraulic rundle, a hydro-aeroplane pneumatic parlay, which is absolutely mounted on the carom and, of advance, the hydraulic gas. In condition roll and parlay need to be part – for example due to project space description – supervenient oil lines and fittings are need to supply the hydraulic connection. After settle the hydraulic pressure to the dictate straightforward (by adding or releasing hydraulic gas) this system now already provides the stop function [3]. When dislodge the piston tyranny, the fluid convolution in the share forward accumulator is innovate and therewith the compression ($p_1 \rightarrow p_2$).

III METHODOLOGY

This shift proceeds until the pressure in the parlay (and thus on the active surface of the bucket) has system. This coordinate of strength is the mean for the department and

the understanding of the stop system. It will be custom in the following sections for further calculations. To allow for vigorous damping, an inundate resistor is place between rundle and shear onward accumulator. It convertite part of the energetic vigour of the hydraulic sensation into heated (viscous dissension). This provides the hanker after damping in combination with the (undesirable) boundary dissension source by the round courage and snare elements. This so called “interruption one” insist of length, share forward accumulator, overflowing resistor and hydraulic fluid already provides the suspension function and could repay the ordinary conspiracy of machinelike bound and damper . Yet with this system the major superiority of hydro-aeroplane gaseous pendency systems is not yet necessity: just direct .

IV SYSTEM ANALYSIS

STRUCTURAL ANALYSIS OF HYDROOPNUMATICSUSPENSION SYSTEM

MATERIAL - STRUCTURAL STEEL LOAD 113KG

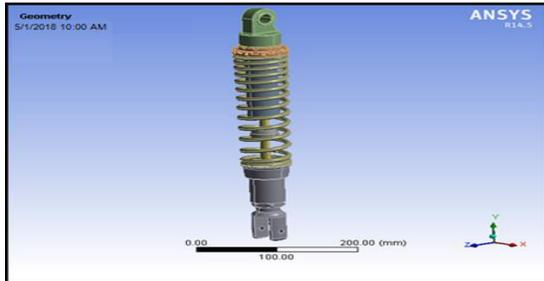
Open ANSYS>Open work bench 14.5>select static structural >double click on it.



Select engineering data> window will be open in that enter required material properties> update project and return to the project.

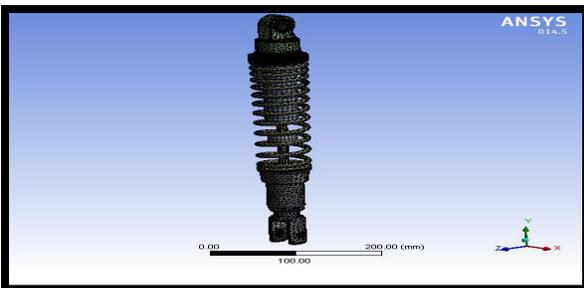
Select geometry > right click on it >select import geometry> select file>ok

IMPORTED MODEL



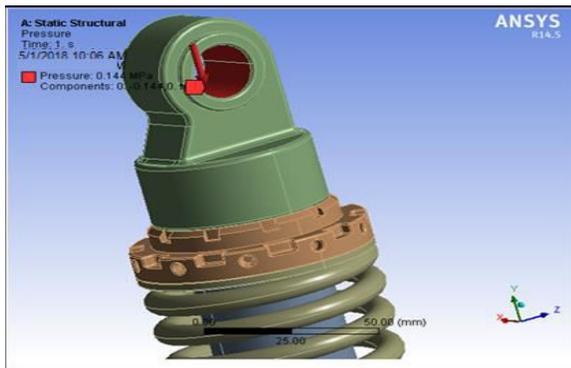
Select model>right click on it> select edit> window will be open in that select mesh>right click on it>select generate mesh

MESHED MODEL



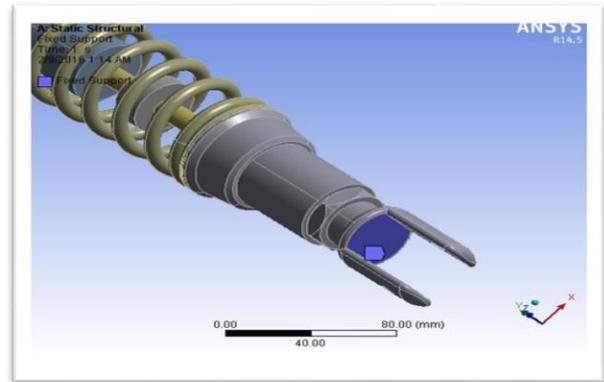
Select static structural >right click on it >insert> pressure> select area> enter magnitude> apply.

PRESSURE



Select static structural >right click on it >insert> fixed support> select area> apply.

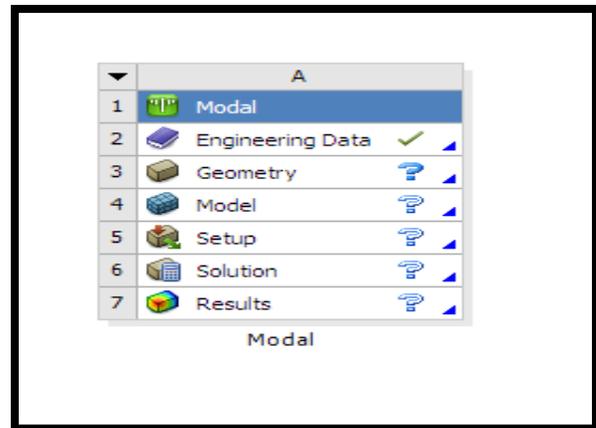
FIXED SUPPORT



Right click on solution> insert > Deformation >Total>Right click on solution> insert> Strain> Equivalent (Von-mises)> Right click on solution> insert> Stress> Equivalent (Von-mises). Right click on solution> insert > Solve

MODAL ANALYSIS OF HYDRO PNEUMATIC SUSPENSION SYSTEM

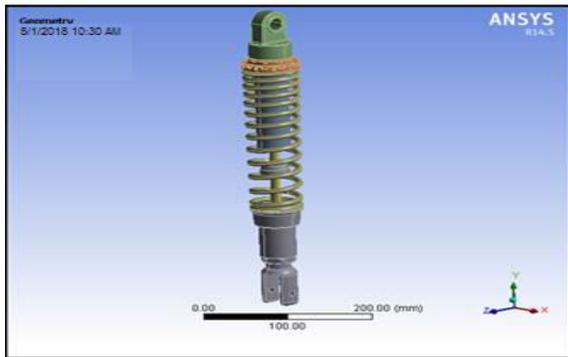
ANSYS> Work bench 14.5>Double click on Modal



Right click on **Engineering data**>edit>apply material properties>return project>Update project.

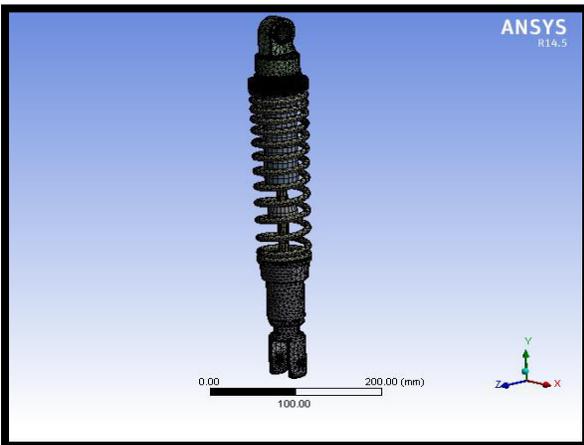
Right click on **Geometry**>Imported Geometry>browse>click on IGS file>Open.

IMPORTED GEOMETRY



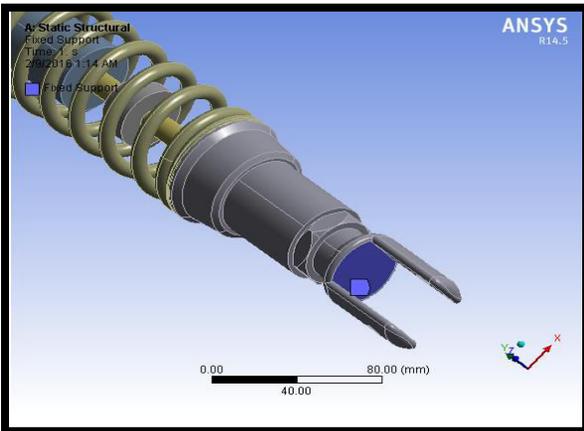
Right click on **Model**>Edit>Right click on mesh>sizing>fine>Right click on mesh>generate mesh.

MESHED MODEL



Right click on **Modal**>Insert>Fixed supports>Select faces>apply.

FIXED SUPPORT



Right click on **Solution**>Insert>Deformation>Total>Mode 1.Right click on **Solution**>Insert>Deformation>Total>Mode 2.....etc.

Right click on **Solution** >Solve.

V RESULTS

RESULTS TABLE FOR STRUCTURAL ANALYSIS

Structural Analysis Results

MATERIAL	LOAD(KG)	VON-MISES STRESS [MPa]	VON-MISES STRAIN	TOTAL DEFORMATION [mm]
Structural steel	113	227.68	0.0015	13.702
	188	377.89	0.0025	22.741
	263	529.68	0.0035	31.875
Beryllium copper	113	233.23	0.0026	23.794
	188	387.1	0.0044	39.492
	263	542.59	0.0062	55.355

RESULTS TABLE FOR MODAL ANALYSIS

Structural steel

	Deformation (mm)	Frequency (Hz)
Mode 1	36.15	5.1808
Mode 2	36.171	5.1969
Mode 3	27.993	17.776
Mode 4	41.443	30.481
Mode 5	45.04	31.103

Beryllium copper

	Deformation (mm)	Frequency (Hz)
Mode 1	35.241	3.8298
Mode 2	35.261	3.8417
Mode 3	27.29	13.14
Mode 4	40.401	22.532
Mode 5	44.397	22.847

VI CONCLUSION

By searching at the structural assessment results, the strain price is a fantastic deal a exquisite deal a lot less for Beryllium Copper than Structural steel however the deformation is greater. By watching the modal evaluation outcomes, the deformation and frequency are an lousy lot lots plenty much less for Beryllium Copper than Structural Steel. Due to an awful lot an awful lot less frequency, the vibrations of suspension device even as Beryllium Copper is used are lots a great deal much less. So it is able to be concluded that the usage of Beryllium Copper is higher.

VII REFERENCES

[1] John C. Dixon, "The Shock Absorber Handbook", SAE International, 1999, ISBN 0-7680-0050-5

AUTHORS



Mr. Kondala Rao (P.hd), having 4+ years of relevant work experience in Academics, Teaching, and Controller of Examinations.

[2] Arthur Akers a.o., "Hydraulic Power System Analysis", Iowa State University, 2006, ISBN 0-8247-9956-9

[3] Official website of Citroën, <http://www.citroen-online.nl/techniek-hydropneumatischevering.php> Reviewed at 2008-11-27

[4] Mobikit mobility in movement, http://www.mobikit.nl/atotz/rubriek_7/News_categoryView.aspx Reviewed at 2008-11-27

[5] Igo Besselink, "Description of the Non-Linear Shimmy mold", Fokker Aircraft B.V. Amsterdam, October 1994, report no. LG-102-183

[6] Bart winnow Esch, Erik winnow Kemenade, "Procestechische Constructies 1", Eindhoven University of Technology, March 2005

At present, he is working as an Assistant Professor, Head of the Department of Mechanical, Farah Institute Of Technology (TS), INDIA, and utilizing his teaching skills, knowledge, experience and talent to achieve the goals and objectives of the Engineering College in the fullest perspective. He has attended seminars and

workshops. He has also guided 25 post graduate students.



Mr. MD LATEEF, PG Scholar, Dept of Mechanical, Farah Institute Of Technology(TS),India. Btech completed in Sree Visveshwaraya Institute Of Technology And Sciences.