

3-Directional Rotating Trolley

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Abstract: Trailer has lots of applications in today's world. In industrial and domestic considerations, tippers can pull a variety of products including gravel, grain, sand, fertilizer, 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 pneumatic 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. For making tipper mechanism with such above conditions hydraulic jack mechanism can be used. 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 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.

Keywords: Trailer, Tipper, Cylinder Piston, Pneumatic, Conveyor

I. INTRODUCTION

A pneumatically operated rotating trolley has three directions. This can be operated with the help of air pressure. The solenoid valves are used in order to regulate the air pressure, so that the trolley can rotate, by rotating the spur gear over the rack gear. At the required position it is stopped. The cylinder piston arrangement is used to lift the trolley with the help of air pressure; so as to set the trolley in inclined position and the material inside is dropped down.

In daily uses the transport of material from one place to another place, so many methods are adopted in such application. The pneumatically operated rotating trolley will overcome the previous problem of rotation of the trolley. The main problem in the existing trolleys is that the material is dump towards back side only; this requires more man power to scatter the material drained. Such types of difficulties are overcome, if we use a rotating trolley which can rotate and enables to deliver the material towards all sides.

Pneumatics is a section of technology that deals with the study and application of pressurized gas to produce mechanical motion. It deals with the study of behaviour and applications of compressed air in our daily life in general and manufacturing automation in particular. Pneumatic systems use air as the medium which is abundantly available and can be exhausted into the atmosphere after completion of the assigned task. Pneumatic systems are used in controlling train doors, automatic production lines, mechanical clamps, etc.

The Pneumatic Trainer Kit consists of a specifically designed stand with proper working area to build various circuits. All the components are pre-fitted on the working area & duly fitted with 'One Touch Push in Fittings' for easy fitting of PU tubes, which are provided for fast & leak-proof connections.

A dumper is a vehicle designed for carrying bulk material, often on building sites. Modern dumpers have payloads of up to 10000kg and usually steer by articulating at the middle of the chassis (pivot steering). A dumper is an integral part of any construction work and hence its role is important for completion of any constructional site. One of the problem are cited with dumper in the time and energy for setting the huge dumper in the proper direction to dump the material it in carrying and hence the need of the project work riser, which is about 3 way dropping dumper which can dump the material in any direction except the rental one without moving the truck in any direction.

A dump trolley is used for transporting loose material (such as sand, gravel, or dirt) for construction. A typical dump trolley is equipped with a hydraulically operated open-box bed hinged at the rear, the front of which can be lifted up to allow the contents to be deposited on the ground behind the truck at the site of delivery. In the UK and Australia, the

term applies to off-road construction plant only, and the road vehicle is known as a tipper, tipper lorry (UK) or tip truck (AU).

1.1 Objective

The basic objectives of this project work for carrying the waste material from the public residential area to remote place where the waste material is dropped.

- [1] To reduce labour cost.
- [2] To minimize the overall operation and production cycle time.
- [3] It is having more power than electric power and has less cost than the hydraulic power systems.
- [4] The trolley so developed having the technique three side dumping which enable to deliver the material towards all sides i.e. back side, left side and right side.

II. METHODOLOGY

This project covers the details explanation of methodology that is being used to make the Model of project. Many methodology or findings from this field mainly generated into journal for others to take advantages and improve as upcoming studies. The method is use to achieve the objective of the project that will accomplish a perfect result. In order to evaluate this project, the methodology based on System Development Life Cycle (SDLC), generally three major steps, this is:

- Planning
- Analysis
- Design
- Implementation
- Maintenance and Support

Project starting from planning, implementing and testing. All the methods used for finding and analysing data regarding the project related.

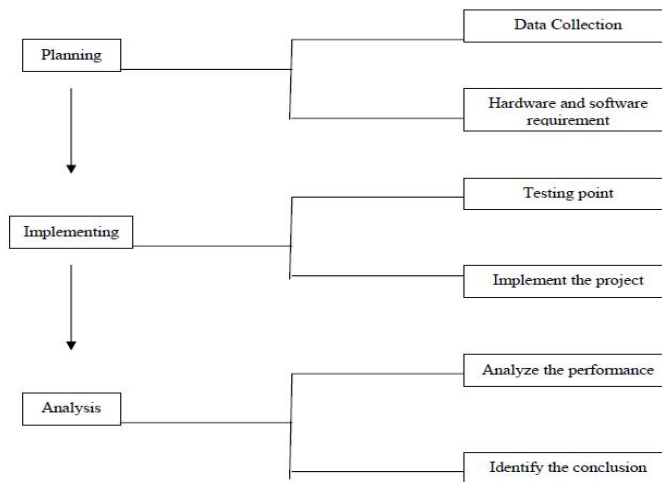
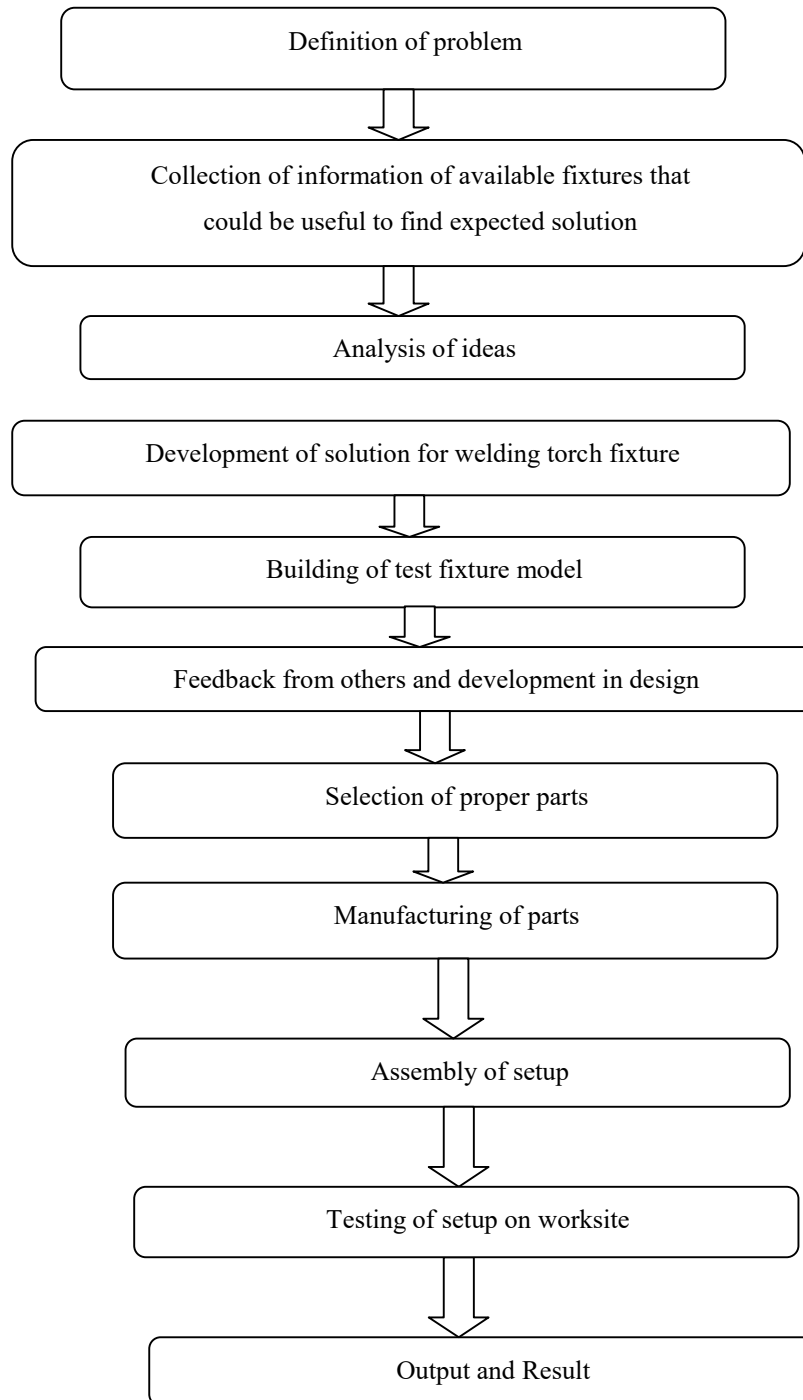


Fig. 1. Planning

FLOWCHART



III. FUTURE SCOPE

World progressing at faster rate which demands efficient working equipment's such as user friendly machineries and hence the three way dropping dumper may be used more than the two way or one way.

During the completion of this project we found out that there are many possibilities with which this project can be enhanced. For more accuracy and precise motion hydraulic system can be used. By using sensor, stopper mechanism we can stop the trolley at any particular angle and any particular direction to dump the goods. To reduce the human work automatic locking and unlocking mechanism can be used.

In our project if the operation of rotates of the trolley or dumping the trolley is done remotely or even automatically by using the software technology and making the system total automatic. This will minimize the requirement of the man power and the function can be done continuously without any break and thus increasing the efficiency.

For the purpose of automation, the sensor technology is used to notice the angle of rotation of the trolley shaft and even this position can be observed remotely through wireless technology.

PLC based operation of the pneumatic trolleys makes it more reliable. Thus we can make the system more flexible and sophisticated. Thus the trolleys are of high importance in industry.

The work can be modified further more on following basis: -

- [1] Dual stage cylinders can be used.
- [2] Capacity can be increased.
- [3] Four-wheel steering can be adopted for more movement ability.

IV. CONCLUSION

This concept saves time & energy which leads to efficient working. The constructional work or the infrastructural work demands efficient and user friendly machinery which will lead to more and more use of unidirectional trolley.

After carrying out the design process of our project we got positive output. We have been able to increase the easiness in unloading trolley. Problems occurred at the time of unloading the trolley in critical areas are eliminated. And thereby reducing overall time and fuel required for unloading the trailer.

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