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Fabrication of Three Side Tractor Trolley

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Abstract: The main aim of the project is about studying the difficulty in unloading the materials. Our survey in the regard in several automobile garages, revealed the facts that mostly some difficult methods were adopted in unloading the materials from the trailer. The trailer will unload the material in only one single direction. It is difficult to unload the materials in small compact streets and small roads. In our project these are rectified to unload the trailer in all three sides very easily. Now the project has mainly concentrated on this difficulty, and hence a suitable arrangement has been designed. Such that the vehicles can be unloaded from the trailer in three axes without application of any impact force. By pressing the Direction control valve activated. The compressed air is going to the pneumatic cylinder through valve. The ram of the pneumatic cylinder acts as a lifting the trailer cabin. The automobile engine drive is coupled to the compressor engine, so that it stores the compressed air when the vehicle running. This compressed air is used to activate the pneumatic cylinder, when the valve is activated.

Keywords: Compressor, Directional control valve, Pneumatic cylinder,Trailer and Valve

I. INTRODUCTION

Dumping process has wide applications in areas like agriculture, construction and garbage transportation etc. conventional damping system has limitation of mechanism which do not allows it to dump the material at rear side only. It is highly inconvenient for vehicles to reposition according to dumping side in narrow lanes and limited spaces. This difficulty is overcome by multiple sides dumping mechanism by using single actuator and locking pins. The dumper unloads the material in only one direction. But this incapability can be full new method mechanism as the multidirectional dumping trailer. This mechanism is an approach to reduce the idle time to settle the dumper. The material is unloaded in three directions and hence can be boldly stated as “Three-way dumper.” The major outcomes of three-way directional dumper have overcome space requirement which often result in road blocking. Hence, we have inversion in the existing mechanism providing the unloading in three directions. This mechanism prevents blocking of road, reduce time and increase productivity at lowest cost.

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 is 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 pneumatic/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 pneumatic mechanism can be used.

II. LITERATURE SURVEY

LavateSagar T [1], has developed the three way dumping mechanism which uses the pneumatic system and automatic operated solenoid valves for its operation. When it is required to dump the material at left or right side of the vehicle, the hinges are engaged automatically by the help of pneumatic locking system pin at respective side of trolley and trolley is lifted by actuator connected to trolley and chassis by a Universal joint. By using this technique, it will be easy for driver to unload the trailer and also it reduces time and fuel consumption

Ganesh Shinde [2], 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.

Ahmad Athif Mohd Faudzi [3], explain force control for a pneumatic cylinder using generalized predictive controller approach. He had compare the ability to do force tracing of GPC control and PI controller. Also he has studied different parts of pneumatic cylinder.

A. Dubey [4], The punishing treatment received by the vehicle bodies in service, together with the great variety of use and abuse, means the combinations of many load cases have to be considered in finding the worst one, for the realistic use in the analysis. Before moving directly to these conditions, it will be a fair practice to visit the simplified representation of the structure, and the actual representation of the load over it. The structure can be simply assumed as beam, with uniformly distributed load due to cabin & body over its length, and the point loads at the engine, transmission and various heavily loaded accessories. It is fixed at its four wheels or suspensions.

M. Harte [5], have the optimization of design parameters associated with composite sandwich body shell walls of light rail vehicles (LRV).

Ahmad Athif Mohd Faudzi [6], explain force control for a pneumatic cylinder using generalized predictive controller approach. He had compared the ability to do force tracing of GPC control and PI controller. Also he has studied different parts of pneumatic cylinder.

III. OBJECTIVES AND METHODOLOGY

3.1 Objectives

The main objectives of this proposed work are as follows:

- This concept saves time & energy which leads to effective working of model.
- It will increase efficiency of truck to unload material at desired place without considering the parking area.
- The problems such as overturning of truck and slipping of truck on un-even site will get solved.
- The operating procedure of this system is very simple, so any person can operate.

3.2 Methodology

- Topic of three side tractor trolley.
- We started the work of our project with literature survey.
- We went through many research papers. We sorted out some papers that were relevant to our topic.
- We got different ideas from different research papers. Thus we decided rough idea of how we are going to make our project.
- With the help of information collected selection of material and construction process is done.
- Once the fabrication of the project is done testing takes place at desired conditions and the obtained result is recorded.
- Here we are constructing the prototype of the expected fabrication model.

IV. WORKING PRINCIPLE

This three axis modern trolley is nothing but one of the lifting system in automobile. In this, lifting system is pneumatically operated. Here the pneumatic cylinder and directional control valve is provided in our system. The Fig. 1 shows the Pneumatic Cylinder. In this project, the directional control valve is used to control the air input. In this mechanism there is one pneumatic cylinder used which is operated for lifting the trailer in required direction. In this Lifting system pneumatically operated one. Here the additional pneumatic cylinder and Control Valve is provided in the automobile itself. In this project, the Control Valve is used to activate/deactivate the Air inputas shown in Fig. 2. The Valve is „ON‟ at the time of emergency; the compressed air goes to the pneumatic cylinder. Then the compressed air passes through the tube, and then pushes the pneumatic cylinder, so that the Lifting is applied at the time of Valve in ―ON position. The speed of the pneumatic cylinder is varied by using flow control valve. This is the way of controlling Lifting speed of the Trailer at the time of emergency. In our project, we have to apply this Pneumatic Modern Trailer Mechanism in Load Lifting Vehicles. The Control Valve is fixed in near of the driving persons in the four wheeler. The air tank contains the compressed air already filled. The Valve was ON at the time of emergency, the Control Valve was activated. The compressed air flow is controlled by the valve is called ―Flow Control Valve. This air flow is already set. Then the compressed air goes to the pneumatic cylinders. The pneumatic cylinder's piston moves forward at the time of compressed air inlet to the cylinder.The Fig. 3 shows the frame structure of the project

model. The pneumatic cylinder moves towards the Lifting arrangement.The completed fabricated model of the project work as shown in Fig. 4. The main components used in this project are listed below

- Air compressor.
- Directional control valve.
- Single acting cylinders.
- Flexible pipe.
- Trailer model frame.
- Ball joint.

V. FIGURES

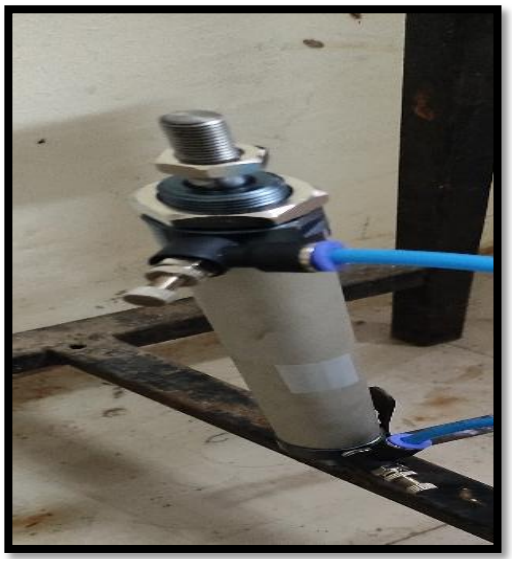

Fig. 1 Pneumatic Cylinder

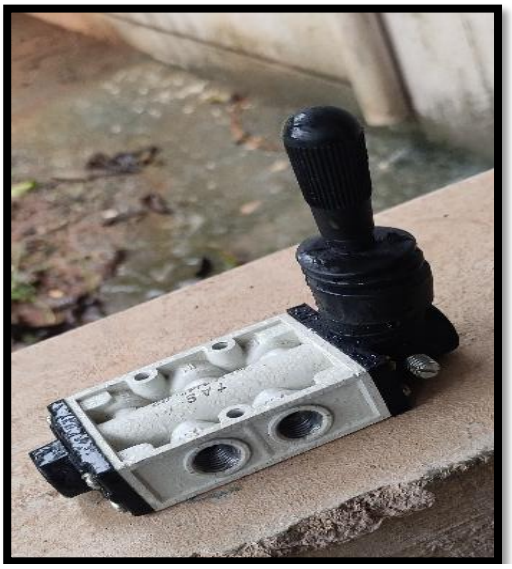

Fig. 2 Directional Control valve

Fig. 3 Frame Structure

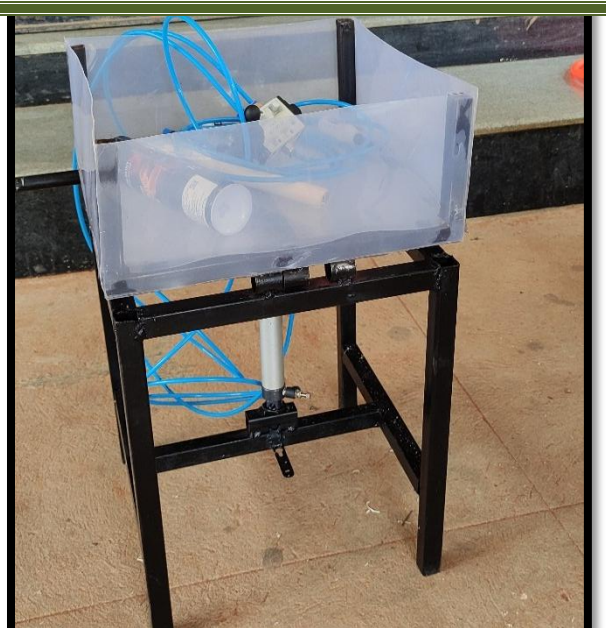

Fig. 4 Completed Project Model

VI. CONCLUSION AND FUTURE SCOPE OF WORK

6.1 Conclusion

This project work has provided us an excellent opportunity and experience, to use our limited Knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between institution and industries.We are able to understand the difficulties in maintaining the tolerances and also quality. We have done to our ability and skill making maximum use of available facilities. The operating procedure of this system is very simple, so any person can operate. By using more techniques, they can be modified and developed per the applications.

6.2 Future Scope of Work

After conducting the operations using this project, following things can be upgraded in the future.

- Precision control over the positioning of the cylinder can be achieved by installation of proper sensor arrangement.
- Instead of one cylinder we can use two small cylinders of identical capacity to lift higher loads with better balancing.
- We can automate the whole system using microprocessors and transformer arrangement.

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