WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Pneumatic Braking System

[1]THOTA VENKATA NAVEEN KUMAR (ROLL NO:317132920063) ,[2]N.RAMESH (317132920009), [3]D.BALA RAJU (ROLL NO:317132920027), [4]P.RAMESH (317132920045), [5]P.RAMANA BABU (317132920053) ,[6]Dr.S. RAMANA BABU

[12345]Final Year B. Tech Students,
[6]Head of the department,
Department of Mechanical Engineering,
SanketikaVidyaParishadEngineering college.

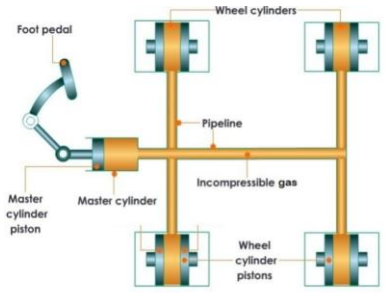
.ABSTRACT:

Design and development of a pneumatic air braking system is the goal. A brake is a mechanism that applies frictional resistance to a moving machine element in order to slow or halt the machine motion. Most brakes use friction between two surfaces that are forced together to convert the kinetic energy of a moving object into heat and slow down the vehicle's motion. A pneumatic brake is one that uses air as its operating fluid. Pneumatic Braking System is the system that is used to apply this phenomenon. A pneumatic brake, also known as a compressed air brake system, is a type of friction brake for automobiles that uses compressed air to apply the brake pad and bring the vehicle to a stop. The major goal of this project is to lower the burden of the engine drive in order to operate the air compressor, which is not done by the engine drive in this case. For actuating various systems, a battery is used as a power source. The air compressor compresses ambient air, which is then stored in the air tank, which has a pressure relief valve to keep the pressure in the tank under control. To apply the brake, the air tank sends compressed pneumatic power to the pneumatic actuator via a solenoid valve. The pneumatic actuator is a two-acting cylinder that transforms hydraulic energy into linear motion. The system developed is a useful for prompt braking action

1.INTRODUCTION:

The air braking system was originally developed for railway cars to increase brake reactivity and safety, as well as to avoid the all-too-common train collisions. Air braking systems began to be used in road cars when a number of upgrades and enhancements to the original model were made, and their effectiveness was established. In 1869, George Westinghouse (founder of the Westinghouse Air Brake Company – WABCO) invented the railway air brake in New York. It used a triple valve and a reservoir on the carriage to invert the direct air brake's behaviour: charging air into the brake pipe charged the system and released the brakes, while draining air from the brake pipe applied the brakes. This mechanism was much more responsive and fail-safe, and it became the foundation for today's air brake.

2.WORKING PRINCIPLE:



WORKING OF PNEUMATIC BRAKE SYSTEM

Pneumatic or Air brakes operate on compressed air. Entire braking system pipeline is initially charged up with compressed air to maintain optimum pressure. This charged up brake line makes sure the brakes are dis-engaged. Moment driver applies force on brake pedal, air pressure drop initiates via. driver's brake valve. Due to this pressure drop, control reservoir gets disconnected from the brake pipe and auxiliary cylinder gets connected to brake cylinder. Compressed air from auxiliary cylinder rushes in to the brake cylinder causing brake to get engaged. This is how pneumatic brakes work in real time operation of brake pedal by drive.The simplest air brake system consists of an air compressor, a brake valve, series of brake chambers at the wheels, unloader valve, a pressure gauge and a safety valve, and an air reservoir. These are all connected by tubespressure indicator, an air supply valve to supply air for tyre inflation, a quick release air quickly Some air braking systems may have additional components such as stop light switch, a low from the front brake chambers when the brake pedal is released, a limiting valve for limiting the maximum pressure in the front brake chambers and a relay valve to help in quick admission and release of air from the rear brake chambers.

3.COMPONENTS:

1.Mild steel frame.
2. Wooden plank.
3. Motor and gear wheel.
4. Compressor.
5. Pneumatic cylinder.
6. Pneumatic lever.
7. Motor and Gear wheel.
8. Bearing -Motor gear and wheel gear.
9. Free wheel.
10. Battery.
11. Pneumatic cables.

4.SPECIFICATIONS:

1. Pneumatic cylinder – 10kpa.
2. Dc compressor – 12 v
3. Battery – 12v

5.CONCLUSION:

Brakes are the parts of the vehicle that absorb the energy generated by a vehicle in motion order to stop if. Pneumatic brakes become popular because of their tremendous stopping power and long as compared to hydraulic system. In order to do this a system with several components with proper function is required. Thought the pneumatic brake is complicated to use ad training has to be provided for its efficient use because of its tremendous power and its effectiveness. One of the reasons why a pneumatic system is commonly used in industrial equipment is that it is intrinsically safe. It does not derive power or energy from electricity; hence, a pneumatic system will not produce sparks that could ignite gases and cause fires or explosions. Mining equipment, factory equipment, and other similar hazardous working environments benefit from using pneumatic systems.
Atmospheric air is abundant and readily available, which makes the power source an infinite resource. A pneumatic system purges compressed air, automatically keeping the instrument clean and free from contaminants that can damage or prevent the system from working. A pneumatic system is easy to maintain and easy to use. Pneumatic systems are suitable for working environments exposed to radiation and high temperature, which makes pneumatics immune to most elements present in nature. A pneumatic system can also use other types of compressed gases. This is beneficial for applications where natural gas is the power source. Compressed natural gas may be used as an alternative power source for pneumatic instruments
A pneumatic device is sensitive to extreme changes in temperature as well as vibration.

Compressed air is more expensive than electricity It is essential to ensure that there are no leaks in a pneumatic system because compressed air escaping leads to energy loss. Pneumatic systems are known for making a loud noise. As a solution, you can install a silencer in every dump line. Installation cost increases when the instrument requires speciality pipes. Pneumatic systems are not upgradable to become compatible with smart

electronic. Despite these disadvantages, however, modern machines still use pneumatics because it is reliable. Many facilities that have been using pneumatic systems for many decades now prefer to do so because it is a significant expense to replace the instruments, and the benefits of using another system yet to be proven.

REFERENCES

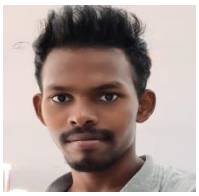
[1] Ji, H., & Zhou, D. (2020). Incipient fault detection of the high-speed train air brake system with a combined index. Control Engineering Practi100104425. doi: 10.1016/j.conengprac.2020.104425

[2]Gong, J., Luo, Y., Qiu, Z., & Wang, X. (2020). Determination of key components in automobile braking systems, based on ABC classification and FMECA. Journal of Traffic and Transportation Engineering (English Edition).doi: 10.1016/j.jtte.2019.01.008.

Annexure

N.RAMESH

D.BALA RAJU



P.RAMANA BABU

P.RAMESH

T.V.NAVEEN KUMAR

Smt . CH. BHANU SRI (M. Tech)
Associate Professor
and Head Of The Department