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Design and Analysis of Bus Chassis Using ANSYS

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Abstract: The plan of the transport body depends to a great extent upon the execution necessities under different sorts of stacking and working conditions other than those of the street conditions. The body of Ashok Leyland Viking 115 is chosen. Their basic quality, strength, crash value and so on are scarcely assessed, bringing about diminished traveler wellbeing with expanded probability of harms. Thus, the first body is overhauled by changing the thickness and diminishing the quantity of components, so that, the aggregate weight of the transport is lessened. The present utilized material for structure is steel. It is supplanted with composite materials of fiber. The thickness of steel is more than that of composite materials, so by supplanting with composites, the heaviness of the structure is diminished. Auxiliary and dynamic examination is done on both the structures utilizing three materials to decide the quality of the structure. Investigation is done in ANSYS.

Key words: Bus chassis, ANSYS, materials, dynamic and investigation, auxiliary, supplanting

INTRODUCTION

The transport body structure must be adjusted keeping in mind the end goal to get the security when the transport is running, body must be adequately solid in both the circumstance of supporting ordinary burdens and mishap loads (Lan *et al*., 2004; Ming, 2008; Gao *et al*., 2007). The body contains six principle segments, the left casing side, the correct casing side, the front casing side, the back casing side, the top casing side and the base edge side. The left and the correct side are comparable however the left side is regularly made out of traveler entryways. Then again, the correct side has two entryways, the driver entryway and the crisis entryway. The sides are worried to be basic parts and they should be solid. The static load reaction of basic structures for example, uniform pillars, plates and tube shaped shells, might be gotten by settling their conditions of movement. The solid model of the bus chassis which is created in the solid research software was shown in Fig. 1.

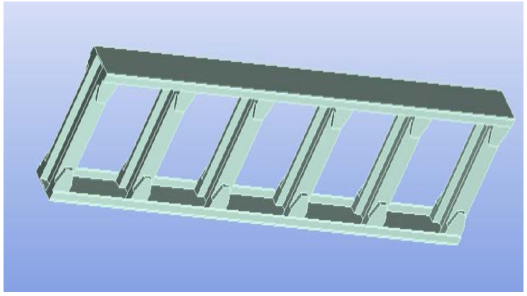

Fig. 1: Bus chassis 3D Model

MATERIALS AND METHODS

The bus weight is important thing for efficiency of increasing the vehicle efficiency. Bus body chassis weight is more than the other components. So, we will change the less weight material for the bus chassis and the same time the material has high strength than the present material. In this study, steel alloy 304, steel alloy S737 and glass fiber are selected.

The bus chassis 3D Model was created in the design software and it was imported to the ANSYS WorkBench 15.0. The bus chassis was meshed after the importing and set the boundary conditions. Get each and every result for the every material and they are compared with each other.

Boundary conditions: Driving circumstances influencing either little or substantial a basic distortion could show up in two primary modes (Binglin and Hong, 2002; Dai Hongjun, 2005). Initially, it was a bowing case happened when the transport was subjected to the vertical load or removal. Another was a tensional case an outside load endeavored to twist the transport structure in turning design along a longitudinal hub. For this situation, a turn point was used to figure a torsional firmness. In past review, it was found that an extensive tensional twisting specifically affected the weakness crack of window column individuals (Xichan *et al*., 1996; Butdee and Vignat, 2008; Bovenzi and Hulshof, 1999). Fabrication of CuO nanoparticles using chemical precipitation method is examined (Sagadevan *et al*., 2017) various properties of Barium L-Tartrate single crystal is studied as mentioned

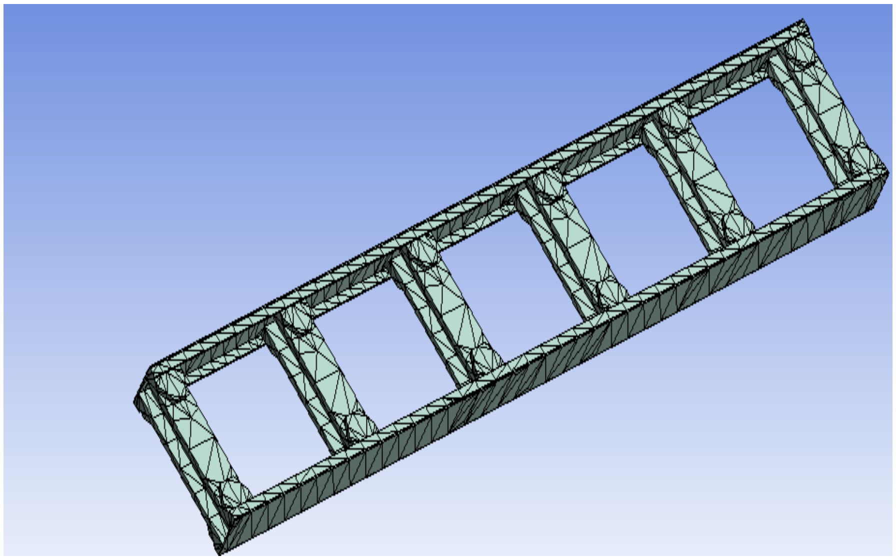

Fig. 2: Meshing

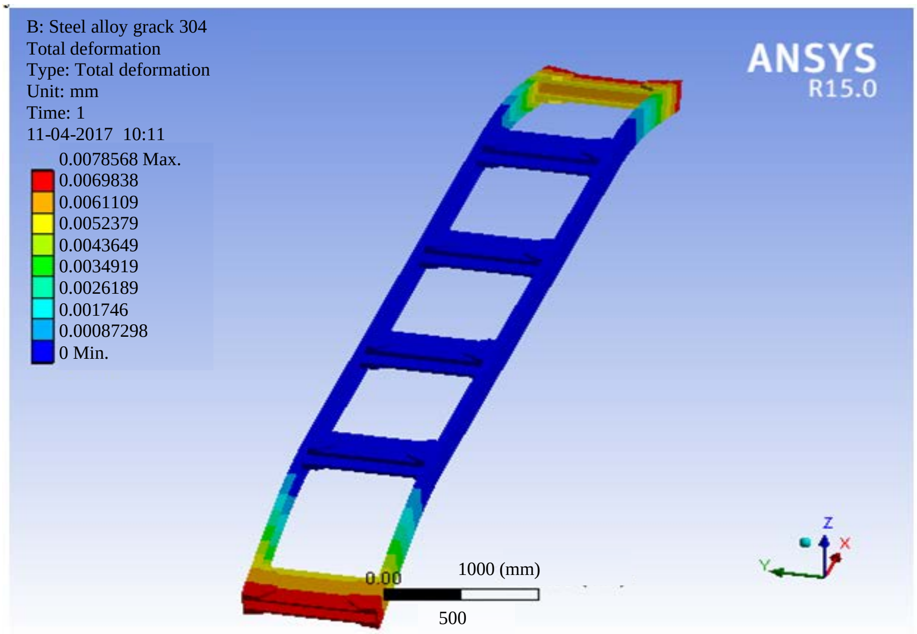

Fig. 3: Total deformation of steel alloy 304

by Rajesh and Kumar (2017). Experimental and numerical simulation of magnetic pulses for joining of dissimilar materials with dissimilar geometry (Muthukumaran *et al*., 2017).

Meshing: The bus chassis solid model was meshed in the ANSYS WorkBench 15.0. In this meshing, the bus chassis was divided as more number of elements and nodes. In the analysis, we didn't give any boundary conditions without meshing. Meshing is one of the important step in the analysis. In this study, normal size meshing was done in the bus chassis as shown in Fig. 2.

Analysis

Steel alloy 304: The static structural analysis method was selected in this study. The bus chassis was analysed in the various boundary conditions with different materials. The ANSYS WorkBench results are shown in Fig. 3-5.

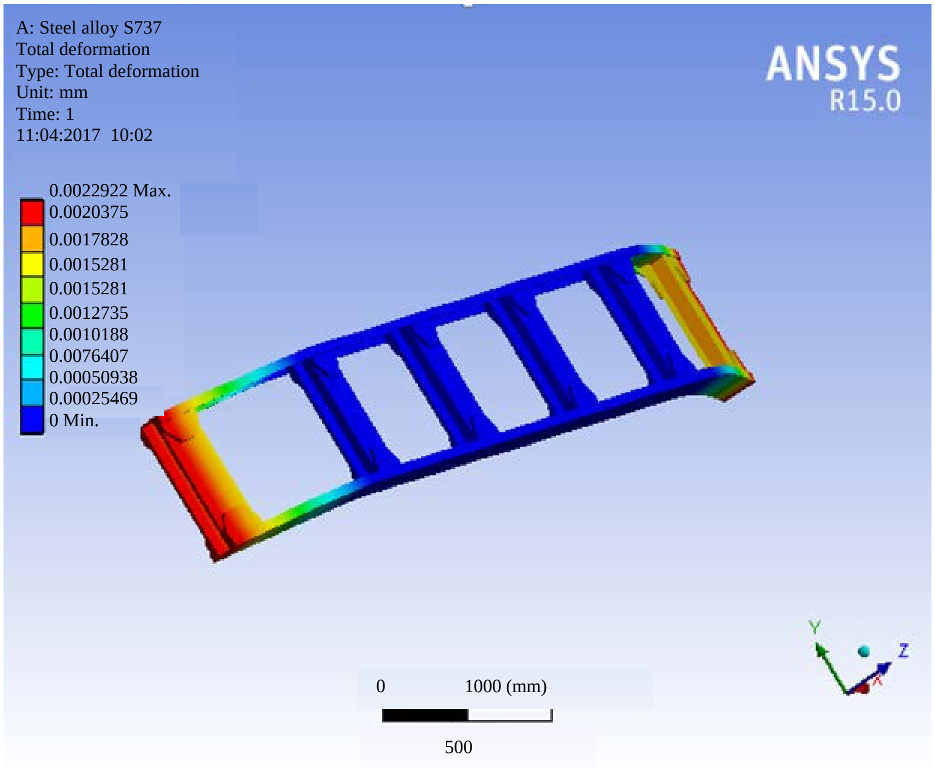

Fig. 4: Total deformation of steel alloy S737

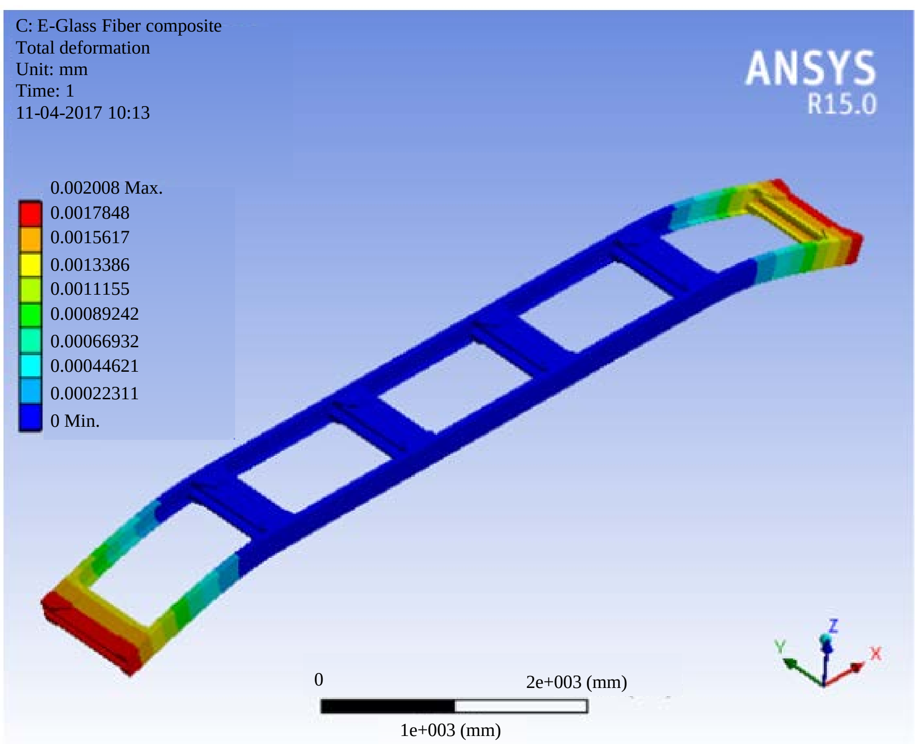

Fig. 5: Total deformation of glass fiber

Table 1: Results

Materials	Total deformation (mm)
Steel alloy 304	0.00785
Steel alloy-S737	0.00290
Glass fiber	0.00200

Figure 3 shows the total deformation value of the steel alloy 304. The deformation value is in mm and the result was taken for every 1 sec.

Steel alloy-S737: Figure 4 shows the results of the steel alloy S737 due to the various boundary conditions. Figure 4 shows the level of the bus chassis strength was varied by the different colors. The blue color of the chassis was more safe area and red color of the chassis was dead point.

Glass fiber: Figure 5 shows the results of the glass fiber due to the various boundary conditions. Figure 5 shows the level of the bus chassis strength was varied by the different colors. The blue color of the chassis was more safe area and red color of the chassis was dead point (Table 1).

RESULTS AND DISCUSSION

The total deformation for steel alloy 304, steel alloy S737 and glass fiber are noted in Table 1. The steel alloy S737 and glass fiber are has less deformation value than the steel alloy 304. And the same time stress, strain also better than steel alloy 304. The glass fiber has less weight than steel alloys. So, the glass fiber was fabricating the bus chassis.

CONCLUSION

The TRIZ rule and parameters are associated with help a light weight transport body diagram which is diverged from the present arrangement (Butdee and Vignat, 2008). The vehicle body model is made by CAD and trade data to CAE using FE examination. The material parameters and weights are associated with the vehicle show. The results are showed up. The weight of the e-Glass fiber is lesser than the steel alloy. And also, it has less economic than the steel alloys.

REFERENCES

Binglin, W.H.T.W.Z. and Y.I. Hong, 2002. Research on finite element modeling technique and result analysis methods for bus body frame. J. Mech. Strength, Vol. 1,

Bovenzi, M. and C.T.J. Hulshof, 1999. An updated review of epidemiologic studies on the relationship between exposure to whole-body vibration and low back pain. Int. Arch. Occup. Environ. Health, 72: 351-365.

Butdee, S. and F. Vignat, 2008. TRIZ method for light weight bus body structure design. J. Achievements Mater. Manufacturing Eng., 31: 456-462.

Dai Hongjun, L.C., 2005. Weight-lightening design and finite element analysis on the electrical bus-body. Bus. Technol. Res., Vol. 3,

Gao, Y.H., H.X. Li and D.S. Zhang, 2007. Finite element modeling and analysis of the semi-integral bus body frame. J. Hefei Univ. Technol., Vol. 4,

Lan, F., J. Chen and J. Lin, 2004. Comparative analysis for bus side structures and lightweight optimization. Proc. Inst. Mech. Eng. Part D. J. Automobile Eng., 218: 1067-1075.

Ming, Y.C.Z., 2008. Design of monocoque bus body structure. Bus. Technol. Res., Vol. 2,

Muthukumaran, S., A.S. Kumar, S.A. Vendan and S. Kudiyarasan, 2017. Experimental and numerical simulation of magnetic pulses for joining of dissimilar materials with dissimilar geometry using electromagnetic welding process. Intl. J. Appl. Electromagnet. Mech., 53: 237-249.

Rajesh, K. and P.P. Kumar, 2017. Mechanical, thermal, linear and nonlinear optical properties of barium L-tartrate single crystal. Mater. Res. Express, Vol. 4,

Sagadevan, S., K. Pal and Z.Z. Chowdhury, 2017. Fabrication of CuO nanoparticles for structural, optical and dielectric analysis using chemical precipitation method. J. Mater. Sci. Mater. Electron., 28: 1-7.

Xichan, Z., Z.H.A.N.G. Jinhuan and L.I. Yibing, 1996. Modal analysis of bus body testing and its application in body design appraisal. Automobile Technol., Vol. 6.