

Joint Alarm & Display for Engine Staff

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Abstract—The main aim of “JADES” is to display the coach number in the loco whenever the passenger pulls the chain in case of emergency. The alarm chain in the passenger coach is designed to create a brake in the continuity of the brake pipes which immediately resulting a loss of brake pressure. There by the speed of the train reduces then the loco pilot listens to the alarm and stops the train. Then the clap pet valve which is arranged outside the bogie will release when ACP (alarm chain pulling) is happening. The guard or asst loco pilot has to move from their place so as to search for the bogie where ACP has taken place which is time consuming process. The device “JADES” will intimate the driver about the particular bogie number. The small delay amounts huge number of trains to loose punctuality. The chain of reaction puts many trains abnormality. So many people may suffer. This project reduces the detention and as well as difficulties to the loco pilot and guard. Here we use number of transmitters depends upon number of bogies and use one or two receivers in loco and also in the guard bogie.

I. INTRODUCTION

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. A moving train contains energy, known as kinetic energy, which needs to be removed from the train in order to cause it to stop. The simplest way of doing this is to convert the energy into heat. The conversion is usually done by applying a contact material to the rotating wheels or to discs attached to the axles. The material creates friction and converts the kinetic energy into heat. The wheels slow down and eventually the train stops. The material used for braking is normally in the form of a block or pad. The vast majority of the world's trains are equipped with braking systems which use compressed air as the force to push blocks on to wheels or pads on to discs. These systems are known as "air brakes" or "pneumatic brakes". The compressed air is transmitted along the

train through a "brake pipe". Changing the level of air pressure in the pipe causes a change in the state of the brake on each vehicle. It can apply the brake, release it or hold it "on" after a partial application. The system is in widespread use throughout the world.

An alternative to the air brake, known as the vacuum brake, was introduced around the early 1870s, the same time as the air brake. Like the air brake, the vacuum brake system is controlled through a brake pipe connecting a brake valve in the driver's cab with braking equipment on every vehicle. Emergency braking distance (4500 t level track, 65 kmph) for airbrake system is 632m and for vacuum brake system is 1097m. ACP (alarm chain pulling) Ensure the safety, security and boost the confidence of the traveling public in the Indian Railways.ACP equipment placed in each bogie which is used to apply the brakes in emergency conditions. When ACP has happened air pressure is continuously released from the exhaustive valve. Figure 1 shows the basic block diagrams of transmitter and receiver.

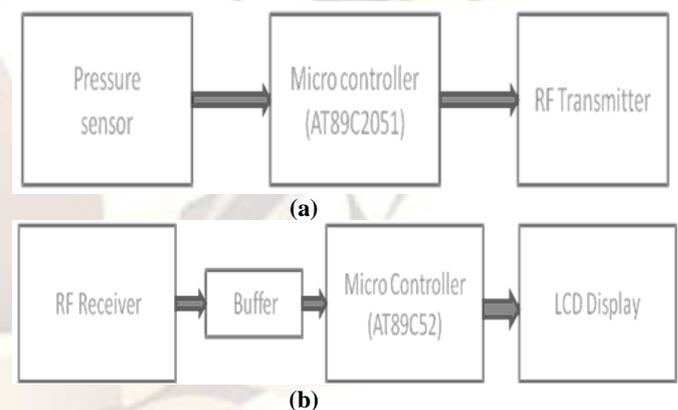


Fig. 1. Block diagram of (a) Transmitter (b) Receiver

II. IMPLEMENTATION

When alarm chain is pulled there will be a loss of pressure in the exhaustive valve. A pressure sensor placed at the exhaustive valve senses that pressure and gives the analog voltage as output. The voltage is given to the micro controller. A source code for the programme is developed and embedded in to micro controller so that when switch is ON Microcontroller equipped in transmitter will transmit the code serially using serial communication to the RF transmitter. In the receiver part the RF receiver is placed which receives the data wirelessly. In the receiver side we used another micro controller. In that

micro controller we wrote another program that is which decodes the input code and generate another code which contains respective coach number. We also used LCD display to show the coach number. One port is totally used to interface LCD with microcontroller.

III. ADVANTAGES

Both Engine staff and guard of the train comes to know the particulars of coach where ACP has taken place, especially during mid nights. It reduces detention of trains since either of engine staff or guard can reach the coach directly instead of searching by both. Nearest person can attend and reset the ACP system. It is of low cost and simple but more informative. The same information can be extended or transmitted to far end agency like controller or section GRP by providing GSM Audible buzzer also additional advantage which alerts Engine staff.

IV. CHALLENGES

Due to financial implication the RF module used can transmit only up to a few meters it can be replaced with suitable one like **CC1101 RF** module. Interference of frequency required to be eliminated as the scope for usage additional JADES with other engines moving in the same section. JADES receiver fitted in loco requires Continuous power supply, which can be derived from the Loco similarly power required for JADES transmitter can be derived either from solar panel or coach supply

V. FUTURE SCOPE

We can also extend this system to check detachments of bogies. RF module can be replaced by the **CC1101 RF** module. It supports serial port communication. Effective frequency ranges are 300-348Mhz, 400-464Mhz, 800-928Mhz. Maximum transfer rate: 500Kbps. Distance covered is 300-500 meters.

VI. CONCLUSION

JADES system is simple and easy to implement which is more informative and user friendly. It's more worthy when compared to present system and that it can be produced within short period and at low cost. We can display the bogie number in driver's cab and guard's bogie also. It saves lot of running time of a train and consequential trains.

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