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Distributed Generation by Speed Braker at Bridge

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Abstract: In present scenario power is major need for human being. Unstability of power grid is major issue of present day due to a huge gap between power demand and generation .There is one method for solving this problem by using the non conventional sources by Distributed generation(DG) .This paper emphasizes on the idea that the kinetic energy getting wasted while vehicles move from bridge .It can be utilized to generate power by using a special arrangement of speed breaker , pump and water turbine . By this arrangement may develop a plant for generating electricity which is totally renewable source of energy .This generated power can be use for electricity for local areas, street light and if excess power generated to give to grid and also can be take from the grid when required.

INDEX TERMS – Speed Breaker, Water Tubes, Water Turbine, Generator, Distributed Generation (DG) and Non Conventional Energy.

I. INTRODUCTION

This paper attempts to show how energy can be tapped and used at a commonly used system the road, speedbreaker .The number of vehicles passing over the speedbreaker is increasing day by day. If we use this speedbreaker concept in the bridge speedbreaker .With the help of speedbreaker or power hump (kinetic energy can be utilized to produce power by using a special arrangement called POWER HUMP) [12] A large amount of energy is wasted at the speedbreaker through the dissipation of heat and also through friction, every time a vechile passes over it. There is great possibility tapping this energy and generation unit with the help of pumps and run the small hydro plant easily because India has of rivers and its bridge.

II. BACKGROUND

The utilization of energy is an indication of the growth of a nation .For example ,the per capita energy consumption in USA is 13246 KWh (kilo watt hour) per year , whereas the consumption in india is 684 kwh.One might conclude that to be materally rich and prosperous,a human being needs to consume more and energy. A earlier survey on the energy consumption in india had published a pathetic report that 85000 villages in india do not still have electricity and we also know that india have many rivers and rivers have many bridges are there. If we use speedbreaker concept in the bridges and with the help of pump we run a small hydroplant easily and supply electricity to the local areas and villages and streetlight in local areas and village.It is also known as distributed generation (DG).

III. WORKING PRINCIPLE

Today hydroplant is not possible in medium type of rivers but in this paper .We can run small hydroplant in medium type of river in previous research of speedbreaker we only produce electricity for streetlight but in this concept we produce electricity for local area with the help of small hydroplant .In speedbreaker the reciprocating motion of the speedbreaker is converted into rotary motion using the rack and pinion arrangement. The axis of the pinion is coupled with the sprocket arrangement. The sprocket arrangements is made of two sprocket, first is small sprocket and second is large sprocket.Both the sprocket are connected by means of a chain which serves in transmitting power from the larger sprocket to the smaller sprocket .As the power is transmitted from the small sprocket to the smaller sprocket, the speed that is available at the large sprocket is relatively multiplied at the roltation of the smaller sprocket The axis of the smaller sprocket is coupled to a flywheel and flywheel is connected to high lift centrifugal pump shaft with the help of belt and high lift centrifugal take water from suction pipe and with high pressure it deliver water with delivery pipe and delivery pipe is connected to the water tube pipe which goes to the water tank which store water for contineuse run of turbine and tank have one outlet in lower side which is connected to the pipe and nozzle ,flow a water to the reaction turbine and turbine are coupled with generator which generate electricity and the outlet of the turbine is

connected with pipe in outlet side which is go again to river . This process again and again.In speedbreaker one small generator is also connected it is used for streetlight.

IV. CONSTRUCTIONAL DETAILS OF SPEEDBREAKER AND CENTRIFUGAL PUMP

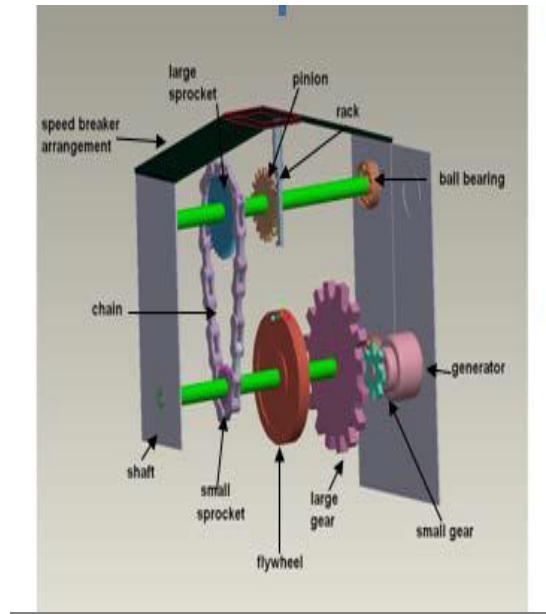
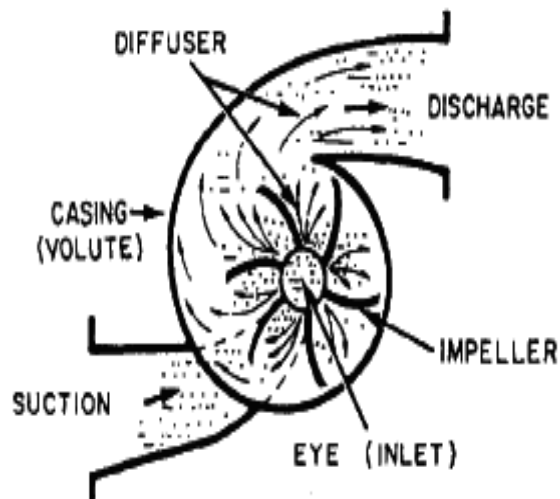


Fig .1 (Construction of speed breaker. [11])



Centrifugal Pump Flow

Fig .2 pump design

Today vehicles are a part of human being .the manufacturing of vehicle are increasing day by day .In India there are many bridge and many vehicle cross the bridge daily and the weight of vehicles are approximately 1000kg or more. When any vehicles are cross the speedbreaker of bridge when the front wheel of vehicle are



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cross the speedbreaker then pump rotate one revolution and when back wheel cross the speed breaker then again rotate one revolution .It means one vehicles come at bridge then 2 revolution of pump.

Revolution of pump= 2* no. vehicles cross the bridge

V. FORMULA

The centrifugal pump acts as a reverse of an inward radial flow reaction turbine .The workdone by the impeller (rotating part of the pump) on the water per second per unit weight of water per second flowing through the pump is given as [8]

$$=1/g[Vw1 u2]$$

Vw1- velocity of whirl at outlet, and

U2- Tangential velocity of wheel at outlet

VI. BLOCK DIAGRAM

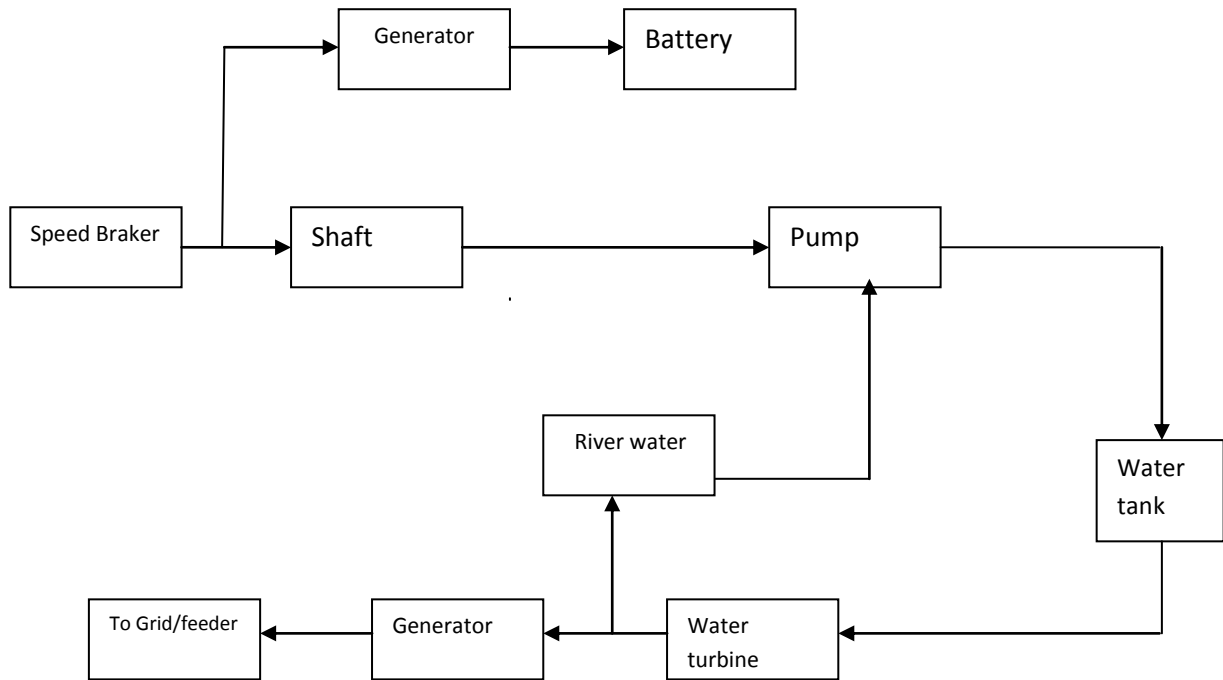


Fig 3 block diagram

VII. ADVANTAGES

Following advantages may be the used of the technique mentioned in this paper.[3][5]

- Pollution free power generation.
- Simple consumption, mature technology and easy maintance.
- No consumption of any fossil fuel which is non –renewable source of energy.
- No fuel transportation required.
- No external source is needed for power generation
- Energy available all year rount.
- No manual work necessary during generation.



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VIII. ASSUMPTION

For this concept following assumption are taken in mind.

- Bridge used where very rush of vehicle.
- Hump used very sensitive material.
- No mechanical loss due to this hump.

IX. CONCLUSION

In coming days ,human being needs to consume more and more energy and we know that fuel is decrease day by day than after 20 year the fuel is finished than we use non conventional source of energy . This concept is of non conventional source of energy. Which is work on movement of vehicular traffic in bridge.Now the time has come to put forte there type of innovation ideas, and researches should be done to upgrade there implication.

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