RESEARCH ARTICLE OPEN ACCESS

"FABRICATION OFCENTRIFUGAL PUMP FOR REGENERATION ENERGY"

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Abstract:

The cost of electric power is a great concern to common man. Convectional energy is also a great concern for environment. More attention of the people is diverted towards use of other form of energy other than conventional energy. Water pump is the most useful machine every days and are the commonly used in the industrial equipment after electrical motors. The centrifugal pump is the mechanical pump which runs on kinetic energy and its convert into pressure energy. This type of pump is a blessing to rural areas and farmers. This paper deals with fabrication and analysis of water lifting device without using electricity and fuel. Analyses have been done by varying various parameters to analyse flow rate and delivery head. The electricity mostly used in daily life more device or equipment made by any one is operated by electricity these is very dangerous for us, because for producing electricity very much.

Keywords — **centrifugal pump, dynamo, Dc motor, solar panel.**

I. INTRODUCTION

In general centrifugal pump lift water by using electricity, fuel or man power. There are many technologies are analysing to lift water without using electricity. As fossil fuel one of the most energy Crises in the world. Solar Powered Water Pump (SPWP) is an eco friendly water pump system. The SPWP works on mechanical energy without electricity. SPWP is the pump that runs without use of any fuel like petrol, diesel , kerosene, etc. SPWP provides drinking water and irrigation in remote areas where electricity is not available. SPWP is free from pollution. SPWP reduces the rising energy costs. SPWP consists of a regenerative turbine pump operated by solar power. The regenerative turbine pump is positioned on its stand and the driven shaft of the regenerative turbine pump is connected to the motor drive on solar power through the battery. By solar power battery will charge and motor rotates, thereby rotating the centrifugal pump which in turns discharges water from the sump

Its acts by "1st law of Thermodynamics" its state that, "Energy is neither be created nor be destroyed, it just transfer from one from of energy into another form"

Dynamo works on faraday's law its state that, "The motion of wire within the magnetic field creates an electromotive force which pushes on the electrons in the metal creating an electric current in the wire".

The objectives of the project include:

- To minimize the used of fuel, coal and human efforts.
- To introduce a new and simple way of water transfer.
- Day by day increasing cost of electricity and fuel.
- Where the source of electric energy is absent.

II. LITERATURE REVIEW

K SREENIVASULA REDDY:-

"Worked on Modelling an Simulation of an Asynchronous Generator" with AC/DC/AC Converter Fed RLC Series Circuit in an Isolated Power Generation System. Converter Fed RLC Series Circuit in an Isolated Power Generation System. The objective of this paper is to simulate the model of a self-excited asynchronous generator (SEASG) feeding R L load in conjunction with an AC/DC/AC converter fed RLC series circuit connected at the Point of Common Coupling (PCC). MATLAB/SIMULIMK is used to develop this system. The effect of RLC series circuit when operated at variable frequency affects the generation voltage profile. This reflects that an additional capacitance or inductance effect is possible to inject when the RLC is operated at a frequency lower or higher than the resonance frequency.[2]

J.D.DENTON:-

Defines loss as 'any flow feature that reduces efficiency of a turbo machine'. Further, he categorizes losses as profile loss, secondary loss (End wall loss) and tip leakage loss as major source of turbo machine losses.[3]

III.METHODOLOGY

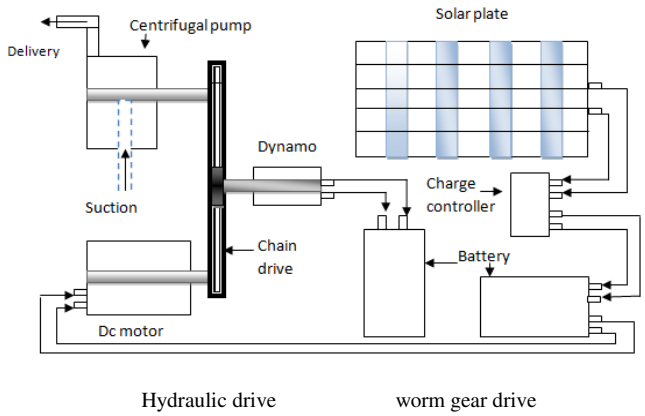

Figure 1: overall system block diagram

Centrifugal pumps are used to transport fluids by the conversion of rotational kinetic energy to the pressure energy of the fluid flow. The rotational energy is provided by the engine or electric motor. The fluid enters the pump impeller along or near to the rotating axis and is accelerated by the impeller, flowing radially outward into a diffuser or volute chamber (casing), from where it exits.[4]

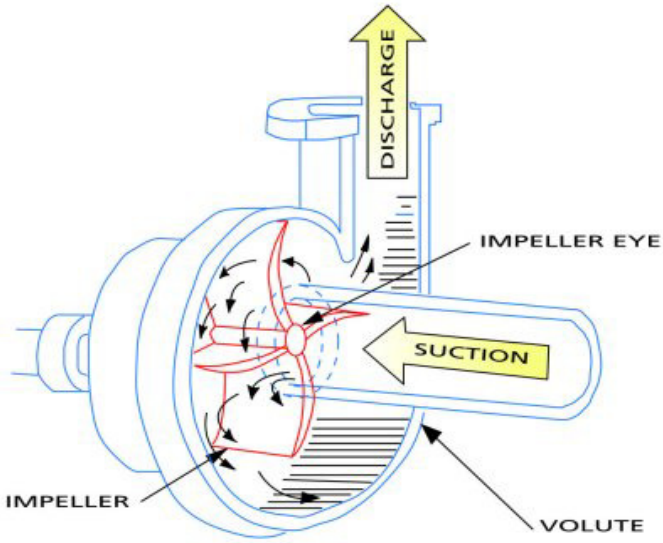

Figure 2: Working principle of centrifugal pump

Power supply: Battery is a device used to store energy into a secondary cell .The motor is powered by 12v, 7.5 amp supplies. This battery can be recharge.

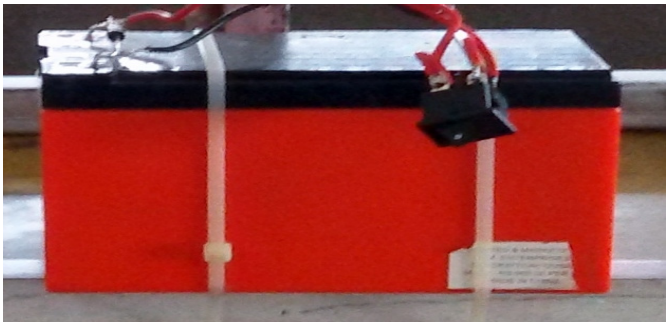

Figure.3: 12v dc supply

Centrifugal pump arrangement: - It is consist of centrifugal pump, Dc motor, chain drive, sprocket,

dynamo. This is main part of the project as whole system depends on it.

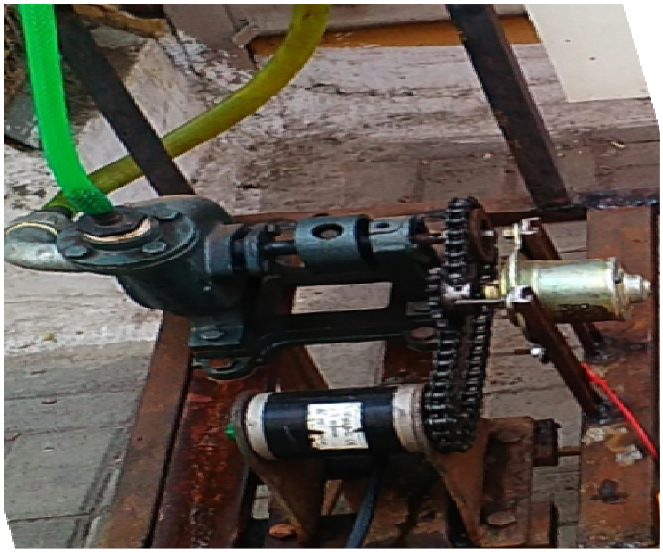

Figure 4: centrifugal pump arrangement

Centrifugal pump: In this project we have used impeller. impeller is the device working in straight line for converting kinetic energy into pressure energy. In centrifugal pump, the force exerted by the pressuring medium transfer the water from one place to another place. The reason for selecting this pump is continue supply of water. Whole process can be seen through it.

Volute casing diameter	: 24 cm
Suction head	: 4feet
Delivery head	: 6-6.5 feet
Gear ratio	: 1.285
Suction pipe nozzle	: 1.9cm
Delivery pipe nozzle	: 1.27cm

Dc motor: A DC motor is a rotary electrical machines that converts electrical energy into mechanical energy. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to change the direction of current flow in part of the motor. . A DC motor's speed can be controlled the various range, using either a variable supply voltage or by changing the strength of current in its field windings.

Chain drive: Roller chain and sprockets is a very useful method of power transmission compared to (belt-drive) belts, with less frictional loss. Although chain is made stronger than belts Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in machines besides vehicles. Most often, the power is conveyed by a roller chain, known as the drive chain or transmission chain, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain.

Figure5: chain drive mechanism

Dynamo: Dynamo is the device that converts mechanical rotation into electrical power with the help of electromagnetism. It is generated power is 12V or more at high speed. Dynamo is simple consist of the electromagnetism if the any object can be rotate along these magnetism hence the winding of wires generate the electric energy output. The output of the dynamo is depend on the torque or speed of rotation of dynamo shaft. High speed gives high voltage output similarly low speed give low speed.[5]

Charge controller: A 12 volt solar charger is easy to build and will help to charge the battery, reduce pollution and reduce dependence on fuel. The simplest battery charger is just a power supply that sends electricity of the correct voltage to a battery. You can connect battery to the power supply until the battery is fully charged and then disconnect it. For a 12 volt battery, you can plug it into a 15-18 volt power supply and then when it is fully charged, disconnect it.

Solar plate: Solar panels absorb photons from sun as a source of energy to generate electricity or heat . A photovoltaic (PV) cell is used to covert the light energy into electricity. They consist of silicon crystalline (semiconductor) for each photovoltaic cell. It consist of the p-type and n-type junction. The p-type has a positive charge and n-type has a negative charge and holes as valence electron. The sun rays strike the solar plate and p-type absorb and travels along the positive to negative charge. Thus in any system the electrons can flow hence electricity is generated or direct current generated.

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IV. TECHNICAL SPECIFICATIONS OF COMPONENTS

DC motor (high speed)	: 2650 rpm,
Power Supply	: 12V, 7.5Amp.
Centrifugal pump casing	: 160mm
Impeller diameter	: 140 mm
Gear teeth	: 14 and 18 teeth
Suction head	: 4 feet
Delivery head	: 6-6.5 feet
Solar plate	: 10watt
Charge controller	: 12volt
Dynamo generate	: 3 volt

V. RESULT

Figure 8.1: Model of centrifugal pump system

Initial power gives to the motor with the help of battery operated arrangement and the motor shaft is rotated in rotational direction. With the help of chain drive motion of the shaft is transfer to the dynamo shaft and pump shaft is rotated in same direction. The shaft of the dynamo is rotated at high speed and the dynamo converted mechanical rotation into electrical power with the help of electromagnetism. The generated power is transfer to battery and cycle is repeated. Solar plate charge to battery with the help of charge controller. The impeller rotates and the kinetic energy converted into pressure energy and suction head is developed then fluid coming out

VI. CONCLUSION

Experimental work has been carried out carefully and successfully. This drive is very useful at high load shedding condition. The result shows that this centrifugal pump is functional and can be better option is used in industrial ,farms, and home. It is

used full in the rural area where no any source of electric energy.

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