

Tipper Chassis Leveling

Sijo MS¹, Abid T², Aseenul Ashif³, Sahil K⁴, Saif Ahamed Ali⁵, Shanu Niyas⁶,

¹Faculty of Mechanical Engineering, Eranad Knowledge City Technical Campus, Manjeri, Malappuram, Kerala, India.

^{2,3,4,5,6} Students of Mechanical Engineering (2014-2018 batch), Eranad Knowledge City Technical Campus, Manjeri, Malappuram, Kerala, India.

Abstract:- Tipper is a vehicle designed for carrying bulk materials, When a load vehicle or tipper falls there is a chance to chassis twist, normally twisting is leveled by taking the chassis alone outside by separating engine and cabin body. It is time consuming process. by using our technique we expecting to solve this issue within a hour. Normally twisting is leveled by taking the chassis alone outside by separating engine and cabin body. It is time consuming process. By using our technique we expecting to solve this issue within an hour. Main requirement are platform and EOT crane. Here a force is creating against twisted chassis by EOT crane.

Keywords:- Tipper , Chassis, Leveling, EOT crane, I section beam, plat form.

I. INTRODUCTION

Tipper mainly used for transporting material for construction. A typical dump truck is equipped with an open-box bed, which is hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material in the bed to be deposited on the ground behind the truck at the site of delivery.

Chassis is the main part of a vehicle. The frame ,engines, running gears such as wheels and transmission and driver seat are linked with chassis. Tipper is a vehicle designed for carrying bulk materials. So there is a chance to chassis twist due to load.

Normally twisting is leveled by taking the chassis alone outside by separating engine and cabin body. It is time consuming process. By using our technique we expecting to solve this issue within an hour. Main requirement are platform and EOT crane. Here a force is creating against twisted chassis by EOT crane.

II. LITERATURE SURVEY

A. Design And Analysis Of Eicher 20.16 :

In the research article “Design and Analysis of Eicher 20.16 Chassis Using Ansys 12.0” by Jothiprakash P ,Raju K, Sivaraman (February 2017), This paper presents the study of stress and deformation occurred in the chassis frame of EICHER 20.16 due to static and impact load. It was calculated for the chassis frame and analysis was carried out to find which load would leads to the chassis failure. In this indicates that static load has no effect on the chassis failure and the impact load applied causes the chassis to get failure. For the effective utilization of chassis the material has to be considered. By selecting suitable material for chassis the failure can be arrested.

B. Structural Analysis of Eicher 11.10

In the research article “Structural Analysis of Eicher 11.10 Chassis Frame by Chiranjeeva Rao seela, Chintada Vinnod babu, Vykunta Rao Matta, In IJETT Volume 22 april 2015”. This paper is related with work performed towards the static structural analysis of the truck chassis in which study of the stresses developed and deformation of chassis frame of EICHER 11.10 has been done by considering three different materials like St52, Ni-Cr Steel and CFRP in each case. The chassis is modeled in PRO-E and finite element analysis has been done in ANSYS.

C. Jash Acumen For Accuracy

Jash acumen for accuracy says that the cast iron is highly efficient to make structures. Jash is the pioneer brand in India for quality meteorology products including Precision Surface Equipment (PSE)

III. METHODOLOGY AND EXPERIMENTATION

A. Current Scenario

Twisting is leveled by taking the chassis alone outside by separating cabin, engine, body and wheel. the twisted area of separated chassis is heated until red hot. Then twisting is leveled by forging.

➤ Disadvantage

- Time consuming: Take more time for separating body parts, heating and forging process.
- High man power : Man power is more need for separation and forging of twisted chassis
- Labour cost
- Costly

B. New Methodology

We are going to make a platform using I section beam to place the vehicle. Then 5 TON EOT crane placed opposite side of twisted chassis of the vehicle on one side of platform. The twisted chassis is locked to platform by a chain. The rope put over the body of vehicle for pulling and other end of rope is given a support to arrest movement of vehicle to the crane by using chain lock to platform. The power supply is applied to crane. Here a force is creating against twisted chassis by EOT crane. Leveling the twisted chassis by EOT crane force.

IV. CONSTRUCTION

A. Platform Making

Make a platform using I section beam to place the vehicle on dimension as per cad drawing. Size of the platform: 5042mm x 2985mm x 500mm. I section beams are joined by electric arc welding and sized through gas cutting. we making correct path for tipper placing in platform.



Fig 1:- Welding process



Fig 2:- Oxy-Fuel cutting process

B. Eot Crane Placing

5 TON EOT crane placed opposite side of twisted chassis of the vehicle on one side of platform. A clamp is welded to platform. EOT crane is placed in clamp by nut and bolt. Also arc weld is done.



Fig 3:- EOT crane

C. 2d Drawing

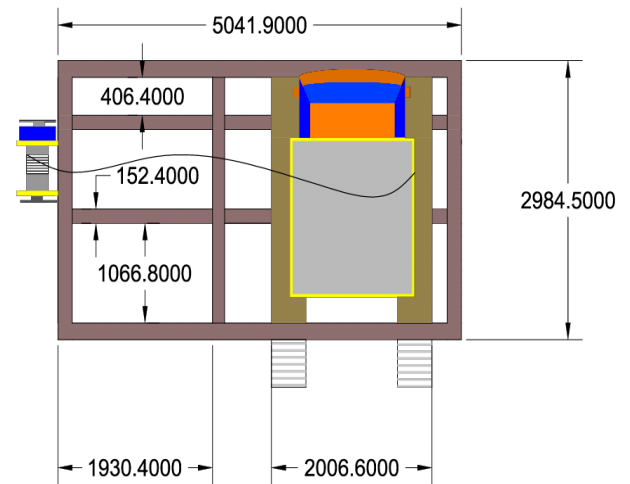


Fig 4:- Top view drawing of project



Fig 5:- EOT crane on platform one side

V. EXPERIMENTAL SETUP

A. Requirements

Major component involve in tipper chassis leveling

- EOT crane
- I section beam
- Chains
- Arc welding machine
- Electrode

B. Research About Project Material

➤ *Chassis of tipper*

Chassis is the main part of a vehicle. It consist of internal vehicle frame. It also provide protection for some internal parts. The chassis of tipper must be too strong. Mainly all load and forces are acting on chassis. When a load vehicle

or tipper there is a chance to chassis twist due to fall . The frame, engines, running gears such as wheels and transmission and driver seat are linked with chassis. So the separating of chassis alone from vehicle is too risky process and time consuming process. Also need re-assemble the vehicle parts after level of chassis. Tipper chassis type is 'c' channel ladder type frame , 230 76 6 mm The material used to construct vehicle chassis and frame is carbon steel. An important consideration in chassis design is to have adequate bending stiffness for better handling characteristics. So, strength and stiffness are two important criteria for the design of the chassis.

➤ *Why opt cast iron as platform material*

- Cast iron is an iron alloy amount of carbon is 4%.
- Mild steel is an iron carbon alloy containing less than 0.25% carbon, which makes to more ductile and less hard , thus rendering unsuitable for structures.
- Cast iron is easier to work.
- It is highly suitable for casting large and heavy object.
- Cast iron is hard and it can be hardened by heating and sudden cooling this makes it quite durable. but in the case of mild steel, it can be hardened and tempered by many process.
- CI have good damping property which absorb vibration , so we can use a bed or flat.
- Compressive strength of CI is 6.3 – 7.1 Tons/ sq cm.
- Ultimate tensile strength of CI is 1.26 – 1.57 Tons/sq cm.
- Cast iron will not show signs of wear and tear easily

➤ *Why use i section beam*

I Section beam is also known as H Beam. The horizontal element of the “I” are known flanges, while the vertical element is “web”. The web resist shear force , while the flanges resist bending moment experienced by the beam. Just put enough thickness web that the shear is taking care of. Beam theory shows I section beam is very efficient for carrying both bending and shear loads.

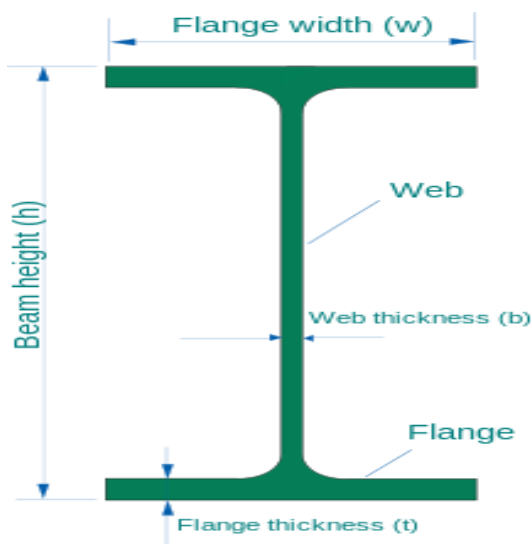


Fig 6:- I section beam

VI. CONCLUSION

Through this project, We could to level twisted chassis with out separating other vehicle parts. So we could to reduce time consumption. Reduced man power. We could Afford the project. We are able to understand I Section beam is more better to make platform. I Section is made up of cast iron. Cast iron will not show signs of wear and tear easily and you can expect long term performance from CI.

REFERENCES

- [1]. “Structural Analysis of Eicher 11.10 Chassis Frame by Chiranjeeva Rao seela , Chintada Vinnod babu ,Vykunta Rao Matta, In IJETT Volume 22 april 2015”.
- [2]. “Design amd Analysis of Eicher 20.16 Chassis Using Ansys 12.0” by Jothiprakash P ,Raju K, Sivaraman (February 2017).
- [3]. https://en.wikisource.org/wiki/1911_Encyclop%C3%A6dia_Britannica/Chain.
- [4]. Kevin K Pender, “Adjustable Front Wheel ASSEMBLY for Vehicles” U.S. Patent 007111861B2, issued September 26, 2006.
- [5]. http://www.jashmetrology.com/Tony_Foale “Motorcycle Handling and Chassis Design the Art And Science”, Spain: ISBN, 2002.