

Three Directional Dumping System for trolley/dumper: A Proposed work

S. N. Waghmare¹, N. J. Kamble², A. S. Dhamankar², A. A. Shinde²,
A. D. Vishwasrao²

(Mechanical Engineering Department, Rmcet, Ambav, India)

Abstract: The conventional dumping mechanism trolley/dumper has been comprehended by detecting the difficulty in unloading the materials. The study in this regards in several automobile garages, revealed the facts that mostly some difficult methods were accepted in unloading the materials from the trailer. This paper has mainly focused on above difficulty. Hence a prototype of suitable arrangement has been designed. The vehicles can be unloaded from the trailer in three axes without application of any impact force. The Direction of the mechanism can be control with the help by providing the sideways movements of the trolley which could be very useful where there is a shortage of space. This mechanism prevents blocking of the road which saves the time and enhances the productivity. This concept saves time & energy which leads to efficient working. This paper proposes a model of three directional dumping systems.

Keywords: Trolley, Chassis, Base, Hydraulic Cylinder, Locker, Pin, Groove & Bearing

I. Introduction

A dumper is a vehicle designed for carrying bulk material, often on building sites. Dumpers are distinguished from dump trucks by configuration: a dumper is usually an open 4-wheeled vehicle with the load skip in front of the driver, while a dump truck has its cab in front of the load. The skip can tip to dump the load; this is where the name "dumper" comes from. They are normally diesel powered. A towing eye is fitted for secondary use as site tractor. Dumpers with rubber tracks are used in special circumstances & are popular in some countries.

Modern dumpers have payloads of up to 10000 kg & usually steer by articulating at the middle of the chassis (pivot steering). A dumper is integral part of any construction work & hence role is important for completion of any constructional site. One of the problem is cited with in the time & energy for setting the huge dumper in proper direction to dump the material it in carrying & hence the need of the project work riser which is about 3 directional dumper which can dump the material in any direction

3-Directional dumper can be helpful for farmers, site construction, garbage collector as well for dumping gravel, sand etc. It also can reduce the work while it can dump in 3 directions. It also takes less time than traditional dumpers which can reduces the work & time.

Truck, tipper, dump truck are used to transport loose material from one place to another place at construction site in mines or in dump yards to accomplish the actual site requirement. If one can understand the ground condition and availability of space in mines and on construction site, it is very tough task to unload loose material at appropriate place, adjustment of truck is needed which take considerable time and effort to unload loose material. As everyone knows that tipper is mostly used for unloading loose material on construction site, mines and dump yards.

The Existing system available is to unload material on back side. As considering the mines space available is very less due to which unloading material on left or right side is not possible to take this as a problem Multisided tipper tilting is the need of time. To overcome one side tilting of trolley, multisided tilting mechanism come into focus. This will help to reduce the efforts to unload loose material one side of tipper.

Now days dropping dumper has been conceived by observing the difficulty in unloading the materials. Dropping damper can unload only in one side by using hydraulic jack mechanism. By this project, mainly we focused on above difficulty. Thus it is easy for the driver to unload the dumper and also it reduces time and fuel consumption. For making tipper mechanism with such above conditions hydraulic jack mechanism can be used.

II. Literature Review

Amboji et al (2014) a proposed a trailer mechanism for the driver to unload the trailer and also it reduces time and fuel consumption. For making tipper mechanism with such above conditions both mechanisms namely hydraulic jack and conveyor mechanism can be used. But eventually it comes with question that how both systems can arrange in single set up? Answer to this question is nothing but this research work.

Three Directional Dumping System for trolley/dumper: A Proposed Work

Borikar et al (2012) developed a prototype model of three direction movement tipper overcomes the problem of unloading the vehicle on side way by using BOOM (D.C. Motor operated). By using Boom the material can be unloaded in all three directions as per requirement. The prototype is developed and tested for its movement in all three possible direction to unload the materials in the tipper trolley and monitor the inclinations for its gradualism (linearity). The results of inclination of the tipper in all three directions are obtained with respect to time period with material and without material as 22.80° and 23.24° for 100 seconds of operation of tipper respectively.

Prasath et al (2015) focused on tipper can unload only in one side by using pneumatic jack or conveyor mechanism. Hence a prototype of suitable arrangement has been designed. The vehicles can be unloaded from the trailer in three axes without application of any impact force. The Direction control valves which activate the ram of the hydraulic cylinder which lifting the trailer cabin in require side. By this research it is easy for the driver to unload the trailer and it reduces the time.

Shinde et al (2014) considered the Modern 3 Ways dropping dumper which has been conceived by observing the difficulty in unloading the materials. The survey in this regards in several automobile garages, revealed the facts that mostly some difficult methods were adopted in unloading the materials from the trailer. They have mainly focused on above difficulty. Hence a prototype of suitable arrangement has been designed. The vehicles can be unloaded from the trailer in three axes without application of any impact force. The Direction control valves which activate the ram of the hydraulic cylinder which lifting the trailer cabin in require side. Further modifications and working limitations will put this work in the main league of use. This concept saves time & energy which leads to efficient working.

Gaikwad and Awate (2011) proposed a work is on placing three hydraulic cylinders each on front side, right side and left side of trolley to unload loose material on back side, left side and right side of trolley respectively. Some design modification is needed in existing system to work on multiside tipper tilting mechanism.

III. Proposed Model



Figure 1 Proposed Model

Figure 1 shows proposed model of three directional dumping system.

Working

Backside: - With the help of gear, ratchet trolley will move in back side direction by mechanism of pin and lock system. It will stop at position where lockers are placed.

Right and left side: - with the help of gear, ratchet and groove it will move in the right direction and it will lock in the locker which is placed on the chassis and hydraulic cylinder will lift the trolley.

IV. Conclusion

We are suggesting the sideways movements of the trolley which could be very useful where there is a shortage of space. This mechanism prevents blocking of the road which saves the time and enhances the productivity. Three direction dumper can be helpful for farmers, site construction garbage collectors as well for dumping gravels, sand etc. it also reduce the work while it can dump in three directions. It also takes less time than traditional dumpers which reduce work time as well.

References

- [1]. AmbojiSudhakar, R., Humane Yogesh, A., ChavanRohan, R., PatilJyotsna, C., &KshirsagarPrashant, R. (2014). Design and Fabrication of Three Way Tipper Mechanism.International Journal of Research in Advent Technology, 2(4).
- [2]. Shinde, G., Tawele, P., &Raut, L. (2014). Design and development of 3-way dropping dumper.Int. J. Emerging Tech. and Adv. Engg, 4(9), 766-775.
- [3]. Prasath, N. E., Shanmugam, S., Sundaram, C. M., &VembathuRajesh, A. DEVELOPMENT OF THREE AXES LIFTING MODERN TRAILER.
- [4]. Borikar, S. A., Karkade, H. V., &Pokley, P. G. (2012). Development, Testing and Monitoring of the Movement of Three Directional Tipper Mechanism.International Journal of Scientific and Research Publications, 158.
- [5]. Gaikwad, H. A., &Awate, N. P. Design of Multiside Tipper Tilting Mechanism