Electricity produce by using sugarcane crushing machine an experimental study of energy transformation by using turbine setup

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ABSTRACT
This is innovative idea to produce electricity. Now a day’s world mostly depends up on the electricity, why means all industry machinery are run by source of electricity. In summer time don’t get the wind and water energy properly. So this time electricity demand are occur so this kind of problem 50% satisfied the project. This system produces two outputs give one input. The system consists two circuits are primary and secondary circuits. To give input energy to the primary circuits and produced mechanical energy. This Mechanical Energy applied to the secondary circuit. The secondary circuits produce the two output energy. The two output energy is work and electrical energy. Finally DC generator produce 2kw and also work are done. This project using small scale industry means get many profits.

Objectives
A Characteristic of turbine energy by using that, we produce mechanical energy and electricity. The main objective of the project “to give single input and produce two outputs”. This is innovative idea to produce electricity. This project may use small scale industry means get many profits.

Literature Reviews
Sugar Cane Trash Processing for Heat and Power Production
Kurt Woytiak (2006), This paper summarizes a preliminary investigation into new sugar cane trash processing methods at the Puunene Sugar Mill on the island of Maui, Hawaii. The mill is owned and operated by Hawaiian Commercial and Sugar, a subsidiary of Alexander and Baldwin. The objective of the investigation was to eliminate the practice of open field cane burning used in current cane harvesting methods in order to dispose of the non-sugar bearing component of sugar cane called “sugar cane trash.” As opposed to open field burning, sugar cane trash could be used to offset the need for supplemental fuel in the existing power side of the milling process. However, due to the herbaceous nature of sugar cane trash, without treatment, high levels of slagging and fouling are certain in conventional biomass fired spreader stoker boilers.

Laboratory and pilot scale tests were carried out to investigate the removal of elements known to cause boiler slagging and fouling by water leaching. Temperature, leaching duration and particle size were varied in the laboratory. Particle size was found to effectively reduce slagging and fouling probability of the potential fuel. This was determined by observing an increase in ash fusion temperatures, a reduction in chemical components known to cause boiler fouling and a decrease in total alkali concentration per energy unit below the level empirically found to be the threshold for slagging and fouling.
Similar pilot scale tests were also performed, but particle size reduction was made impossible due to equipment failure and pilot scale samples were not reduced below the threshold for slagging and fouling in the leaching treatments. Further laboratory scale tests are recommended to determine the precise particle size limits below which slagging and fouling will not occur.

**Improvement of the fabrication and testing of a sugarcane juice extractor for the cottage industry**

Makinde-ojo, Ayoola Macjay (2010). University of Agriculture, Abeokuta, Ogun state. The purchased materials for the machine improvement work were fashioned into the required form and installed, while the purchased sugarcane was used in testing the improved machine.

Finally, aside the obvious upgrade in the aesthetics of the machine, the improved sugarcane juice extraction machine for the cottage industry was tested and the extraction efficiency was obtained as a range of 65% – 76%, while the rate of juice extraction is 56.19 kg/hr.

**Experimental methods**

**Construction**

The constructions have two circuits. The two circuits are primary and secondary circuits. The primary circuits consist of water tank, pump (2HP), pentastock, blade setup. The blade setup has a pelton wheel turbine.

**Dimensional views**

It is 2-dimensional view of total process has shown below.

The pelton wheel turbine shaft connected to the secondary circuit. The secondary circuits have sugarcane machine, dc generator (5HP). The generator are coupled to the pelton wheel and also sugarcane machine pulley connected to the generator pulley using belt.

**Working**

Initially the electric motor (2HP) switch will be ON. The motor will be rotate and also rotate the pump. The Pump suck the fluid in water tank in way of pentastock and discharge the fluid in blade setup. The blade setup having the pelton wheel turbine. The water will strike to the pelton wheel(input energy).

The pelton wheel will be rotate(1750rpm). It has shaft coupled to the dc generator and rotate (1750rpm) and produce electricity (2KW) and also the rotation of dc generator is transmitted to the sugarcane machine pulley through the belt. The machine run means work are done. The process are continued. It is also called cyclic process.

**Calculation**

**Specification of pump:**

- Diameter of the impeller: \( D_1 : 200 \text{mm} \)
- External diameter of the impeller: \( D_2 : 400 \text{mm} \)
- Speed: \( N : 1200 \text{rpm} \)

**Assume data:**

- Angle made by relative velocity at inlet: \( \theta_1 : 20(\text{deg}) \)
- Angle made by relative velocity at outlet: \( \theta_2 : 30 \)
- Angle made by absolute velocity at inlet: \( \alpha : 90 \)
- Whirl velocity of inlet: \( V_{w_1} = 0 \)
- Velocity of flow at inlet: \( v_{f_1} = v_{f_2} \)

**Calculation for outlet velocity of water:**

\[
\begin{align*}
\text{Tangential velocity of impeller inlet} & : U_1 = \quad \\
\text{Tangential velocity of impeller outlet} & : U_2 = \quad \\
\text{Velocity of flow} & : V_f = 4.57 \text{m/sec} \\
\text{Whirl velocity at outlet} & : V_{w_2} = 17.215 \text{m/sec} \\
\text{Outlet velocity of pump} & : V_s \text{ = 20m/sec} \\
\end{align*}
\]
Work done:

\[ W = \frac{VW^2 + U^2}{g} \]

\[ = \frac{17.215 \times 25.13}{9.81} \]

\[ W = 44.1 \text{ NM/N} \]

Nozzle

\[ A_1 V_1 = A_2 V_2 \]

\[ \left( \frac{\pi}{4} \right) \times (0.80)^2 \times 20 = \left( \frac{\pi}{4} \right) \times (0.30)^2 \times V_2 \]

\[ V_2 = 142.22 \text{ m/sec} \]

Hence the outlet velocity of nozzle is 142.22m/sec to strike direct on the turbine blade.

Conclusion

Thus the experimental setup and that specification are identified. By using the water tank, pump, blade setup, generator, and sugarcane machine produce the electricity. Furthermore we will research the related work and execute the idea for the future work.

We use project at democracy area. Identify the fabrication setup like pump, water tank, turbine setup, dc generator & sugarcane machine. Thus the project of design & calculation are obtained.

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