Review on Three Way Unloading Tipper Mechanism

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Abstract- Tipper has lots of applications in today's world. In industrial and domestic considerations, tippers can haul a variety of products including gravel, potatoes, grain, sand, compost, heavy rocks, etc. By considering wide scope of the topic, it is necessary to do study and research on the topic of tipper mechanism in order to make it more economical and efficient. In existing system, tipper can unload only in one side by using hydraulic jack or conveyor mechanism. By this research it is easy for the driver to unload the trailer and also it reduces time and fuel consumption and easy handling of material by using Ardino Uno Controller For making tipper mechanism with such above conditions both mechanisms namely hydraulic jack and conveyor mechanism can be used.

Key Words- *Tipper; hydraulic jack; conveyor mechanism; Ardino Uno Controller.*

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I. INTRODUCTION

This tipper mechanism can do a great job by unloading the goods in three direction as nowadays trailers unloads in only one direction. Existing trailers requires more space, time and fuel so to overcome these problems we want to introduce the three way tipper mechanism so that the device is economical and efficient etc. [1] This tipper mechanism generally relates to conveyor equipment and in a particular use of a conveyor mechanism for unloading material from trailer in left/right side and use of hydraulic jack for unloading in back side. [2, 3, 4] A conveyor mechanism is provided for transporting objects. The conveyor mechanism, in particular, includes a single continuous belt member wrapped around rollers. A lever is connected to the first roller for driving the rollers and the surrounding belt member. This will unload tipper in left/right side. A hydraulic jack is a powerful lifting or pushing tool designed to provide effective lift over greater distance than basic mechanical jack. Hydraulic jacks use a plunger mechanism and non-compressible fluid, typically a hydraulic oil to create required pressure and resulting lifting capability. In this project hydraulic jack is attached below whole setup to lift the trolley for backside unloading. [7, 8, 9] This tipper mechanism can be applied to both domestic and industrial use. Whatever the application, the choice of equipment, its safe use and correct maintenance is vital if the job is to be done safely, cost effectively and efficiently.

II. FIELD OF USE AND BENEFITS

Tipper is having lots of applications in today's world. In industrial and domestic considerations, Tippers can haul a variety of products including gravel, potatoes, top soil, grain, carrots, sand, lime, peat moss, asphalt, compost, heavy rocks, etc. By considering wide scope of the topic, it is necessary to do study and research on the topic of tipper mechanism in order to make it more economical and efficient. This mechanism is useful in dumping vehicles like tractor, trucks etc. This mechanism can provide faster work rate, less human interaction. In existing system, tipper can unload only in one side by using hydraulic jack or conveyor mechanism. That's why in case of two trailer truck, it is difficult for the driver to unload it at only one place and also it consumes more fuel, time, space etc. Wide area is available for research in this topic in order to make it easy for the driver to unload and reduce time and fuel consumption. It is easy to operate, does not required any special skill of driver, rapid, safe operation and simple maintenance.

In addition to these by using Ardino Uno controller it ensures the easy operations the controller itself generates a language through which the signal is provided to the mechanism to operate as per the input method given by the switches which ensures the easy handling reduces the effort and smart work with digital technology Time sensors also can install in Ardino Uno through which the time to unload material in either of direction is set and after unloading of material tipper will automatically come into initial position which reduces the extra power required although increasing the overall efficiency of Work.

III. LITERATURE REVIEW

et all studied [1] Three way tipper can unload materials in all three sides. Also we require special types of hinge joints in this case. It will be having three hydraulic piston cylinders one on cabin side (as in existing system), one each on lateral sides. Six hinges- 2 on each side to give degree of motion on that side. The framing will be rigid enough to sustain the reactive forces generated, refer the attached picture of 3-way tipper arrangement. Main hydraulic cylinder is placed at middle of front side of chassis i.e. 1 for back side tilting of the trolley and other two (2,3) cylinders

are placed on along lateral side of the chassis at appropriate distance as shown in fig.3.4 for left and right side tilting of the trolley. Trolley is connected with chassis with the help of six hinges .Two hinges on each lateral side for left and right side tilting of trolley, two hinges on back side of chassis for back side tilting of trolley. Above figure 3.4 shows the hinge position. Now with this mechanism it is possible to tilt trolley on all three sides i.e. back, left and right side

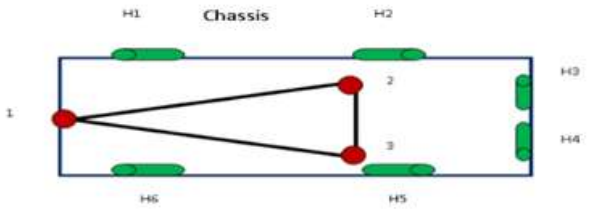

Fig 2.3 Three way tipper mechanism

et all studied [2] A dump trolley is a trolley used for transporting materials (such as gravel, potatoes, grain, sand, compost, heavy rocks, etc.) for construction. A typical dump trolley is equipped with an open-box bed, which is hinged at the rear and equipped with hydraulic pistons to lift the front, allowing the material in the bed to be deposited ("dumped") on the ground behind the trolley at the site of delivery. In this paper, the Control Valve is used to activate/deactivate the oil input. The Valve is „ON" at the time of emergency; the pressurized oil goes to the hydraulic cylinder. Then the pressurized oil passes through the tube, and then pushes the hydraulic cylinder, so that the Lifting is applied at the time of Valve in "ON" position. The pressurized oil flow is controlled by the valve is called "FLOW CONTROL VALVE". This oil flow is already set. Then the pressurized oil goes to the hydraulic cylinders. The hydraulic cylinders piston moves forward at the time of pressurized oil inlet to the cylinder. The hydraulic cylinder moves towards the Lifting arrangement.

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With respect to above reviews from different researches some design and fabrication required for this mechanism By using two hydraulic cylinder of same capacity at edges installed restricting right cylinder and by using the right cylinder left side tilt is possible and vice versa to operate the flow of oil in hydraulic cylinder DC valve is used which can be made automatic by using Ardino Uno control which takes the input provided by switches and pass the input to the DC valve and timing control Valve which operates automatically.

Major Parts Of three way unloading tipper mechanism by using Ardino control:-

- Hydraulic cylinder
- Hydraulic pump
- Trolley
- Chassis (Base frame)
- Hinged Joints
- Connecting hoses
- Wheel arrangement
- Vehicle model frame
- Direction Control Valve by using Ardino Uno Control

IV. CONCLUSION

Design of multisided tipper tilting mechanism is done to help unloading loose material on three side of the tipper as per the availability of space. The construction truck with the three way tipper mechanism helps unloading easier. The benefits of 3D CAD and FEA packages can be taken for designing of three way tipper construction trucks To control the sides of tipping Ardino Uno Control is used. Also we require special types of hinge joints in this case. Study and analysis of existing Tipper system, its design constraints, limitations. Mechanism to be used and its workability. Actual designing and balancing of system. Modifications to overcome the remedies. Comparative analysis of multisided tipper with the existing Tipper system.

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….in, EN8 material is selected which is having tempered and hardened capacity which is reducing the size of pin for The narrow work space and insufficient loading access

restricted the parking position of the tipper. Design and development of mining operations should take into consideration *the safe positioning of tipper vehicles on so2ft or undermined benches particularly where risks are increased by the loading operations. The construction truck with the three way tipper mechanism helps unloading easier. The benefits of 3D CAD and FEA packages can be taken for designing of three way tipper construction trucks. Three way tipper can unload materials in all three sides. To control the sides of tipping there needs to be required one more pneumatic cylinder apart from the main hydraulic cylinder. Also we require special types of hinge joints in this case. • Study and analysis of existing Tipper system, its design constraints, limitations. • Mechanism to be used and its workability. • Actual designing and balancing of system. • Modifications to overcome the remedies. • Comparative analysis of Multiside tipper with the existing Tipper system.