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Generation of Electricity through Speed Breakers: A Review

Sukhada Shelar[1], Mayur Singh[2], Mohd.Fazil.Ashar[3], Mahesh Hulpale[4], Yash Patil[5]
[1, 2, 3, 4, 5]*Y.B.Patil Polytechnic, Akurdi, India*

Abstract: ***Electricity is the most necessary form of the energy. Energy is responsible for development of any country. Consumption of electricity is increasing day by day. Now a days most of the electricity is generated by conventional fossil fuels, eventually the conventional power sources will get depleted by the next few decades. This project is about to use nonconventional energy source for power generation. In this method we are generating energy by air compression. All the set up will be placed under speed breaker and when the vehicle will pass over speed breaker, it will generate electricity with the help of air compression device.***

Keywords: Electricity, Non-conventional energy, vehicles, speed breakers

I. INTRODUCTION

Electricity generation was first developed in the 1800's using Faraday's dynamo generator. Almost 200 years later we are still using the same basic principles to generate electricity, but on a much larger scale. Electricity and power can be called as the backbone for development and modernization of the country and therefore, the rapid speed of development has led to a constant increase in the rate of electricity consumption. The number of vehicles passing over the speed breaker in roads is increasing day by day. Vehicles waste a tremendous amount of energy on speed breakers. The increasing traffic and number of speed breakers motivate us to create device which can channelize the energy of vehicles. This energy can be converted into electrical energy & used for toll booth itself. Hence more research and development of technologies are needed in this field. Every time a vehicle passes over, large amount of energy is wasted at the speed breakers through the dissipation of heat and also through friction. The generated power can be used for general purpose like streetlights, traffic signals.

II. WORKING METHODOLOGY

Traffic volume is a measure to quantify the traffic flow. Traffic volume or traffic flow is expressed as the number of vehicles that pass across a given transverse line of the road during unit time. Traffic volume counts may be carried out either manually or by using mechanical or automatic counters. Manual count employs a field team of enumerators at predetermined locations of the selected roads and intersections. The enumerator's carryout classified count of the vehicles and record them on the prescribed record sheets/forms at desired time intervals. By this method, it is possible to obtain all details of the classified traffic data which can be collected by mechanical or other automatic counters. Mechanical traffic count may be either fixed or permanent type or portable type of counters. The mechanical counter can automatically record the total number of vehicles crossing a section of the road in a desired period.

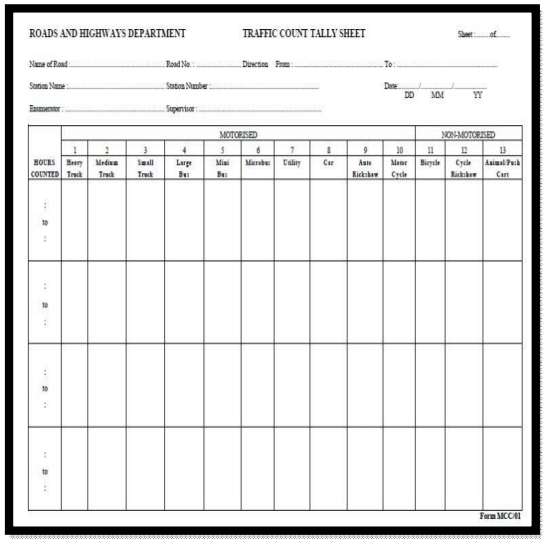
ROADS AND HIGHWAYS DEPARTMENT TRAFFIC COUNT TALLY SHEET

Fig. 1 Manual Count Tally sheet

Fig. 2 Counter with tube on roadway and counting device on sidewalk

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A. Analysis of Traffic Volume

When the traffic volume counts are carried out for only a few days such as for 3days or 7days, the average daily traffic volume obtained is called average daily traffic. Traffic census on non-urban roads are generally carried out twice in a year by taking direction-wise counts for 7 day period, once during the peak traffic season and once during the lean season.

B. Components of System

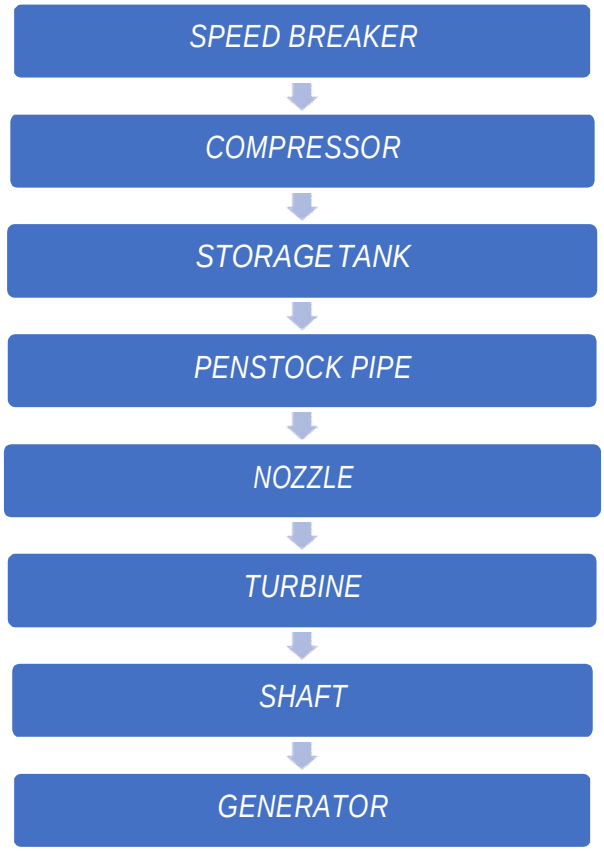

Fig. 3 Components of System

1) *Speed Breaker:* A speed breaker is a hump surface across the roadway having a rounded shape with width greater than the wheel base of most of the vehicles using the road. There should be no damage to vehicles nor excessive discomfort to the drivers and passengers when passing at the crossing speed.
2) *Compressor:* An air compressor is a device that convert impact energy into potential energy stored in pressurized air. An air compressor forces more and more air into a storage tank, increasing the pressure. The energy contained in the compressed air can be used for a variety of applications.
3) *Storage Tank:* The air is compressed slowly in the compressor. But since the pneumatic system needs continuous supply of air, this compressed air has to be stored. The compressed air is stored in an air receiver. It also helps the air to cool and condense the moisture present. The air receiver should be large enough to hold all the air delivered by the compressor.
4) *Penstock Pipe:* A pipe carrying pressurized air from storage tank to nozzle of pelton wheel turbine.
5) *Nozzle:* The air from source is transferred through penstock to which end a nozzle is provided. Using this nozzle, the high-speed air jet can be formed. To control the air jet from nozzle, a movable needle spear is arranged inside the nozzle. The spear will move backward and forward in axial direction. When it is moved forward the flow will reduce or stopped and when it is moved backward the flow will increase
6) *Shaft:* A shaft is a rotating element of turbine, usually circular in cross section, which is used to transmit Power.
7) *Generator:* It is a device that converts motive power (mechanical energy) into electrical power for use in an external circuit.

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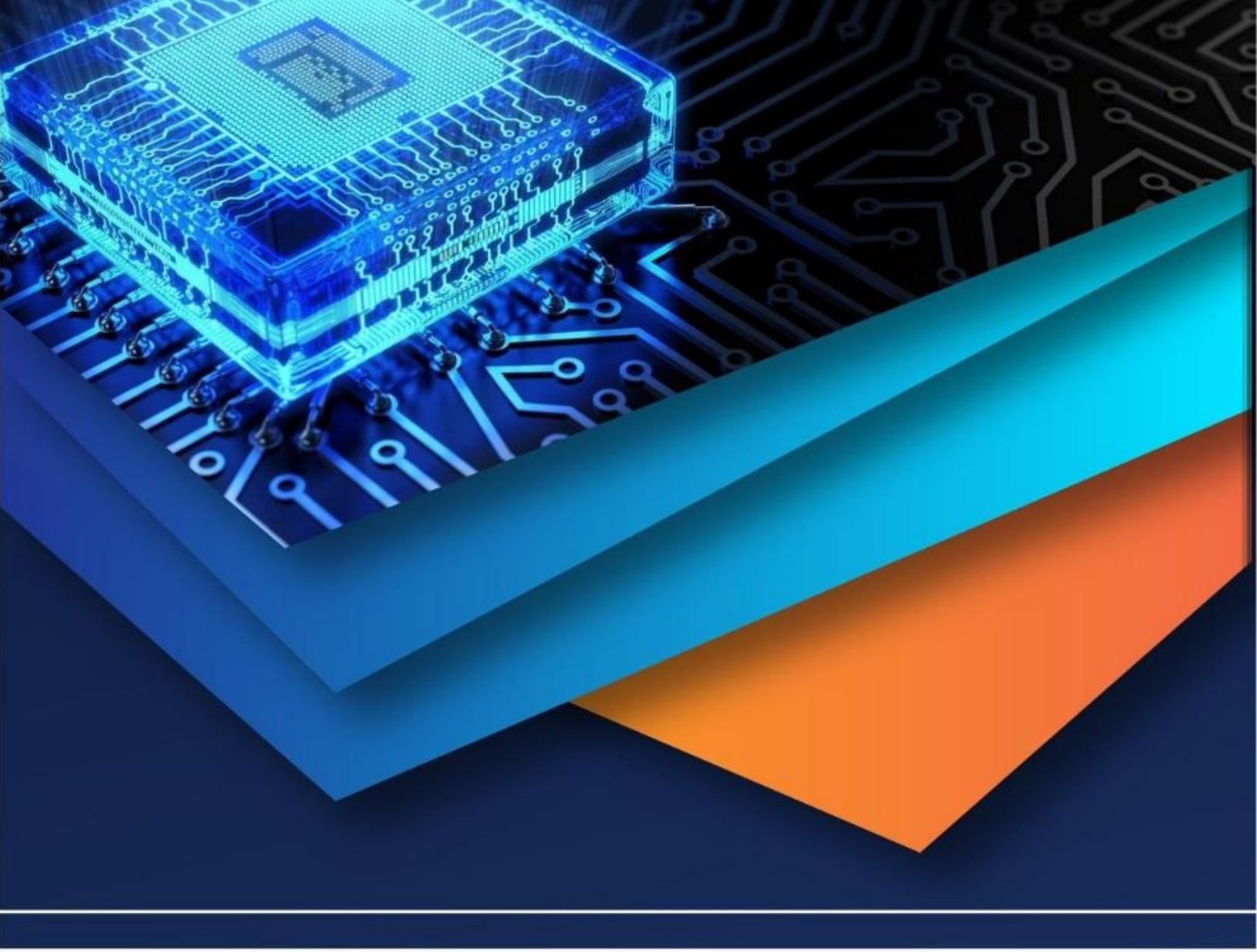

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