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Hydraulic Traffic Reduce System

Shelar Shital Babasaheb¹, Shinde Rutuja Somnath², Paithankar Ashwini Sanjay³,

Paithankar Gaytri Vijay⁴, Ramkisan Nana Ahire⁵

Student, Dept. of Civil Engineering, SND Polytechnic Yeola, Maharashtra, India ^{1,2,3,4}

Lecturer, Dept. of Civil Engineering, SND Polytechnic Yeola, Maharashtra, India⁵

ABSTRACT: India is one of the fastest and largest growing frugality in the world. Since, there's a huge population living in India there are huge number of private vehicles running on the road, which in turn causes the problem in control of the business of an exigency, on the road side if there's a huge business traffic and there's need to give a path to an exigency vehicle. By using hydraulic business reduce system. i.e. use of hydraulic medium underneath the path, we can allow the perpendicular movement of path so that vehicles can fluently crawl on to it and clear their way. By introducing this system while constructing of the new road we can make it bring effective and also this will help in the times of exigency. Hence, we can minimize the business traffic in the unstable circumstances and extremities. India, is a country with the third largest road network in the world. In the year 2019, about 295.8 million vehicles wandered their way through these roads. And amidst this herd, are 10,017 ambulances in an urgency to reach hospitals with patients fighting for their lives. Indian government data shows, about 30% of on-road deaths are caused due to delayed ambulances. Also, more than 50% of heart attack cases reach hospital late due to traffic. With india's speeding population and economy, and people with their personal vehicles, prolonged signals and obstacles for emergencies, our project hydraulic traffic reduce system aims to reduce such casualties.

KEYWORDS: Traffic congestion, emergency, footpath, hydraulic system

I. INTRODUCTION

Traffic congestion has been one of the major issues. As vehicular traffic began to increase the congestion on streets began to hamper the safe and efficient movement of traffic. Traffic congestion may directly affect the means of the emergency. So, to avoid these we have introduced the concept of Hydraulic TRS for easy and efficient movement of vehicle. Traffic congestion has been one of the major issues. As vehicular traffic began to increase the congestion on streets began to hamper the safe and efficient movement of traffic. Traffic congestion affects travel costs, travel time, mobility, accessibility, productivity, and also impacts on the environment such as air pollution and global warming. So, to avoid these we have introduced the concept of HYDRAULIC TRS for easy and efficient movement of vehicle. The hydraulic jack is a device used for lifting heavy loads by the application or applying of much smaller force. It is based on Pascal's law, which states that intensity of pressure is transmitted equally in all directions through a mass of fluid at rest. Hydraulic jacks are devices that have countless applications. This type of jack is used in the automotive industry to lift cars above ground level so they can be tooled. Many tools in the construction industry utilize hydraulic jacks to complete tasks.

PROBLEM STATEMENT

1. India is one of the fastest growing economies in the world. The average income of Indians is growing and thereby the number of privately owned vehicles is rising.
2. Though public transport is widely available in India, still it is not sufficient for the population of India. Especially in Metro cities, often public transport services are crowded. So, to travel peacefully people are opting for commuting in their own vehicles. And as a result more vehicles are coming on roads.
3. Due to lack of footpaths in many places pedestrians are forced to walk on the edge of roads which further increasing traffic issues.



Fig.1 Heavy traffic on road

Objectives

The main objective of the study is to solve the traffic congestion problem in cities. The other objectives are given below:

- a. To minimize the traffic in unstable circumstances.
- b. To speed up traffic flow.
- c. To use footpath as an extra lane in case of emergency.
- d. To reduce traffic congestion and make easy flow of traffic

II. LITERATURE SURVEY

1.Mr. Anurag Tated, Mr. Ved Kale, Mr. Omkar Agalave, Mr.AudumbarSarvade- Traffic congestion has been one of the major issues. India is one of the fastest and largest growing economy in the world. Since, there is a huge population living in India there are huge number of private vehicles running on the road, which in turn causes the problem in control of the traffic. So, to counter act this problem we have introduced the new way. In the times of an emergency, on the road side if there is a huge traffic congestion and there is need to give a path to an emergency vehicle. By using hydraulic traffic reduce system i.e. use of hydraulic mechanism underneath the footpath, we can allow the vertical movement of footpath so that vehicles can easily crawl on to it and clear their way.

2.Heat Exchangers: Thermal-Hydraulic Fundamentals and Design”, Kakac et al., 1981- Heat exchanger fouling is often dealt with in industrial applications through design (overdesigning heat transfer surfaces) and regular maintenance (shut-down and cleaning), both of which have economic consequences. Taking no care will ultimately degrade TE performance to an extent that the flow is severely restricted and the unit/device becomes inoperable. Fouling thermal resistance factors have been discussed for many common industrial environments by various researchers.

3.Awari Mahesh Babu “URBAN TRAFFIC PROBLEMS AND SOLUTIONS”- Most of the urban metropolitan cities are facing traffic problems due delay and overcrowding. Recently the growth of population increased unusually because of the development and employment in metropolitan cities. Generally, road transportation is the major approach of convey which connects the villages, towns, cities, metropolitan regions, states and whole country in to the system establishing an innovative communicué. It improves the entire nation development, environment surroundings and socio economic customs developments. Additionally the special advantages of the highway transport individual have been facing unusual troubles owing to the need of its suitable organization, refurbish & preservation.

III. METHODOLOGY

Since, our concept is based on the hydraulic jack system we use the basic of hydraulics and its principles. Principle of Hydraulics: Hydraulics is based on the Pascal's Law. Pascal's Law: A change in pressure at any point in an enclosed fluid at rest is transmitted undiminished to all points in the fluid.

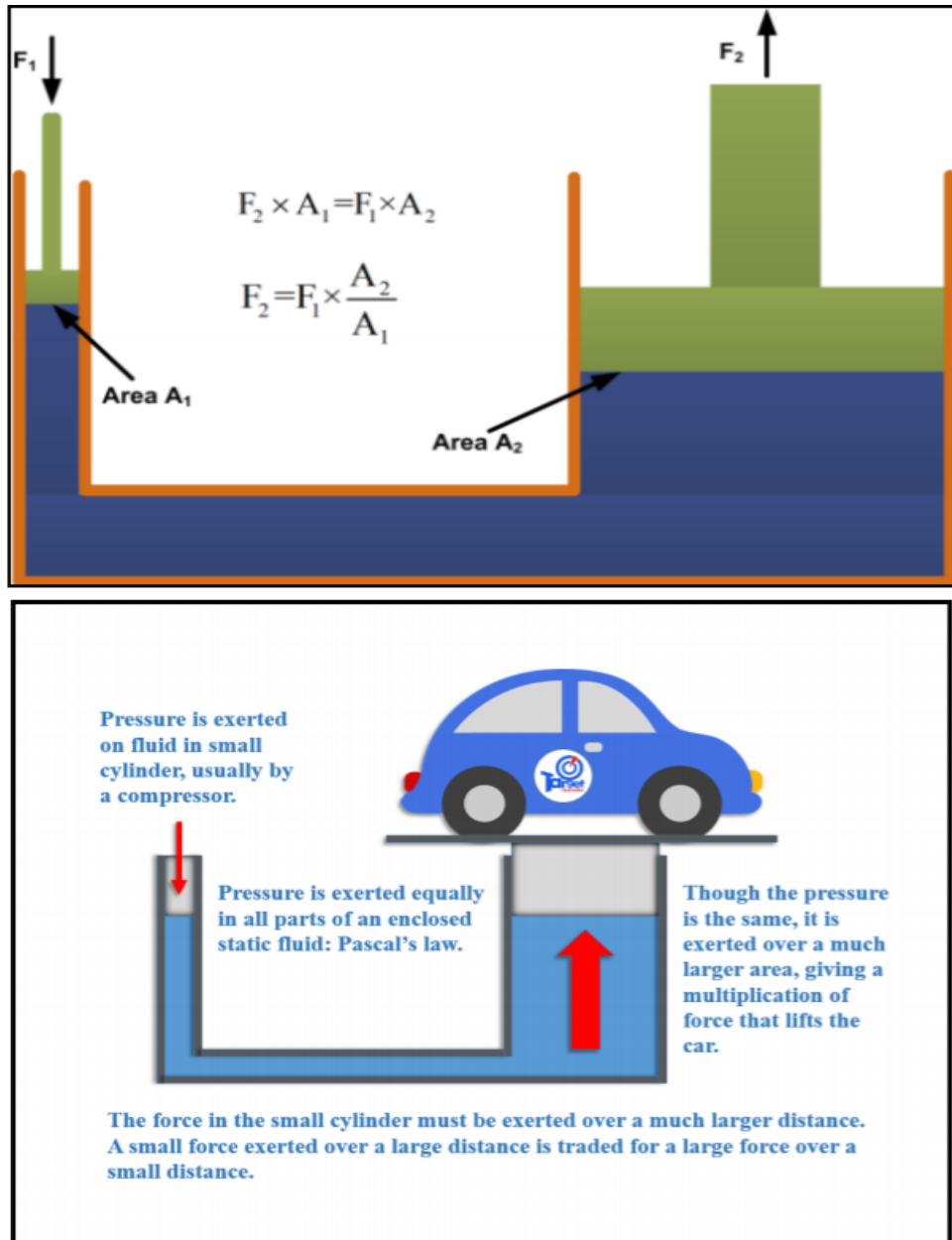


Fig. 2 Pascals Law

IV. WORKING PRINCIPLE

Hydraulic Jack As shown in the figure a bottle is fixed at a place for lifting purpose. A dc motor is kept with the jack for the pumping purpose. A cam is attached to the motor shaft which can be rotated with the help of power supply. When the dc motor rotates the cam also rotates. The pumping rod in the jack is fixed with the cam. The working of the hydraulic jack is when the pumping process takes place the piston rod in the jack moves in upward direction. This helps to lift the

weight. The rear side of the pumping rod is fixed to the cam as shown in the figure. So when the motor turns on, the cam attached to the motor starts to rotate. So the pumping rod gives the up and downward direction which leads to lifting process. When the motor turns off, the rotation of the cam is also stopped. So the pumping action is also stopped. To make the piston rod to come back to its old position the pressure created in the jack due to pumping action should be released. To release the pressure a pressure relief valve is used. When the pressure relief valve is operated the pressure is released from the jack

Working Principle of Hydraulic Jack-As shown in the figure a bottle is fixed at a place for lifting purpose. A dc motor is kept with the jack for the pumping purpose. A cam is attached to the motor shaft which can be rotated with the help of power supply. When the dc motor rotates the cam also rotates. The pumping rod in the jack is fixed with the cam. The working of the hydraulic jack is when the pumping process takes place the piston rod in the jack moves in upward direction. This helps to lift the weight. The rear side of the pumping rod is fixed to the cam as shown in the figure. So when the motor turns on, the cam attached to the motor starts to rotate. So the pumping rod gives the up and downward direction which leads to lifting process. When the motor turns off, the rotation of the cam is also stopped. So the pumping action is also stopped. To make the piston rod to come back to its old position the pressure created in the jack due to pumping action should be released. To release the pressure a pressure relief valve is used. When the pressure relief valve is operated the pressure is released from the jack.

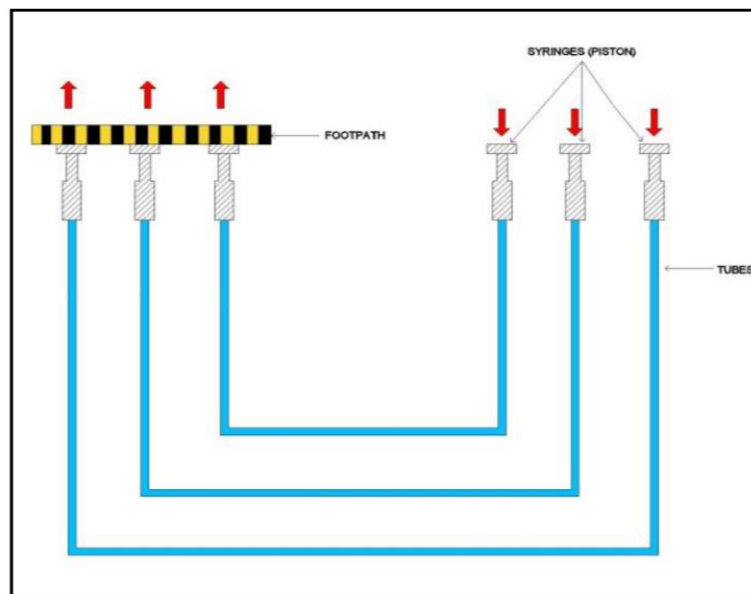


Fig -4: Conceptual design for actual Hydraulic TRS

Advantage of using hydraulic lift is that by applying small force on the small area we are able to generate a larger force. Mathematically:-

$$F_2 = PA_2$$

where F_2 = Resultant Force,

A_2 = area of crosssection

$$F_2 = (F_1/A_1)A_2$$

where $P = F_1/A_1$ (Pressure P is due to force F_1 on the area A_1)

$$F_2 = (A_2/A_1)F_1.$$

This shows that the applied force has increased by A_2/A_1 .

Because of Pascal's law the input gets magnified.

At a very basic level, hydraulics is the liquid counterpart of pneumatics, which concerns gases. Fluid mechanics provides the theoretical foundation for hydraulics, which focuses on the applied engineering using the properties of fluids.

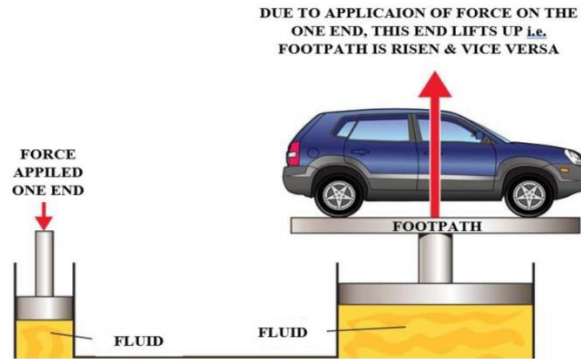


Fig -5: Demonstration of hydraulic jack actual in footpath

V. HARDWARE USED

The hydraulic systems consists a number of parts for its proper functioning. These include storage tank, filter, hydraulic pump, pressure regulator, control valve, hydraulic cylinder, piston and leak proof fluidflow pipelines. The schematic of a simple hydraulic system is shown in figure.

It consists of:

- a movable piston connected to the output shaft in an enclosed cylinder
- storage tank
- filter
- electric pump
- pressure regulator
- control valve
- leak proof closed loop piping.

The output shaft transfers the motion or force however all other parts help to control the system. The storage/fluid tank is a reservoir for the liquid used as a transmission media. The liquid used is generally high density incompressible oil. It is filtered to remove dust or any other unwanted particles and then pumped by the hydraulic pump. The capacity of pump depends on the hydraulic system design. These pumps generally deliver constant volume in each revolution of the pump shaft. Therefore,the fluid pressurecanincrease indefinitely at the dead end of the piston untilthe system fails. The pressure regulator is used to avoid such circumstances which redirect the excess fluid back to the storage tank.

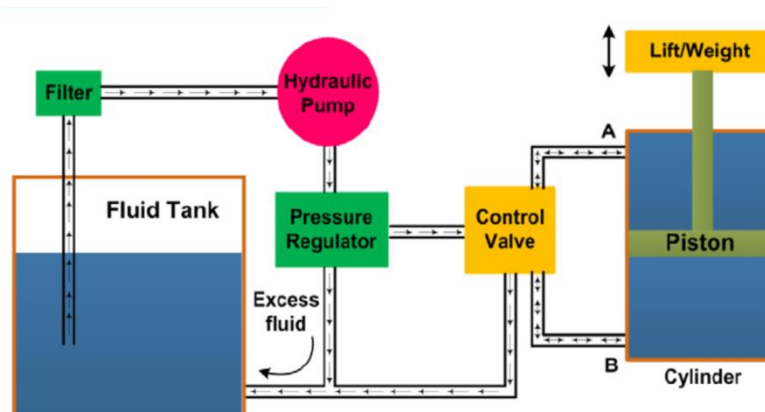


Figure 5.1.2 Schematic of hydraulic system



VI. ADVANTAGES, DISADVANTAGES & APPLICATIONS

Advantages

Reduces traffic problems
Accidents are reduces

Disadvantages

Installation and maintenance cost is high

VII. FUTURE SCOPE

By adopting this concept of using hydraulic jack underneath the footpath for construction of new roads in modern world we can help to reduce the traffic congestion problems.

In the current world, we can help to alleviate traffic congestion by implementing this notion of deploying hydraulic jacks beneath the pavement for the construction of new roads.

VIII. CONCLUSIONS

Traffic congestion has been a worldwide issue which results into wastage of time, energy and causes environmental pollution. Identification of congestion is the initial step for selecting appropriate method to avoid this situation. To understand congestion in simple way it is classified into different categories. There are number of reasons for the congestion problem. There are numerous potential congestion administration procedures. The suggested two related measures are for traffic management are; Regularity measures and Economic measures. Regularity measures are access management and parking management and pricing policies are economic measures. Overall, we can use this mechanism to solve the problems. I am confident that it can reduce traffic congestion in the future

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