"GENERATION OF ELECTRICITY FROM SULLAGE WATER"

"A Case Study on Amanora Park Town Pune"

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Abstract- Now a days Renewable and sanitary forms of energy is the important need. The development of sanitary engineering has guide to the growth of the city. Without the sufficient supply of the safe water, the great city could not exist and life in it would be in danger unless and until human and other waste are undisturbed on time. Due to large proportion of population in relatively small areas has made the challenge for a sanitary engineer moredifficult. The cities, town and villages are being polluted by groundwater day by day. Industries also demand more and better water from all available local sources. Due to this increasing amounts of sewage and industrial wastes, resulting in extra attention to the sewage treatment, stream pollution and difficult existence of self- purification. But in various developing countries they are forgetting on this treatment and resulting indangerous diseases. This project is helps to generate electricity by sullage water.

Keywords-(sanitary engineering1, sewagetreatment2, sullage water3, Electricity4, Reuse5)

Eliminating sewage in the town, city area is mostly run by municipalities.
The application of population in the quite small town, town has made task of the sanitary engineering is more difficult. In many countries there is no such treatment plant for the sludge water. Rivers receive large amount of polluted water and cause many diseases. Thus, self-purification and the treatment plants play a vital role in sanitation of water. The otherbenefit are introduced in the form of generating electricity.

Sullage water (Grey water):

1. Sullage wastewater generated in the houses or office buildings from streams without excreta contamination, i.e. all streams except the wastewater from toilets.
2. Sources of Grey water include, sinks, dish washers, showers, baths or clothes washing.
3.As the grey water include fewer pathogens than domestic waste water, it is generally more safe to handle and easy to treat and reuse on site for landscapeor crop irrigation toilet flushing and other non-potable use.

1. INTRODUCTION

To development of the public health engineering has some added to the growth of the city without enough supply of safe and pure water. The life in the huge city is unsettling, unpleasant and dangerous unless human and other wastes were rapidly eliminate. There are two types of the system of sewerage. First oneis river basin sewerage and the another one is the public sewerage for primarily

2.LITERATURE REVIEW

1) Jalees Asghar: Jalees Asghar has mentioned in their paper that the development of the sanitary engineering has contributed to the growth of the city. Without a proper supply of safe water, the great city cannot be exist and life in it would be both disagreeable and dangerous unless human and other wastes were punctually removed. The considerationof population in relatively small areas has made thetask of sanitary engineer more difficult. The cities and villages are being polluted ground waterand surface water. Industries also demand additionaland better water from all existing sources. The rivers receive ever increasing amount of sewage and industrial wastes and thus resultant more care to the sewage treatment, river pollutionand difficult phenomena of self-purification. In many developing countries there is not such treatment plant for the sewerage water. Rivers receive large amount of polluted water and resulting many diseases. In this way self- purification and treatment plants play an important role in sanitation of water. The other benefit is nowintroducing in the form of generating electricity.

2) Anand Parkash: Anand Parkash has deliberated in this paper that the two major difficulties that have frolicked destruction with our lives are one is protection and perseverance of our surroundings and the other is energy crises. This problem is being undergone by both by industrialized and developing countries. Another power technologies and procedures are needed very desperately at this time to address the growing power difficulties as necessity for energy is going up very speedily, so there must he required out solutions to this problem. Also, those procedures should be and would be ideal which are economical. At the same time dangers to our failing environmental situation should also be taken into account so as to create only those equipment which do not cause any danger and damage to our environment, which now cannot pay for any damage to it. For this purpose, we have to sort out operational and harmless energy power replacements with minutest percent use of hydrocarbons.

3) S.U. Pate, Prashant N Pakale: S.U. Pate, Prashant N Pakale has deliberated in their paper that the demand of the electricity and fresh water is ever growing due to the increase in population and comfort level of human beings. The micro hydropower is one of finest available solutions as it hasprofitable, social and environmental profits and is also have a massive potential globally. So, this will make demand for micro hydro power generation. The core tools in micro hydro power generation is turbine. Various turbines are accessible but among them cross flow water turbine becomes popular as having benefits over using it as in less important head and small water flow rate, simple structure and advance method for energy generation in hydro power plants. The objective of paper is to study the implementation of cross flowwater turbine in micro hydro power plants for power generation.

Classification of Hydropower Plants are follows by:

1. Micro hydro power plant = up to 0.1 MW
2. Mini hydro power plant = up to 0.1 to 2.0 MW
3. Small hydro power plant = up to 2.0 to 25 MW
4. Large hydro power plant = above 25 MW

4) Prof.Q.H. Nagpurwala:- Prof.Q.H. Nagpurwala has declared in their paper that the Pelton Turbine is created by Pelton scientist in 1890. ThePelton turbine power energy is the tangential. The Pelton turbine energy is a tangential flow impulse turbine. The Pelton wheel is maximum efficient in great head applications, Power plants with heads ranging from 250 to 1500 m. The biggest units is 200 Megawatts. Pelton turbines are greatest suited for great head and low flow sites. Dependent on water flow and design the pelton wheel can role with heads as minor as 20 meters and as high as 1800 meters.

5) Jumoke Oladejo Kaiqi Shi, Xiang Luo: Jumoke Oladejo, Kaiqi Shi, Xiang Luo they have declared intheir paper that the speedily increasing population and urbanization progress has resulted in greater demands on finite properties such as land

space, water, food and energy. It has also intensified environmentally friendly challenges, which include waste management problems. These problems are comparatively dangerous to the over-all goal of sustainable progress and hence, have burnt over-all attentionin sustainable strategies for energy utilization, production and waste management A direct and an easily over observed value of the increasing waste globally is the increasing volume of urban wastewater, especially sewage sludge. Sewage sludge can be defined as any solid, semi-solid waste generated from a wastewater treatment capacity. This waste water can be source from community, commercial or industrial methods. The physical properties (low ratio of solid to liquid matter) of sewage involves coagulating and mechanical dewatering to simplify transportation and logistics for the duration of the treatment processes. These methods help increase the solid particles absorption in sludge to 10–25wt% from the original predominantly liquid (<3 wt% solid) state. In water treatment facilities, the preliminary treatment of the raw sewage is done such as initial straining of received sludge for removal of large particles such as sand, grit and stone. This is followed by the settling of the sewage in sedimentation tanks using gravitational force.

3. METHODOLOGY

1) First the installation of Pelton turbine, with a jet which will be rotate from the flow of sullage water when the water is release from the septic tank or from the household works like kitchen basin water, W.C, Bath etc.

2) The turbine consists of circular section of PVC pipe, shaft bearings etc.

3) Then the sullage water falls on the circular section pipe and with the help of shaft bearing the rotation of the turbine will be smooth.

4) The designs of the turbine consist of central portion of shaft bearing socket and combination of triangular weight which will create centrifugal force.

5) It will allow the turbine to rotate for the efficienttime just as same concept of fidget spinner.

6) The location of the turbine will be between the septic tank and the main drainage.

7) The shape of the casing of the turbine will be the semi hollow cylindrical and its size will be depend to the traffic of the sullage water.

8) If the turbine doesn't have a suitable speed then we can be provide a Nozzle jet which will give the turbine a suitable speed

FIG-1: Model On Generation of Electricity From Sullage Water

4. CALCULATIONS

For example,

In case of amanora park town, Pune

Quantity of Sullage water generated perday = 3000000 Liter/day

The potential energy falling from a height is givenby the ;

U = mgh, where:

- U is the potential energy in joules
- m is the mass in kilograms
- h is the height in metersGiven : m = 3000000

g = 9.81

h = 15

Now ,

U = mgh

= 3000000*9.81*15

U = 441450000 J

If we turn that into electrical energy mostcommonly used, the unit kWh, that isequal to 3,600,000 joules.

Therefore the value is,

= 441450000/3600000

= 122.625kWh

Motors are not 100% Efficient, so we can take80% efficiency.

= 122.65*100/80

= 153.28 kWh

So we can generate total **153.28 kWh** Energy.

This energy we can use in following category:

CATEGORY	NO. OF QUANTITY
House	30 unite
Street light	86 unite
Parking light	212 unite

TABLE N0:1

5. CONCLUSION

1) We can produce the electricity by the continuous flow of sullage water as it will be help inenergy saving.
2) It will help the future generation for the smart city.
3)
4) By this project we can provide proper electric supply to remote areas.
5) It is highly energy saving and can be used for street lights also.
6) It will reduce the load on power generation plant if use of this project is increased in practical life.
7) The electricity generated from this concept can be stored and can be used for other purpose also.
8) By making other modifications along the period this project can be used for other electricity consuming things including street lights.
9) India is the developing country this project will encourage India to become the developed country.

6. FUTURE SCOPE

1) Different types of turbines are used on this projectto achieve great efficiency.
2) Instead of sullage, sewage water can be used afterits purification to produce electricity
3) This project is very useful to the newly updated cities,townships etc.
4) It can be used this sullage water for gardening as wellas toilet flushing also.

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