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# Hydraulic Traffic Reduce System (HTRS)

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**ABSTRACT:** Traffic jams were one of the major problems. India is one of the fastest-growing economies in the world. Since then, India has had a huge population and a huge number of private vehicles driving on the road, which in turn causes a traffic control problem. So, until we have introduced a new method against this problem. In times of emergency, on the side of the road if it is a huge traffic jam and it is necessary to give way to an emergency vehicle. By using a hydraulic system to reduce traffic, i.e. using a hydraulic mechanism under the pavement, we can allow vertical movement of the pavement so that vehicles can easily crawl up to it and clear the way for them. By introducing this we can make the system more expensive when building a new road effectively and it will also help in times of emergency. We can thus minimize traffic jams in unstable circumstances and extraordinary events.

**KEYWORDS:** Traffic congestion, Emergency, Footpath, Hydraulic system.

## I. INTRODUCTION

The population on Earth is expanding at a very rapid rate. Because every individual chooses to travel with their vehicles instead of public ones of vehicles due to greater comfort and time efficiency, the number of vehicles also increases, leading to traffic jams because vehicles on the road exceed their capacity. If this traffic is not managed properly, it will lead to conflict, and especially emergency vehicles such as ambulances and fire engines will not be able to reach their destination on time. However, the main problem remains emergency vehicles cannot go as fast as they can because of the vehicles on the road. Nowadays, most deaths are caused by traffic jams and emergency vehicles are also not useful because they can't move fast enough due to the traffic jam. Even if it doesn't exist traffic jams, emergency vehicles still get stuck on the road due to traffic lights, resulting in loss of lives. Also, most people could not do trying to let these vehicles get through first. And also due to the lack of footpaths in most places, people are forced to walk on them the edges of the road causing additional traffic problems. Our idea will easily control the traffic and will effectively achieve the goal in case of vehicle impact. This study aims to direct the traffic flow by creating an extra lane using the modified sidewalk that will speed up the flow of traffic and reduce the latency of emergency vehicles.

Generally, traffic is defined as the movement of people or any kind of goods between one place and another, which includes pedestrian animals, and other means of transport. There is no widely accepted definition of traffic congestion. The main motive of this loss consensus in congestion is:

- i. A physical phenomenon relating to how cars obstruct each other's progress as a call for limited space on the road at full capacity.
- ii. A relative phenomenon related to consumer expectations about the overall performance of the avenue system. Every operational and personal perspective is critical to understanding congestion and its impact.

## II. OBJECTIVE

The main goal of the study is to solve the traffic problem of congestion in cities. Other goals are given below:

- A. To minimize operation in unstable conditions.
- B. To speed up traffic.
- C. To use the footpath as an additional lane in case of emergency.
- D. Reduce traffic congestion and facilitate flow operation.

**CONCEPT**

For the vertical movement of the footpath, we are walking on installing a hydraulic jack/mechanism under footpath.

**Hydraulic Jack:-** A hydraulic jack is a device that is used to lift heavy loads by applying power through a hydraulic cylinder. A hydraulic lifter lifts loads using the generated force pressure in the cylinder chamber.

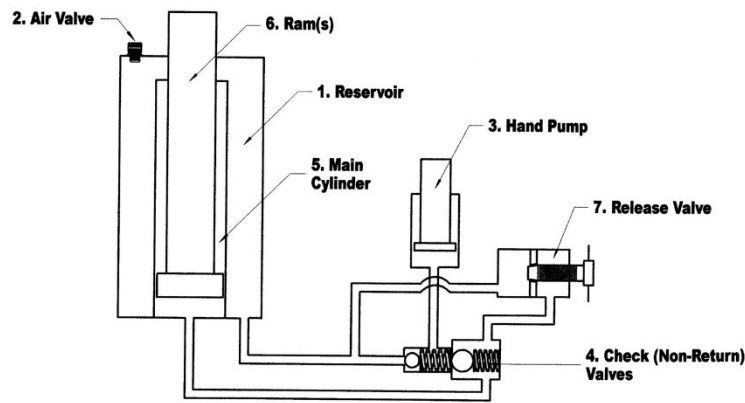


Fig -1: Conceptual hydraulic mechanism/jack

**III. METHODOLOGY**

Because our concept is based on our hydraulic jack system uses the basics of hydraulics and its principles.

**Principle of Hydraulics:** Hydraulics is based on Pascal’s Law.

**Pascal’s Law Statement:** If pressure changes by some value at a place in an incompressible confined liquid, then pressure changes by the same value at every point inside the liquid.

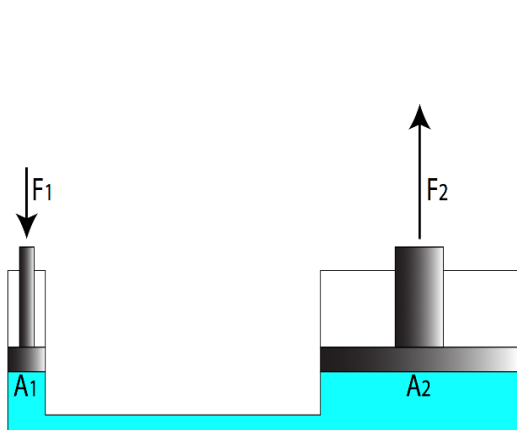


Fig -2: Pascal’s Law

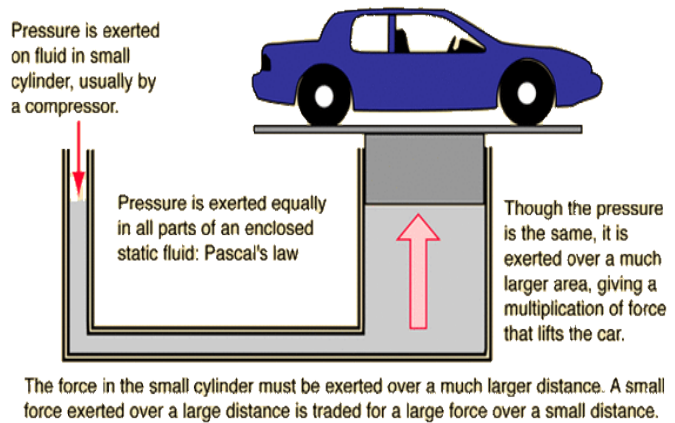


Fig -3: Principle of hydraulic jack

- The advantage of using a hydraulic lift is the use of small force on a small area to generate a more power.

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 fluid counterpart of tires, which refers to gases. Fluid mechanics provides the theoretical basis in Hydraulics, which focuses on applied engineering using the properties of fluids

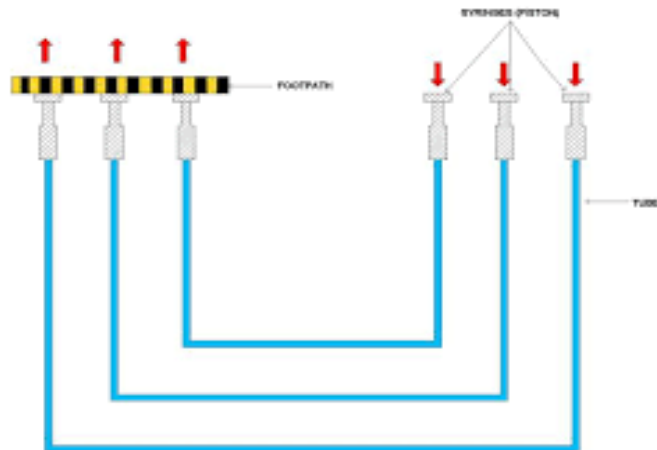


Fig -4: Conceptual design for actual Hydraulic TRS

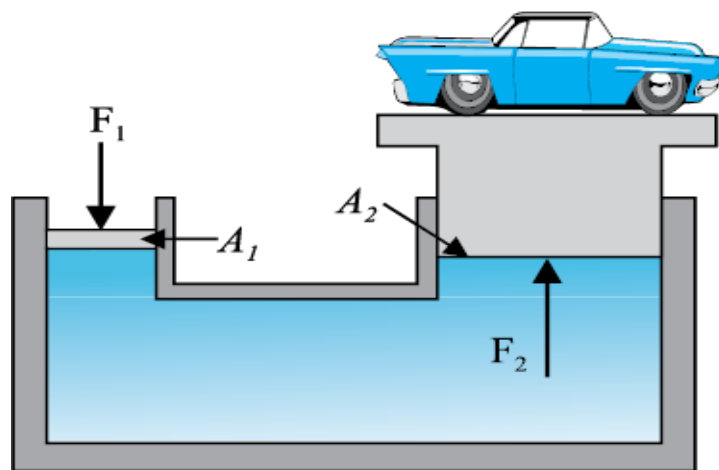


Fig -5: Demonstration of hydraulic jack actual in footpath

Whenever pressure is applied to one end of the cylinder fluid pressure lifts the other end. Similarly, in the event of an emergency, the sidewalk will be lowered to road level so that the vehicle can easily climb over and clear the way.



#### IV. FUTURE SCOPE

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

#### V. CONCLUSION

Traffic congestion is a worldwide problem, resulting in wasting time, and energy and environmental causes pollution. Identifying overload is the first step for choose an appropriate method to avoid this situation. On understand overload in a simple way in which it is classified into different categories. There are several reasons for the overload problem. There are many potential congestion management procedures. Proposed two related measures for traffic management; Regularity and Economic measures. Regularity measures are access control and parking and management and pricing policies are economic measures. Overall, we can use this mechanism to solve problems. I believe this can reduce traffic congestion in the area in future.

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