

Working Principle of Three Axis Pneumatic Advance Trailer

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Abstract: The trailer is unloading the material in only one single direction. It is difficult to unload the materials in small compact streets and small roads. In this seminar these are rectified to unload the trailer in all three sides very easily. The motor drive is coupled to the compressor so that it stores the compressed air when the three axis pneumatic advance trailer. This compressed air is used to activate the pneumatic cylinder, when the valve is activated. the efficiency of dumping trailers will increase. The unloading of materials can be done to the three directions. This is very useful in the shipping industry.

Keywords: Pneumatics, compressor, trailer, motor.

1. Introduction

The Three Axis Pneumatic Advance Trailer is nothing but one of the Lifting system in automobile at the time of emergency. In this Lifting system pneumatically operated one. Here the additional pneumatic cylinder and Control Valve is provided in the automobile itself. In this seminar, the Control Valve is used to activate/deactivate the Air input. 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 (i.e. Emergency time). 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. 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 cylinders piston moves forward at the time of compressed air inlet to the cylinder. The pneumatic cylinders move towards the Lifting arrangement.

Material handling in construction and civil works is one of the basic necessities. The material supply to civil and construction is provided through trucks, dumper etc. The material should be properly loaded, managed, stacked, transported and unloaded. The dumper carries the material which is loaded from the site, where the material is initially stored. It is then loaded to the dumper and transported to the

required site and then unloaded. The major issues raises over here, the incompatibility of the site with the fully loaded dumper causes a lot of settling time for the trolley to get the material properly arranged and transportation time to reach its location. The dumper unloads the material in only one direction. But this incapability can be full new method mechanism as the "Three Axis Modern Pneumatic Trailer". Gothic mechanism is an approach to reduce the idle time to settle the dumper. The material is unloaded in any direction and hence can be boldly stated as "three axis modern pneumatic trailer". The major outcomes of "three axis modern pneumatic trailer". Has overcome space requirement which often result in road blocking. Hence, we have inversion in the existing mechanism providing the unloading in 180 rotations. This mechanism prevents blocking of road, saves time and enhances productivity at lowest cost.

The automotive sector is fast booming section in India. There are variable in automotive industry light and heavy motor vehicle. Heavy-duty vehicle support as the backbone and confront to the working. A dumper whose material can easily be unloaded in one direction that is mostly to its rear end. These inefficiency is been overcomes three axis modern pneumatic trailer. Automation can achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation. Automation plays an important role in automobile. Nowadays almost all the automobile vehicle is being atomized in order to product the human being.

2. Guidelines

A. Types of dump truck

1) Dump trucks in the 1950s

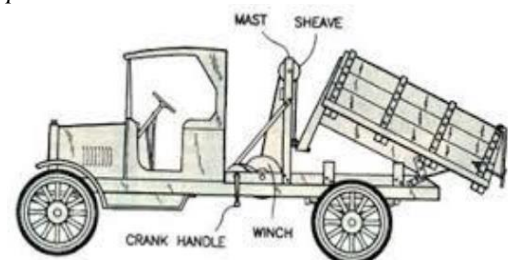


Fig. 1. Dump box for truck

The 1940s the technological development of dump trucks had reached its peak. In the U.S., bottom dump trucks were already dominating earthmoving sites by the 1950s. As the industry moved away from a reliance on rail operations to haul material, the need for domestically produced construction site tippers began to emerge. One of the heavy-duty dump trucks manufactured during this time was by Faun.

B. Standard dump truck

Another kind of 8x4 dump truck three rear axles (two powered one lift) A standard dump truck is a truck chassis with a dump body mounted to the frame. The bed is raised by a hydraulic ram mounted under the front of the dumper body between the frames, and the back of the bed is hinged at the back to the truck. The tailgate can be configured to swing on hinges or it can be configured in the "High Lift Tailgate" format wherein pneumatic rams lift the gate open and up but is distinct from semi-trailer trucks in that the cab is a permanent fixture, not a separable vehicle. above the dump body.

C. Articulated dump truck

An articulated dump truck, or "Yuck" in the construction world, has a hinge between the cab and the dump box Steering is accomplished via hydraulic rams that pivot the entire cab, rather than rack and pinion steering on the front axle. This vehicle is highly adaptable to rough terrain. In line with its use in rough terrain, longer distances and overly flat surfaces tend to cause driveline troubles, and failures. Articulated trucks are often referred to as the modern scraper, in the sense that they carry a much higher maintenance burden than most trucks. See the first mass produced articulated dump truck (articulated hauler).

D. Truck and Pup

A truck and pup is very similar to a transfer dump. It consists of a standard dump truck pulling a dump trailer. The pup trailer, unlike the transfer, has its own hydraulic ram and is capable of self-unloading.

E. Super dump truck

A Super dump is a straight dump truck equipped with a trailing axle, a lift able, load-bearing axle rated as high as 13,000 pounds (5,897 kg). Trailing 11 to 13 feet (3.35 to 3.96 m) behind the rear tandem, the trailing axle stretches the outer "bridge" measurement—the distance between the first and last axles to the maximum overall length allowed. This increases the gross weight allowed under the federal bridge formula, which sets standards for truck size and weight. Depending on the vehicle length and axle configuration, Super dumps can be rated as high as 80,000 pounds (36,287 kg). GVW and carry 26 short tons (23.6 t; 23.2 long tons) of payload or more When the truck is empty or ready to offload, the trailing axle toggles up off the road surface on two hydraulic arms to clear the rear of the vehicle Truck owners call their trailing axle-equipped trucks Super dumps because they far exceed the payload, productivity, and return on investment of a conventional dump truck. The

Super dump and trailing axle concept was developed by Strong Industries of Houston, Texas.

F. Semi-trailer end dump truck

A semi end dump is a tractor-trailer combination wherein the trailer itself contains the hydraulic hoist. A typical semi end dump has a 3-axle tractor pulling a 2-axle semi-trailer. The key advantage of a semi end dump is rapid unloading. A key disadvantage is that they are very unstable when raised in the dumping position limiting their use in many applications where the dumping location is uneven or off level.

G. Semi-trailer bottom dump truck

A semi bottom dump (or "belly dump") is a 3-axle tractor pulling a 2-axle trailer with a clam shell type dump gate in the belly of the trailer. The key advantage of a semi bottom dump is its ability to lay material in a wind row (a linear heap). In addition, a semi bottom dump is maneuverable in reverse, unlike the double and triple trailer configurations described below. These trailers may be found either of the windrow type shown in the photo, or may be of the 'cross spread' type with the gates opening front to rear instead of left and right.

3. Working Principle

In this modern three axis pneumatic trailer system, the air circuit plays a vital role in the system and it is necessary to understand the movement and working principle of the air circuit. First we can start with the compressing of the air; the atmospheric air which is normal pressure is taken by the reciprocating compressor and converted into higher pressure depending on the requirement. Cooling as to be provided for the compressed air to neutralized the heat generated by the compression process. The compressed air is supplied to the compressed air tank and the compressed air tank should have a drain to drain the water accumulated in the tank air moisture condensation. In the ship the main air bottle is used for the three axis trailer operation with the help of the pressure reducing valve because the main air bottle pressure is nearly stored at 35 bars for the main engine starting operation. In the modern three axis pneumatic trailer system we need maximum of 7 bars, 35 bars air pressure will damage the system. But some cases the variable pressure reducing valve will be used depending the requirement of the system also direction control valve are available for the desired operation.

For the pneumatic circuits usually the 5/2 direction control valve is used for the better compatibility. When the high compressed air is supplied from the compressor which is operate on external source through the flow control valve .The hand lever of flow control valve is activated when it is required to start the flow of air as well as pressure required .the flow control valve is act as a nonreturn valve The flow control valve is activated at the time of hand lever in forward direction "ON". The compressed fluid (air) goes to the pneumatic single acting cylinder. The compressed air passes the pneumatic cylinder piston and move forward. The RAM is fixed at the end of the

double acting pneumatic cylinder. Due to the compressed air, the piston moves towards the upward direction and the ram is lifting the trailer upwards. The flow control valve is deactivated at the time of hand lever in backward motion “OFF”. The air goes to the atmosphere from the cylinder through Exhaust port. Then the RAM & piston is moves downward direction and the trailer set at original position. When we change the lifting side of cylinder by removing the pins to another position for dumping another side. The compressed air is supplied to cylinder the piston moves in upward direction with the help of ram which is fixed at the end of pneumatic cylinder and procedure is same for another side dumping.

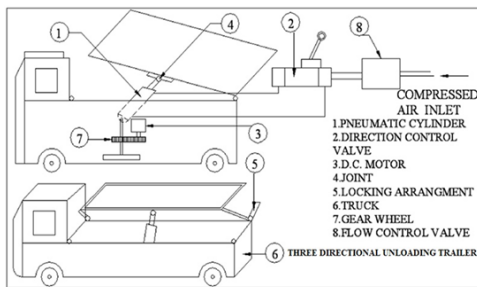


Fig. 2. Working principle

4. Conclusion

This paper presented an overview on working principle of three-axis pneumatic advance trailer.

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