COMPOSITE MATERIAL ANALYSIS OF FRONT AXLE OF A HEAVY VEHICLE USING MATERIALS GLASS CARBON COMPOSITE SUBJECTED TO DYNAMIC ANALYSIS

Palukuri Sunil, Master of Technology, Department of Mechanical Engineering,

SVR Engineering College, Nandyal.

P. Hussain, Associate Professor & HOD,, Faculty Of Engineering & technology
Department of Mechanical Engineering , SVR Engineering College, Nandyal.

ABSTRACT

An axle is a central shaft for a rotating wheel. On wheeled vehicles, the axle may be fixed to the wheels, rotating with them, or fixed to its surroundings, with the wheels rotating around the axle. The axles serve to transmit driving torque to the wheel, as well as to maintain the position of the wheels relative to each other and to the vehicle body. The axles in a system must also bear the weight of the vehicle plus any cargo. The front axle beam is one of the major parts of vehicle suspension system. It houses the steering assembly as well. About 35 to 40percent of the total vehicle weight is taken up by the front axle.

Hence proper design of the front axle beam is extremely crucial. In present research work design of the front axle of heavy commercial vehicle were done. The approach in this project has been divided into two steps. In the first step, front axle was designed in CATIA V5 software later the model is imported into ANSYS for results. In the second step, the model is assigned with two different materials and the analysis results for both the materials are compared to conclude a suitable material for a Front axle manufacturing.

1. INTRODUCTION

A pivot is a focal shaft for a turning wheel. On wheeled vehicles, the hub might be fixed to the wheels, pivoting with them, or fixed to its environmental factors, with the wheels turning around the hub. The axles serve to communicate driving force to the wheel, just as to keep up the situation of the wheels comparative with one another and to the vehicle body. The axles in a framework should likewise bear the heaviness of the vehicle in addition to any load. The front hub bar is one of the significant pieces of vehicle suspension framework. It houses the controlling get together also. Around 35 to 40percent of the all out vehicle weight is taken up by the front hub.

Henceforth appropriate plan of the front pivot pillar is incredibly urgent. In present exploration work plan of the front hub of substantial business vehicle were finished. The methodology in this undertaking has been partitioned into two stages. In the initial step, front hub was planned in CATIA V5 programming later the model is brought into ANSYS for results. In the subsequent advance, the model is relegated with

two unique materials and the investigation results for both the materials are contrasted with finish up a reasonable material for a Front hub fabricating.

2. LITERATURE REVIEW

An untimely disappointment that happens before the normal burden cycles during the vertical weariness trial of a back pivot lodging model is considered. In these tests, break basically started from similar area on test tests. To decide the explanation of the disappointment, a point by point CAD model of the lodging was created. Mechanical properties of the lodging material were resolved through pliable tests. Utilizing these information, stress and weariness examinations were performed by limited component technique. Weariness break commencement areas and least number of burden cycles before disappointment inception were resolved. Results furnished from tests were contrasted and the examinations. Plan improvement arrangements were proposed to build the weakness life of the lodging

The Front Axle Beam (FAB) is most significant part in load conveying vehicle. The disappointment of FAB is genuine worry to substantial vehicle and in this manner for human life. So it is important to break down the hub bar's capacity to withstand run of the mill administration stacking which creates worry in the bar coming about into disappointment. Further the goal of examination is to improve its item quality while decreasing advancement time, material and assembling costs while keeping up the pressure levels.

In this undertaking, the front pivot of Light Commercial Vehicle (LCV) model is utilized. For the limited component examination we utilized Ansys14.0. The goal of the venture is to dissect also, upgrade the bar for diminishing weight. The FEA is been completed for vertical loads because of all out weight conveyed by vehicle. An inertial burden because of speeding up and deceleration of vehicle, which is, causes contorting of head boss segment with regard of PAD centerline. What's more, cornering load segment emerge because of radial power follows up on both head honcho manager during turning. Ultimately the modular examination is done on FAB to discover mode shapes and characteristic frequencies. The model is improved for weight decrease by utilizing parametric methodology.

3. METHODOLOGY

The methodology in this undertaking has been partitioned into two stages. In the initial step, front hub was planned in CATIA V5 programming later the model is brought into ANSYS for results. In the subsequent advance, the model is relegated with two unique materials and the investigation results for both the materials are contrasted with finish up a reasonable material for a Front hub fabricating.

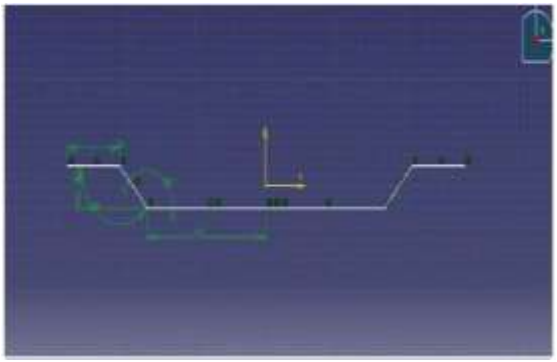
4. 2D sketching and 3D Modeling of Hydrofoil Model

CATIA is mechanical plan programming. It is an element based, parametric strong demonstrating configuration device that exploits the simple to-learn Windows graphical UI. You can make completely cooperative 3-D strong models with or without imperatives while using programmed or

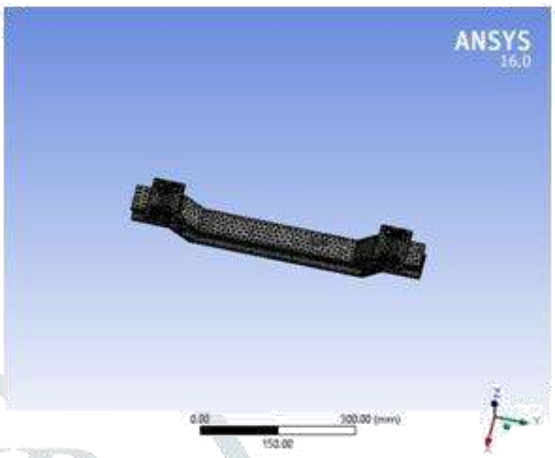
client characterized this definition, the italic terms above will be further.

5. RESULTS AND DISCUSSION

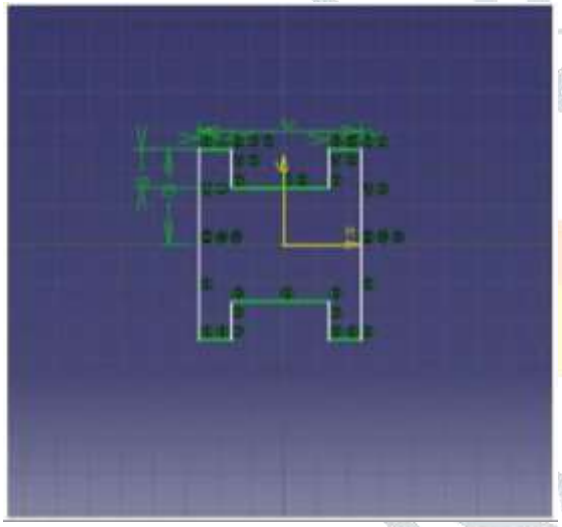
5.1 HARMONIC ANALYSIS



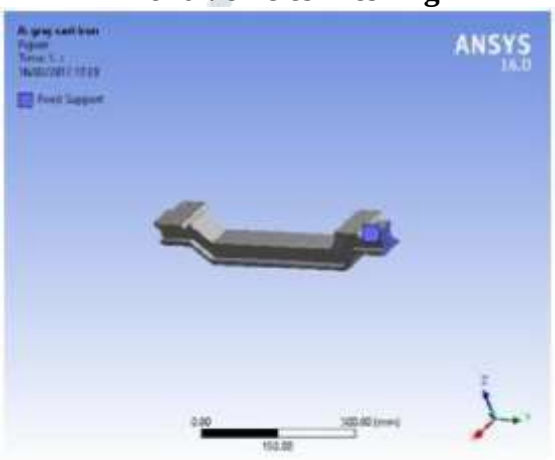
2d front vehicles



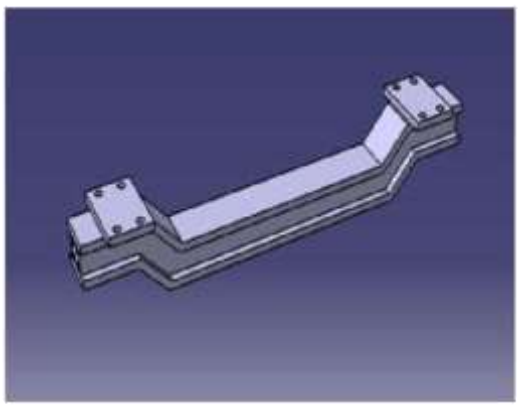
Front Vehicles Meshing



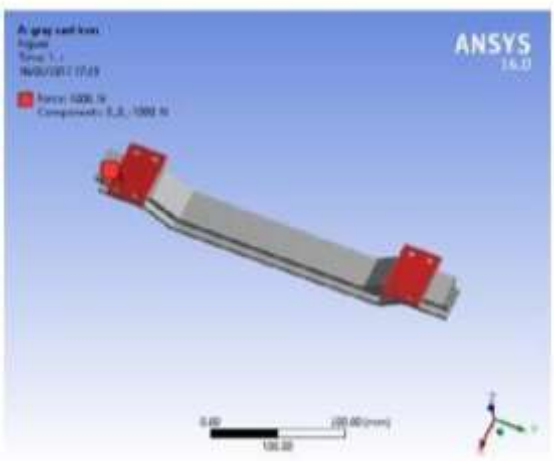
2d front vehicles side view



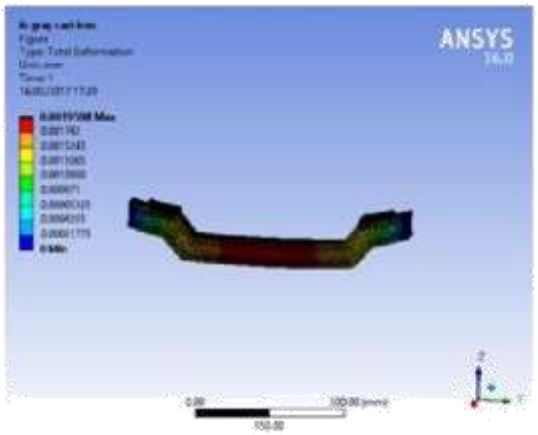
Front Vehicles force support



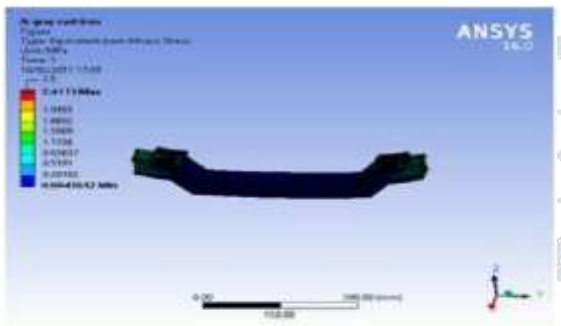
3d front vehicles

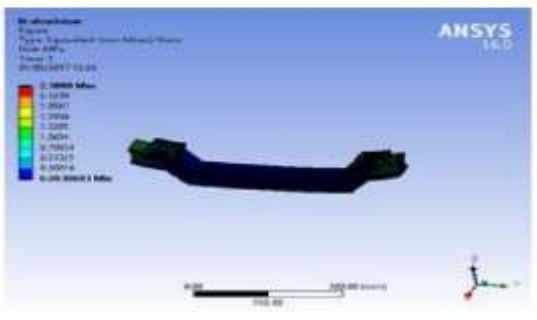


Front Vehicles load 1000N



Stress for Stainless Steel Material





CFD Analysis Results of Hydrofoil

6. Conclusion

From the above outcomes, plainly the greatest diversion in hub is for glass carbon materials and simultaneously the most extreme pressure dissemination is likewise High for glass carbon than Aluminum Alloy. Thus, Aluminum Alloy is better material for assembling of pivot than Gray Cast Iron. Relationship between's pressure results from explanatory count and from FEA guarantees that the work size and demonstrating approach utilized for the part were all around characterized. At last, we had the option to convey a safe and approve configuration to suit the prerequisites of the venture.

7. References

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