



DEVELOPMENT OF RAILWAYS BY USE OF PISTONS (POWER TRACKS)

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Abstract: Mumbai local trains are the lifeline of Mumbai city. The city has Peak hours for travelling in train which has a lot of impact on the life of the travellers. The crowd of the city travelling in this trains depend fully on the trains and due to the population travelling everyday in train and the mismatching of the capacity of the trains to carry this travellers it has become a major issue for every citizen to travel through trains. From our project we are bringing the concept of increasing the number of trains, for this we took the Western Railway from ' Churchgate to Virar ' under consideration as an example to implement the idea of raising platform by the use of hydraulic pistons and letting the crowd more space to get off the trains from both sides of the train doors. Further, we thought of the economy of this project and this project can be made economical by making use of hydraulic pistons to meet the needs of electricity of the platforms, and can also be used as pumps. From this project, we hope to build a better, efficient and economical alternative for our railways.

Keywords: Railway, track, piston, power.

I. INTRODUCTION

Moving platform is a future concept. The introduction to moving platform is making a railway platform which. It is a railway platform made by using a hydraulic energy converting into mechanical energy. Fluid power is through liquids or gas in a confined space. Fluid power is the technology that deals with the generation, control and transmission of forces and movement of mechanical terms or system with use of mechanical elements or system with the use of pressurized fluids in a confined space. Fluid power system includes a hydraulic system where (hydra means water in greek and in a pneumatic system (pneuma means air in greek). Moving platform is a future concept. The moving platform is making a railway platform which will raise on the force created by the axles of train when it will get struck to the hydraulic machines connected parallel to the railway tracks laid for the respective train. It is a railway platform made by using a hydraulic energy converting into mechanical energy. Fluid power is through liquids or gas in a confined space. Fluid power is the technology that deals with the generation, control and transmission of forces and movement of mechanical terms or system with use of mechanical elements or system with the use of pressurized fluids in a confined space. Power tracks, moving platform are necessary for future of Indian Railway. In Indian railway in every day around 500 trains travel on the way route guess for example: 500 trains travel everyday only one side from Churhgate - Virar due to the raising or moving platform technology the time gap between every train may be reduced from 3 minutes to 1.50 minutes and the number of trains travelling can be doubled to around 1000 trains everyday from Churchgate - Virar etc.

AUTOMATIC PLATFORM RAISER :

Aim to raise the platform when the train approaches station using hydraulic action. (PRINCIPLE OF HYDRAULIC LIFT). This is a simple concept of hydraulic lift principle. When the train approaches the station, before the station parallel to the railway tracks hydraulic lifters are placed. The axle of train strikes the hydraulic lifts and the platform raises. Since the hydraulic press works on the basis of Pascal's Law, its working is similar to the one of the hydraulic system. A hydraulic press consists of basic components used in a hydraulic system that includes the cylinder, pistons, the hydraulic pipes, etc. The working of this press is very simple. The system comprises of two cylinders, the fluid (usually oil) is poured in the cylinder having a small diameter. This cylinder is known as the slave cylinder.

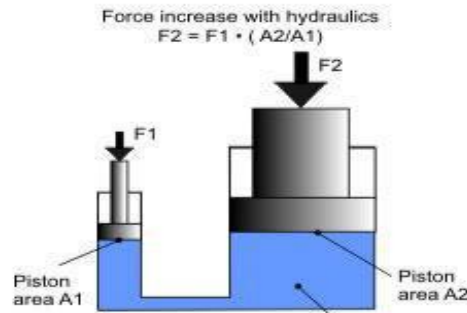


Figure no : 1

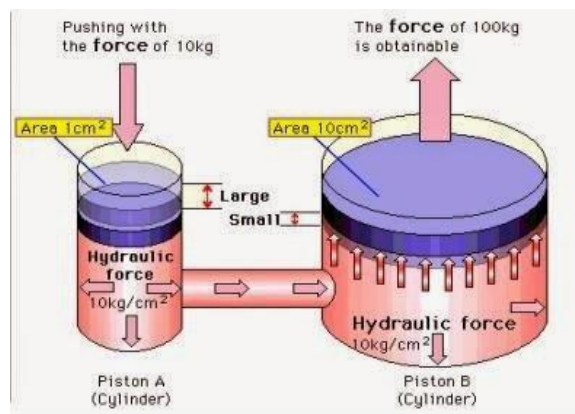
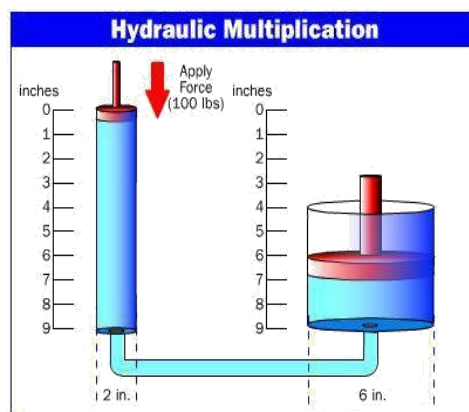


Figure no : 2

The piston in this cylinder is pushed so that it compresses the fluid in it that flows through a pipe into the larger cylinder. The larger cylinder is known as the master cylinder. The pressure is exerted on the larger cylinder and the piston in the master cylinder pushes the fluid back to the original cylinder. The force applied on the fluids by the smaller cylinder results in a larger force when pushed in the master cylinder. The hydraulic press is mostly used for industrial purposes where a large pressure is required for compressing metals into thin sheets. An industrial hydraulic press uses the material to be worked upon along with the help of the press plates to crush or punch the material into a thin sheet



PROCESS :

- Pistons are placed at regular intervals at opposite side of platform running parallel to railway tracks
- When the train approaches the station , the axle of wheel impacts on the head of piston .
- A. A huge force is applied on a comparatively smaller area of piston .
- B. Hence pressure is created on the left side of the limb .



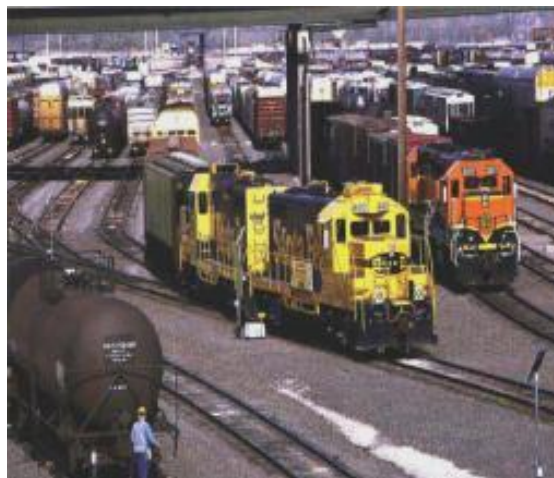
- C. This pressure is transferred to the limb connected to the platform below railway tracks .
- D. As cross sectional area of platform is much greater than the piston , the platform is raised to the required height.
- E. The cross sectional area of platform is designed in such a way that it rises to the required height.
- F. Hence many pistons are placed or provided to cover the entire area .
- G. When the train arrives towards the station this platform is raised and connected to the end .
- H. Thus reducing the crowd and easily movement of people .

II. INTRODUCTION (PART-2)

Electric generator, also called as dynamo, any machine that converts mechanical energy to electricity for transmission and distribution over power lines to domestic, commercial, and industrial customers. Generators also produce the electrical power required for automobiles, aircraft, ships, and trains . The mechanical power for an electric generator is usually obtained from a rotating shaft and is equal to the shaft torque multiplied by the rotational, or angular, velocity. The mechanical power may come from a number of sources: hydraulic turbines at dams or waterfalls; wind turbines; steam turbines using steam produced with heat from the combustion of fossil fuels or from nuclear fission; gas turbines burning gas directly in the turbine; or gasoline and diesel engines. The construction and the speed of the generator may vary considerably depending on the characteristics of the mechanical prime mover. The dynamo can create 80 – 90 volts per piston.

Working:

When the train comes towards the railway station the axle of the wheels of the trains; struck the pistons placed at regular intervals. To this pistons electricity generating dynamos are fixed up. when the train comes and strikes the pistons the springs connected to the piston to the hydraulic pistons gets momentum . The working of dynamo is generally based on the theory or application of hydraulic and the momentum energy converting into electricity by the dynamo When the train's axle strikes to the piston the momentum is created into the pistons and with the help of this momentum the electric generator dynamo starts creating electricity which can be further used for the electricity needs of the railway platform . It can create 80 – 90 volts of electricity per piston as the train strikes the piston with a force with 40 km/hr. The train's axle gives a struck on the piston and the momentum is created into the springs. Due to this momentum energy the dynamo generates electricity. If the train travels at a speed of 40 km/hr the retardation at every piston connected will be 3000 joules as it is less the quantity of electricity generation can be increased by increasing the speed of the train and also by increasing the number of pistons connected to the electricity generating dynamo. It creates 80 – 90 volts of electricity per piston at a speed of 40 km/hr . This helps in creating electricity and supplying for various purposes of the railway platforms etc . As the number of pistons are increased the electricity generated is very high and as we all know that we have decreased the time gap between the trains the electricity generation will be going on and on for 24 hours .During the passage of wagons through marshalling yards accurate speed control is essential for high throughput and zero damage to rolling stock and freight. Speed control is the only means by which optimum operation can be achieved.



With this in mind New Joules Engineering North America Inc. has over the past decade, designed, developed and implemented a variety of products to achieve the efficiency needed to cope with modern day demands of high- speed



marshalling yards. The result of which is the joule retarder . The speed control offered by the JOULERETARDER in marshalling yards allows rail road organizations to hump all types of freight inclusive of automobiles , petrochemicals, livestock and hazardous materials, at the same time virtually eliminating freight and car damage. Speeds offered, ranges from 0mph through 8mph. Typical coupling speeds of 4mph is used in most yards As a proven design these retarders are used throughout the US and available in speed settings ranging from 0 mph to 9 mph . These units can be used all the way from the crest to the bowl tracks, providing speed control from humping operations at the crest to “soft” coupling in the bowl tracks. The retarder is sealed to prevent unnecessary water and debris to enter the housing. It is also beneficial to have a seal edunit in areas of high spillage and where icings a problem. These units are designed for ease of installation and maintenance. Operating in ambient temperatures ranging from –40 to150 F, including rain, snow and ice.



III.CONCLUSION

At a single piston energy of min. 3000 joules can be obtained if a train travels at a speed of 4m/hr. (Mumbai locals travels at avg. Speed of 40000m/hr) When it comes for crowd management at platforms, movable platies are the solution which means uplifting a movable platform to its position when a train arrives on the platform and then return to its original position after its departure. If the train travels at a speed of 40 km/hr the retardation at every piston connected will be 3000 joules as it is less the quantity of electricity generation can be increased by increasing the speed of the train and also by increasing the number of pistons connected to the electricity generating dynamo. It creates 225 volts of electricity per piston at a speed of 40 km/hr .Due to the retarders at the piston the pressure is created and this pressure is used to pump water on the stations .The motor man does not require to apply brakes as the train’s axle strucks the pistons and stops at the platform .

REFERENCES

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