

# Fabrication of Pneumatic Railway Gate

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**Abstract - Fabrication of Pneumatic Railway Gate**  
Pneumatic railway gate is that type of railway gate which operates, with the help of pneumatic cylinder as the main component. Nowadays accident is the major problem in Railways. As per the latest census of India, around 110 accidents took place every year. For this major issue it is very important to take a necessary action.

Pneumatic Railway gate explicitly deals with one of the common problems of traffic jam beside the Railway gate. The working principle of Pneumatic Railway Gate is like when compressed air from the compressor is passed to the air flow controller system which is operated as sensor gets active in the system. And after that the different hardware component in the system works accordingly.

**Index Terms - Pneumatic Railway Gate.**

## INTRODUCTION

The railway is the most commonly used transportation mode in INDIA. It is also one of those mode of transport where a minor human error can cause multiple fatalities as in level cross accident, collisions, etc. A level cross an intersection of a road and a railway line, requires human coordination, the lack of which leads to accidents. Level crosses are mostly controlled by manually operated gates. In order to avoid the human errors that could occur during the operation of gates, the proposed paper introduced the concept off railway gate automation.

## LITERATURE SURVEY

1. Vishvanathan CR, Vidyashree PV Sujit Kumar (2018): The author provides some solution to accidents and delay in arrival of train, a gate is placed for controlling the movement of vehicles which requires human effort and coordination. Gates are manually operated error which may give rise while

opening and closing of gate and technique is suggested here. This paper introduce a whole new way of automating things. From the expected result automation of railway gate control system is implemented to reduce accident and which allows and avoid vehicles and people from passing the crossing. Automation of crossing gate make easy and secure to control the gate in order to avoid accidents and save time of the road users.

2. UJWAL KOHLI, ANMOL AGRAWAL (2016): He introduce smart unnamed level crossing system which is economic and automatic. In automatic railway gate at level crossing replacing the gate operated by the gate keeper, it deals with reduction of time for which the gate is being closed and provide safety to the road user by reducing accidents. By employing the automatic railway gate control at the level crossing the arrival of the train is detected by infrared sensors place near gate. Error due to manual operation is prevented. In this study the author has place battery to collect electricity supply from piezoelectric plates then battery connected to main parts of the system the is IR sensors and LED screen timer.

3. KARTHHIK KRISHNAMURTHY (2015): He introduce the concept of railway gate automation. to avoid the human error that could occur during operation off gate sensor is being used. Delay in opening and closing of gate-by-gate keepers may cause the railway accidents. This paper helps to develop a system which automate gate operation at the level crossing using microcontroller and detect collision at the level crossing the components which is used for automation of railway gate are sensor that is infrared sensor. IR sensors detects the radiation to detect the motion of the object surrounding it.

4. ANIL M.D.et al (2014): He discussed about Advanced Railway accident prevention System Using Sensor Network system in that he talks about increased rail traffic density across the world and in such circumstances how to control. This system makes of IR sensors, fire sensor, Zigbee and embedded system which prevent accidents. when the train arrival at a distinctive side then transmitter IR sensor create their indication and makes railway into stopping position.

5. M KIRUTHIGAET al (2014): researched on Wireless communication system for railway signal automation at unnamed level. He analyses the accidents at unnamed level crossing and collision of train running on same track where the accident is more in railway. Therefore, he proposed to develop full proof system to avoid such accidents. Automatic closure of unnamed gate reduced the time for which the gate is being kept closed and provide safety to the road users by reducing accidents “Railway Gate operated by means of Pneumatic system.’

The railway gate is operated by means of pneumatic system in which we use air compressor, pneumatic cylinder, air flow controller, to operate railway gate.

Pneumatic railway gate: The pneumatic railway gate is gate which is operated with the help of pneumatic system in which our air compressor works at 10 bar pressures to operate pneumatic cylinder to lift the gate at a desire height. The compressed air will pass to hand lever valve (air flow controller) which is of 4/2 flow which allows the air flow to perform an operation of gate as opening and closing.



Fig.1.PNEUMATIC OPERATED RAILWAY GATE

#### Principle Parts

The Pneumatic operated gate consists of following principle parts.

1. Air compressor
2. Hand lever valve
3. Pneumatic cylinder

#### 1. Air compressor

An air compressor is pneumatic device that converts power (using an electrical motor, diesel, or gasoline etc.) into potential energy stored in pressurized air. By one of several method, an air compressor force more and more air into a storage tank, increasing the pressure. When the tanks pressure reaches its engineered upper limit the air compressor shuts off.



FIG 1.1 AIR COMPRESSOR

#### 2. Hand lever valve

In the absence of electrical supply, manually operated valves such as Hand Lever Valve are used. The functioning is the same however the solenoid coil is replaced by a hand lever which control the movement of the spool inside the valve there by allowing the air to pass. The hand lever vale we use in our project to operate the pneumatic cylinder work and gate is of 4/2 flow valve. Which have four port of air flow and two of position.



FIG1. 2. HAND LEVER VALVE

### 3. Pneumatic cylinder

Pneumatic cylinders use compressed air to create rotary or linear mechanical motion and power application that do work. The pneumatic actuator will use the compressed to act on a piston inside the cylinder in order to create the required motion for example clamping or moving load along a linear path. The end application can be as varied as specific device like a gripper or clamp to a vacuum cup used to handle glass.



FIG1. 3. PNEUMATIC CYLINER

Problem: -The current system of railway gate operating is the hydraulic system in which citizen faces a lot of problem and occurs to road accident. Road at railway gate is increasing in day-to-day life and cause death and injury.

1. Road accident at railway gate leading causes death and injuries worldwide.
2. This project explicitly deals with one of the common problems of traffic jam beside the railway gate.
3. To solve such problem, we have come with idea to operate railway gate with pneumatic system.

### METHODOLOGY

3.1.1 Finding Problem: -Road accident on railway gate is the problem which affects many human lives around the world this is a major issue, and it is a question of death or life for those persons who die on railway gate.

3.1.2 Collecting research paper: -Collecting research paper from the internet on the fabrication of Pneumatic railway gate control system. Collecting research paper on sensor operated pneumatic railway gate open & close control system collecting research paper on pneumatic based railway gate control system.

3.1.3 Project proposal: -Making a project proposal for the selection of project and experiencing our ideas with project in charge and getting suggestion and implementing that suggestion and submitting the project proposal to the project in charge.

3.1.4 Selecting area of work: -After project finalization we have to decide and area of work for fabrication of pneumatic railway gate control with respect to the residence of group members as the suitable area of work is our group member house college workshop and other workshop for fabricating some complex components.

3.1.5 Making CAD model and animation of machine: -Making and CAD model of machine for clearing all the concepts related to the machine. Making the animation of machine for explaining the working of machine.

3.1.6 Finding resources: -Resources should be fined for fabrication of machine it requires some prefabricated parts which are readily available in market also the complex parts such as telescopic rod and Archimedes screw should be fabricated from various workshops finding the materials and work piece for fabricating those parts.

3.1.7 Collecting different components: -After fabrication and purchase of all the components all the components should be collected from various locations at the workplace.

3.1.8 Assembly: -Assemble all the components of our model according to their proper position and check they are work proper or not.

3.1.9 Trial on project: -Take a trial on project and find out some parameters such as

1. Time required for gate open & close.
2. Check the sensor sensing power.

### WORKING

This type of gate locking system is used for security purpose. This unit will operate using pneumatic cylinder so less manpower is required. This pneumatic operation is somewhat faster than other methods. The compressed air from the compressor is passed to the

solenoid valve which controls the direction of flow of air to the pneumatic cylinder. Initially the pneumatic cylinder is in rest condition at the time gate is opened. The compressed air from the solenoid valve is pass to the cylinder in order to actuate the piston. Then the gate will automatically close because the piston rod is coupled with the one end of the gate. After some time, the direction of compressed air is controlled, and it is passed to the cylinder which actuate the piston rod and the cylinder returns to initial position. Now the gate is in open position.

### CONCLUSION

The automatic railway gate control system is centered on the idea of reducing human involvement for closing and opening the railway gate which allows and prevents cars and humans from crossing railway tracks. The railway gate is a cause of many deaths and accidents. Hence, automating the gate can bring about a ring of surety to controlling the gates. A human may make errors or mistakes so automating this process will reduce the chances of gate failures. Automation of the closing and opening of the railway gate using the air compressor, hand lever valve, pneumatic cylinder to reduce the human effort and gate operation time. The limitation of this project is air compressor makes a noise so that silencer is required, cannot obtain high torque and load carrying capacity is minutely low.

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