International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

HYDRAULIC TRAFFIC REDUCE SYSTEM

Mr. Anurag Tated[1], Mr. Ved Kale[2], Mr. Omkar Agalave[3] Mr. Audumbar Sarvade[4]

[1]Third Year Student of Diploma in Civil Engineering, JSPM's Bhagwant Institute of Technology, Barshi
[2]Third Year Student of Diploma in Civil Engineering, JSPM's Bhagwant Institute of Technology, Barshi
[3]Third Year Student of Diploma in Civil Engineering, JSPM's Bhagwant Institute of Technology, Barshi
[4]Professor, Dept. of Civil Engineering, JSPM's Bhagwant Institute of Technology, Barshi

---

Abstract – *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. By introducing this system while constructing of the new road we can make it cost effective and also this will help in the times of emergency. Hence, we can minimize the traffic congestion in the unstable circumstances and emergencies.*

Key Words*: *Traffic congestion, emergency, footpath, hydraulic system

1.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.

1.1 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.

1.2 Concept

For the vertical movement of the footpath we are going to install the hydraulic jack/mechanism underneath the footpath.

Hydraulic Jack: A hydraulic jack is a device that is used to lift the heavy loads by applying a force via a hydraulic cylinder. Hydraulic jack lifts the loads using the force created by the pressure in the cylinder chamber.

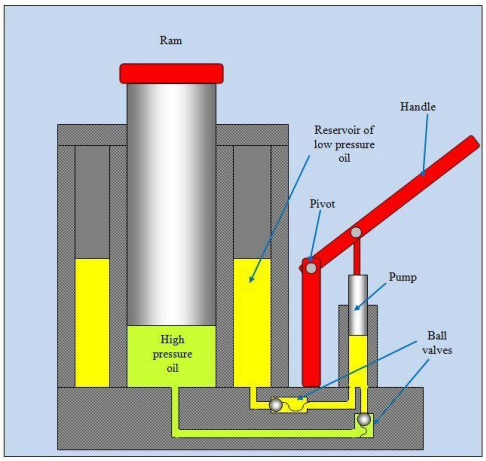

Fig -1: Conceptual hydraulic mechanism/jack

2. LITERATURE REVIEW

a) Ms. Nida Aafreen Aslam Khan[1], Ms. Komal Sunil Pise[2] - *Hydraulic Jack System Installed in Footpath for Reducing Traffic in Case of Emergency*

They discussed about the concept of hydraulic jack system in the footpath, its uses and applications.

b) Dr. Pritesh Prajapati, Pragnesh H Prajapati - *A Research Paper on Traffic Jam at Signal Cross Road*

They discussed about the various system used for controlling traffic congestion and problems it.

3. 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.

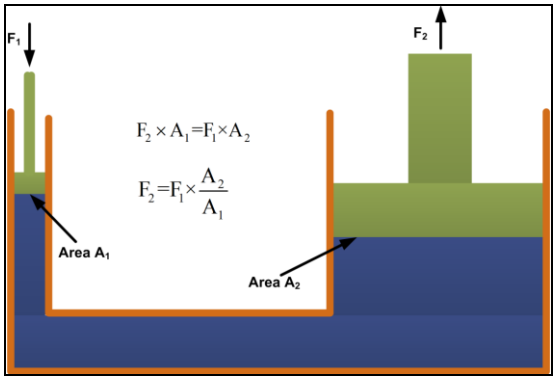

Fig -2: Pascal's law

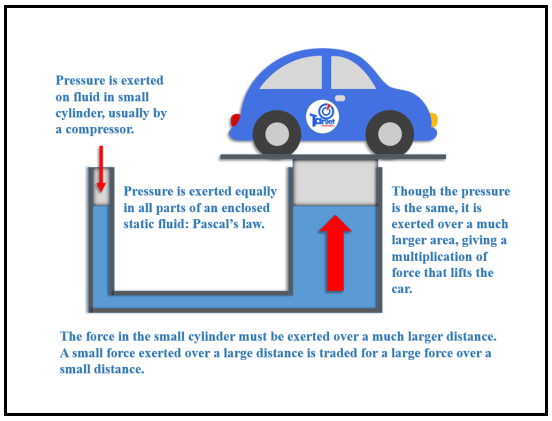

Fig -3: Principle of hydraulic jack

Working of Hydraulic Jack
Consider figure 2.

- Inside a hydraulic jack there are 2 platforms,one has a smaller area and the other one has a larger area.
- It is a tube like structure which is filled with uniform fluid.
- There are 2 pistons (P_1 and P_2)which are attached at both the ends of the tube.
- Cross-sectional area of piston P_1 is A_1 and of piston P_2 is A_2.
- If we apply force F_1 on P_1, pressure gets exerted and according to Pascal's law the pressure gets transmitted in all the directions and same pressure gets exerted on the other end.As a result the Piston P_2 moves upwards.
- 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 cross-section
  - $F_2= (F_1/A_1)A_2$ 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.

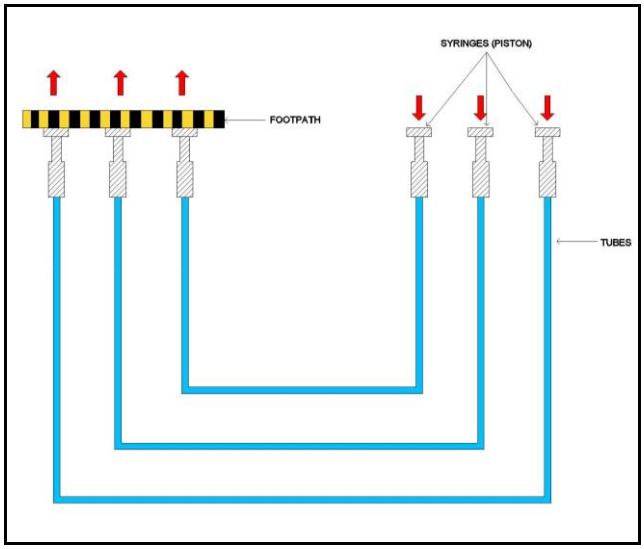

Fig -4: Conceptual design for actual Hydraulic TRS

Demonstration of hydraulic jack actual in footpath:

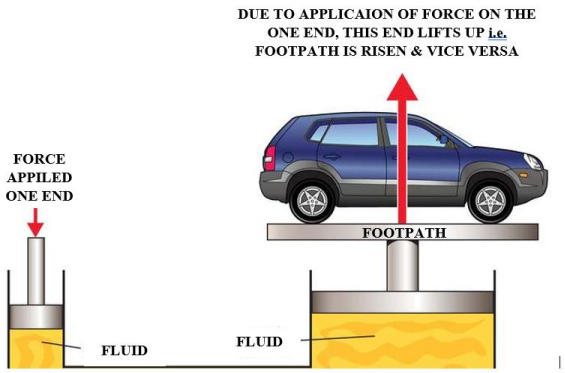

Fig -5: Demonstration of hydraulic jack actual in footpath

Whenever the pressure exerted on one end of the cylinder the liquid pressure will lift the other end. Similarly, in case of

emergency the footpath will be lowered to the level of road so that vehicle can easily crawl over it and clear its way.

4. 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.

5. CONLUSIONS

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.

ACKNOWLEDGEMENT

It gives me an immense pleasure and satisfaction to present this paper on "**HYDRAULIC TRAFFIC REDUCE SYSTEM",** which is the result of unwavering support, expert guidance and focused direction of my guide *Prof. Sarvade A. M***.** to whom I express my deep sense of gratitude and humble thanks, for his valuable guidance throughout the presentation work.

The success of this paper has throughout depended upon an exact blend of hard work and unending co-operation and guidance, extended to me by the supervisors at our college.

Last but not the least. I sincerely thank to my colleagues, the staff and all others who directly or indirectly helped me and made numerous suggestions which have surely improved the quality of my work.

REFERENCES

[1] Cano, C., Galita, W., Samoranos, E.I. and De Leon, A.A., 2019. Design and Fabrication of a Hydraulic Motorcycle Lifter. Available at SSRN 3469969M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

[2] Ms. Nida Aafreen Aslam Khan[1], Ms. Komal Sunil Pise[2] - Hydraulic Jack System Installed in Footpath for Reducing Traffic in Case of Emergency – 2020

BIOGRAPHIES

Anurag Ajaykumar Tated
Third Year Student in Diploma in Civil Engineering
JSPM's Bhagwant Institute of Technology. Barshi

Ved Dattatray Kale
Third Year Student in Diploma in Civil Engineering
JSPM's Bhagwant Institute of Technology. Barshi

Omkar Suresh Agalave
Third Year Student in Diploma in Civil Engineering
JSPM's Bhagwant Institute of Technology. Barshi

Prof. Sarvade A. M.
Department of Civil Engineering
JSPM's Bhagwant Institute of Technology. Barshi