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# Fabrication of an Automated Self-Adjusting Railway Ramp for Physically Challenged People

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**ABSTRACT:** This paper gives the concept on design development of “Automated railway ramp” based on screw rod mechanism. The system mainly focusing on stair mechanism for railway passengers to avoid any accidental falling between the train door and platform. The material used for the project is metal sheet, angles, dc motor and sensor. The fabrication of the system is up to prototype level as it requires government authority to implement in reality so it is manufactured on the basis of conceptual idea.

**KEYWORDS:** Automatic ramp, screw rod mechanism, disability, mobility, safety.

## I. INTRODUCTION

Automatic Railway Ramp easy to get in passenger in safe way from platform to railway bogie. It also insured the safety of passenger over the station were too much rush involved. The ramp is design in such a way that it exactly fits just under the floor of bogie exactly under the frame of door so that ramp could easily expand and contract in telescopic way. We intend to design and fabricate an automatic railway ramp that uses compressed air pressure as a source to power a pneumatic single stage double acting actuator, which in return set the ramp in motion by the means of pneumatic power



### OBJECTIVE:

The main objective of this project is that, the alternative which is used here is ramp, easy to use for walking from platform to the railway door. Safely the overall loading and unloading of passengers as well as luggage must be done. Reduction in accident will takes place. The thesis objective is quite straight-forward, the concept which put forth in front of all the viewer's is that, everyone must know about this concept. In future it may be a need to apply such easy system in railways under the safety regarding of peoples, as population increasing day by day, the public transport will be use large in number. Hence, the project is placed in front. In future, it can be applied in Indian Railways System to improve their system regarding to safety category related to the passengers

### COMPONENTS DESCRIPTION:

#### 1. MICROCONTROLLER - NODEMCU

Wi-Fi chips are a quite lesser in cost than compared to other contemporary chips which has in built MCU and TCP/IP layer. This is cheap cost, lesser power consumption than other controllers and reliable performance.

#### Specification:

- CPU: ESP8266(LX106)
- Developer: ESP8266 Opensource Community
- Introductory price: \$5



- Memory: 128kBytes
- Power: USB
- Storage: 4MBytes

### 1. ULTRO SONIC SENSOR

The ultrasonic sensor is mounted at a height and an appropriate angle for detecting the presence of the ramp's user. Once the sensor detects an object, the signal is transmitted to the control unit that processes this data and triggers the ramp's automation process, which can be raising or lowering of the ramp.

### 2. DC MOTOR

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field.

### 3. DC BATTERY

A DC battery can be used in an automatic ramp system as a backup power source to ensure that the ramp can still function in the event of a power outage or other electrical failure. Overall, using a DC battery as a backup power source for an automatic ramp system is a reliable and cost-effective way to ensure that the ramp can continue functioning even in the event of a power failure.

### 4. SPUR GEAR

Spur gears are commonly used in the automatic ramp mechanism in railway coaches to transfer power and motion from the electric motor to the ramp assembly. The ramp assembly is responsible for lowering and raising the ramp that connects the train to the platform.

The gear system is typically designed to provide a high torque output while maintaining a low rotational speed. This allows for the ramp to move slowly and steadily, ensuring the safety of passengers boarding and disembarking from the train.

### 5.MILD STEEL

A mild steel frame can be used as a structural support for the automatic ramp system in railway coaches. The frame provides a strong and durable structure that supports the ramp mechanism and the motor that drives it.

### 6.BEEARING

Bearings play an essential role in ensuring the smooth and efficient operation of an automatic ramp for railway coaches, providing support, load-bearing capacity, reduced friction, and easy maintenance.

### 7.Screw rod mechanism

A screw rod mechanism is another common type of mechanism used in the automatic ramp system for railway coaches. In this mechanism, a screw rod is used to convert the rotary motion of an electric motor into linear motion, which is then used to raise or lower the ramp. The screw rod mechanism typically consists of a threaded rod (screw rod), a nut, and a motor. The screw rod is rotated by the motor, causing the nut to move up or down the threaded rod depending on the direction of rotation. The nut is connected to the ramp assembly, which is raised or lowered accordingly.

### 8.ADAPTER FOR SENSOR SUPPLY

An adapter used in the automatic ramp system for railway coaches to provide power to the sensors used in the system. The adapter is designed to convert the main power supply voltage to a lower voltage suitable for the sensors, ensuring that the sensors receive a stable and consistent supply of power

MODEL OF AN RAMP:



APPLICATION:

- 1.Improved accessibility: Automatic ramps enable passengers with reduced mobility to board and alight trains with ease. This promotes inclusivity and makes train travel accessible to everyone.
- 2.Faster boarding and alighting: With automatic ramps, passengers can board and alight trains quickly, reducing delays and improving the efficiency of train operations.
- 3.Reduced risk of accidents: Manual ramps can be difficult to use, increasing the risk of accidents for passengers with reduced mobility. Automatic ramps are easy to use and eliminate the risk of accidents associated with manual ramps.
- 4.Compliance with regulations: Many countries have regulations that require public transportation systems to be accessible to everyone, including those with disabilities or reduced mobility. Automatic ramps help rail operators comply with these regulations.
- 5.Increased passenger satisfaction: Passengers with reduced mobility may feel more comfortable and confident. This can lead to increased satisfaction and loyalty among these passengers.

ADVANTAGES:

1. Improved Safety: The automatic ramp system ensures the safety and security of passengers with disabilities, reducing the risk of accidents and injuries.
2. Increases Efficiency: The automatic ramp system speeds up the boarding process, making it faster and more efficient. It reduces waiting time between stops as the ramp closes and retracts automatically, reducing the time between stops.
3. User-Friendly: The automated rail ramp is user-friendly, and passengers can operate it without any assistance or training.
4. Dignity and Independence: The automated ramp system helps to ensure the dignity and independence of people with disabilities. They can travel independently without the need for someone to lift them up or carry them onto trains.
5. Cost-effective: The automatic ramp system reduces the need for manual assistance, reduces waiting times, and



improves efficiency, leading to cost savings for railway companies.

## **II. RESULT AND DISCUSSION**

1. The automatic railway ramp system is a promising technology designed to increase accessibility, convenience, and independence for people with disabilities or reduced mobility in railway travel.
2. The advantages of the automatic railway ramp system include increased accessibility, safety, efficiency, cost-effectiveness, accommodation, improved passenger experience, encouragement to inclusivity, and reduced liability.
3. The automatic railway ramp is user-friendly, requires minimal training, and reduces waiting times at stops, enhancing efficiency and load times.
4. The technology eliminates the physical assistance provided by staff, ensuring a more comfortable and seamless journey for passengers with disabilities.
5. The technology's future scope includes integration with other technologies, customization features, universal design, remote monitoring and management, and increased digital connectivity to passengers.
6. The adoption of the automatic railway ramp system promotes social inclusion and highlights the importance of accessibility in public transportation.

## **III. CONCLUSION**

In conclusion, the automatic railway ramp system is a groundbreaking technology in the field of railway travel that brings solutions to the accessibility challenges faced by people with disabilities, seniors, or anyone with reduced mobility. The automatic railway ramp technology provides several advantages, including increased accessibility, safety, efficiency, cost-effectiveness, accommodation, improved passenger experience, encouragement to inclusivity, and reduced liability. The adoption of the automatic railway ramp system promotes social inclusion and highlights the importance of accessibility in public transportation, emphasizing the need for equal participation of all individuals in society. Moreover, the future scope of the automatic railway ramp technology presents great opportunities for further growth and development with its integration with other technologies, customization features, universal design, remote monitoring and management, and increased digital connectivity to passengers.

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