

# Design and Implementation of Sintering System Exhaust Fumes Vital Reservation

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## ABSTRACT

The energy demand of the world has become unbridled in the past years and is augmenting by leaps and bounds. Sintering system is place a vital role in the process of iron and steel smelting, sintering system, the main exhaust fan power, energy consumption, through the technological transformation of the motor will be able to save electricity costs, reduce business production costs, and improve production efficiency. However, wind energy has a lot of potential and advantages but its utilization is restricted due to its irregularity, geographical and its availability. In this paper deals with the wind energy that can be derived from the wasted wind energy from industrial exhaust fan. The whole power can be stored in the battery and transmuted into ac with the help of an inverter and it can be supplied to the load. The intension is to suggest an idea that can be surmount these conundrums and utilize the wind energy is high extent. This has provoked an extensive research into the area of non-conventional energies like hydro, wind, thermal energy, etc.

Keywords: Wind power, exhaust fan, thermal performance, wind turbine and storage.

## 1. INTRODUCTION

The present electricity demand in our world surpasses the available energy supply and while the price escalates daily, there is an increased emphasis on optimizing energy usage and saving. The rapid depletion of natural resources and fossil fuels as lead to the development of alternative sources of energy. Conventional sources of energy are non-renewable, cause pollution not sufficient to the growing energy demand. One of the most arresting forms of non-conventional energy is wind energy.

Due to these reasons, it is imperative that we must start exploring and developing methods to utilize the non-conventional energy sources to reduce too much of dependence on conventional sources. Some of its limitations, the wind energy cannot be utilized fully to produce electricity. Those limitations can be surmounted with the idea of using the wind from exhaust fan of big industries as a source of power.

## 2. EXISTING SYSTEM

The air movement across the surface of Earth engenders wind and it is influenced by the areas of high and low pressure. Sun unevenly heats the surface of the Earth. Huge bodies of water, such as the oceans are slower than land in terms of heating up and cooling down.

At the Earth's surface, the heat energy is absorbed which is transmitted to the air which is just above it and, as cooler air is denser than warmer air, the warmer air rises above the cooler air to create high pressure areas and thus this causes pressure differentials. When the Earth rotates, the atmosphere is dragged around with it engendering turbulence. These effects

will add up together causing a continuously varying wind patterns across the Earth's surface.

### Disadvantages

- Complexity algorithms
- Difficult and unsatisfactory
- It's not trusted one.

## 3. PROPOSED SYSTEM

The exhaust fan in big industries can play a seminal role in producing electrical energy which can surmount the energy demand to certain extent. The wind force from the exhaust fan can be directed towards a small windmill in front of it.

The wind thrust from the exhaust fan can drive wind turbine and these wind turbines produce electricity which can be stored in storage unit. The storage unit may vary according to the production of electricity from the wind turbines. Then inverter will convert the stored dc energy into ac. This ac energy can be supplied to the load and grid

### Advantages

- 1) Wasted wind force from the exhaust fan can be utilized to generated electrical power.
- 2) It will surmount the present day problems of wind energy conversion, that is, it can provide a constant source of wind and the wind fluctuations can be surmounted.
- 3) It will not be affected by geographical locations and hence can be implemented in many big industries.
- 4) It will be plentiful, renewable and ecofriendly source of energy.
- 5) The stored energy can be used when main supply is cut off. Hence, can be used as an emergency unit.

#### 4. PROCEDURE

##### 4.1 Initial Stage

To demonstrate that heat is a form of vitality by acquaints to Thermo Electric Generator and their application, and to give the progress to use a TEGs to design and construct their own electrical generator allowing them to acquire a better understanding of how heat moves and how much vitality is availability in the form of heat.

##### 4.2 Final Stage

TEGs can convert heat energy into electrical energy, but to need some determined fettle to do this. TEGs meaning there must be a temperature difference between each face of the device otherwise no electricity will be produced. This process cannot be applied to anything that is hot and produces energy unless it also attached to something that is lower temperature. A greater temperature difference equals a greater heat flow which equals a higher electrical output. Here open circuit voltage of the TEGs has a linear relationship with the temperature difference. TEGs today are only about 5% efficient. For power generation, this means that for every 19 units energy moved from face to face but only 1 unit of electrical energy is produced. The greatest challenge in this activity to current events such as NASA Mars rover curiosity, which user TEGs technology for its power instead of solar panel.

##### 4.3 Figures

Based on some fundamental assumption of vitality, we can able to calculate the potency. Now we are going to discuss about five topics:

##### The fundamental assumption of vitality

Based on the theory of Ye Shan design calculation, we defined into two methods: Due to same radius after guide vane of import and export air flow velocity is same, but in different radius the interception of guide vane have different circumferential velocity.

$$|e| = 1/2 C_y B_i W_{mi}$$

$C_y$  - Guide Ye Yi lift coefficient

$B_i$  - Wide for wing

$W_{mi}$  - Wing Waixian angular relative velocity of air

Total Circulation fan should be:

$$|B| = Z |e| = 1/2 C_y Z B_i W_{mi}$$

Total Circulation can be used:

$$|e| = 2|r| \wedge V_u$$

$V_u$  - Projection for air flow

$$V_u = V_{2u} - V_{1u}$$

$$HT = p U_r V_{mr}$$

$U_r$  - toroidal velocity

$$r = R$$

$V_{mr}$  = air flow in cascade.

##### The Vital Reservation potency

| Equip mental No. | Running Tendency | Potency Factor | Active Power | Inlet Vane |
|------------------|------------------|----------------|--------------|------------|
| 1                | 430              | 1.0            | 7448         | 54%        |
| 2                | 400              | 1.0            | 6928         | 59%        |
| 3                | 415              | 1.0            | 7188         | 54%        |

##### Fan Transformation and Implementation

In this process need to use frequency converter to control speed. This frequency converter of sintering fumes synchronous motor when the switch mode.

##### Frequency Converter Speed

Synchronous motor is much smaller than asynchronous motor so the sintering system for synchronous with the suction fan.

$$n = 60f/p(1-s)$$

$n$  - motor speed

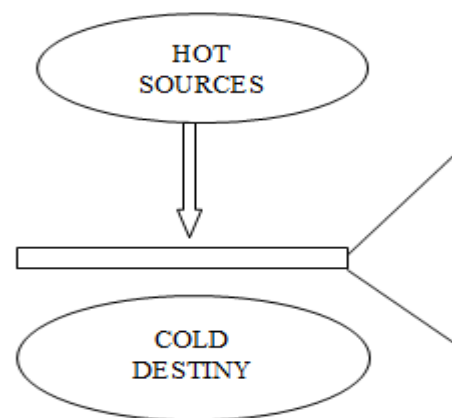
$f$  - power frequency

$p$  - electric pole logarithm

$s$  - motor slip

##### Frequency Converter

It can choose Robicon Series inverter.



#### 5. UNITS (SI UNITS )

|                                            |
|--------------------------------------------|
| Area – m <sup>2</sup>                      |
| Time – s                                   |
| Velocity – ms <sup>-1</sup>                |
| Acceleration – ms <sup>-2</sup>            |
| Density – Kg m <sup>-3</sup>               |
| Temperature – K                            |
| Electric charge – c                        |
| Electric current – A                       |
| Electric potential difference – V          |
| Electric field strength – Vm <sup>-1</sup> |
| Electric resistance – Ohm                  |
| Capacitance – F                            |
| Pressure – Pa                              |
| Kelvin – K                                 |
| Candela –cd                                |
| Mole – mol                                 |

##### 5.1 CGS UNITS

|                                   |
|-----------------------------------|
| Acceleration – Galileo (Gal)      |
| Electric current – Biot (Br)      |
| Dynamic viscosity – Poisu (P)     |
| Electric charge – Franklin (Fr)   |
| Pressure – Barye (Ba)             |
| Magnetic flux density – Gauss (G) |
| Force – Dyne (dyn)                |
| Heat energy – Calorie (Cal)       |

### 5.2 Wind Formation

Wind turbines operate on a simple mechanism. The energy in the wind turns two or three propellers like blades around a rotor. The rotor is connected to the main shaft, which spins a generator to create electricity. Wind turbines use wind to make electricity. The wind turbines work the opposite of a fan. The air movement across the surface of earth engenders wind and it is influenced by the areas of high and low pressure. Sun unevenly heats the surface of the earth. Huge bodies of water, such as the oceans are slower than land in terms of heating up and cooling down. At the earth surface, the heat energy is absorbed which is transmitted to the air which is just above it and, as cooler air is denser than warmer air, the warmer air rises above the cooler air to create high pressure areas and thus these causes pressure differentials. When the earth rotates, the atmosphere is dragged around with it engendering turbulence. These effects will add up together causing a continuously varying wind patterns across the earth surface.

Local winds are caused by unequal heating and cooling of ground and ocean or lake surfaces during day and night. Planetary wind is engendered by daily rotation of earth around its polar axis and unequal temperature between polar region and equatorial region.

### 5.3 Wind Power

Types of modern wind fall in the two groups: Horizontal axis and Vertical axis. The metamorphosis of energy of wind into a usable form of energy is the wind energy (e.g. generating electrical power using wind turbines, mechanical power from wind mills, for water pumping or for drainage, wind pumps are used).

#### Merits of wind energy:

- It is renewable sources of energy.
- It emits no greenhouse gases and hence non- polluting.
- It uses very little land.
- Fuel transportations are not required in wind energy conversion system.

#### De-merits of wind energy:

- Owing to its irregularity, the wind energy needs storage.
- Availability of energy is fluctuating in nature.
- Wind energy conversion is noisy in operation.
- Low energy density.
- Maintenance is required.
- Wind turbines design, manufacture and installation have proved to be most complex due to several variables and extreme stresses.

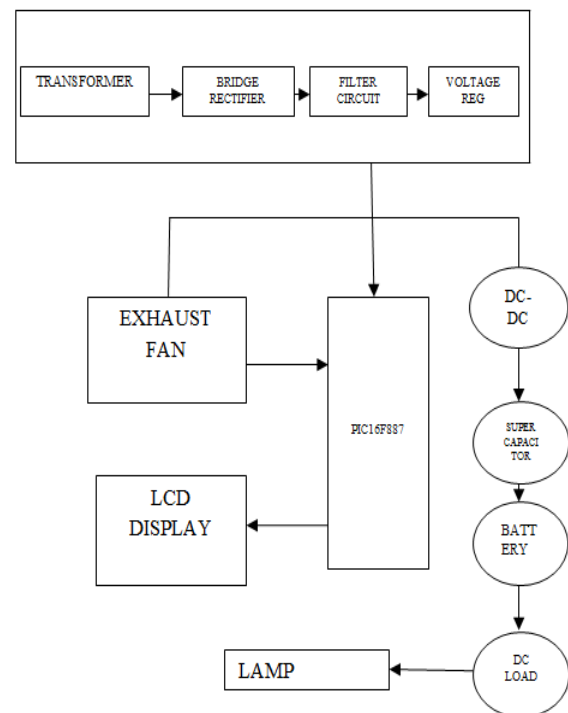
## 6. BLOCK DIAGRAM

#### Hardware Requirements

- PIC microcontroller
- LCD
- Exhaust Fan
- DC-DC Converter
- Power supply unit
- Battery
- Lamp

#### Software Requirements

- MP lab cross compiler
- Embedded C



## 7. CONCLUSION

To custom the above furnished details that the winnow from exhaust can work as a worthwhile of electricity. Moreover, the winnow speed is higher than the inevitable auro. Hence can beget even more electrical power than what is procreated from the auro. We converse about the sooner that wind from exhaust fan may get dissipate some other time. But there should be some kind of real time director to guide the winnow from the exhaust fan directly to wind turbines without getting the limited average speed of the wind abate as the rapidly of the winnow.

## REFERENCES

- [1] P.P.Pradyumn and Swathikrishnan, *Indian journal of pure and Applied physics*, Vol.48, February 2010, pp.115-120.
- [2] Natkrita Prasoetsopha, Supree Pinitsoontorn, Vittaya Amornkitbamrung, *Department of Physics, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand*.
- [3] D. Flahaut, T. Mihara and R. Funahashi, N. Nabeshima, K. Lee, H. Ohta and K. Koumoto, *Journal of Applied Physics* 100, 084911 (2006).
- [4] Ho Kim, Soon-Mok Choi, Won-Seon Seo and Dong-Ik Cheong, Kim et al. *Nanoscale Research Letters*, 2012, 7:2.
- [5] Driss Kenfaui, Guillaume Bonnefont, Daniel Chateigner, Gilbert Fantozzi, Moussa Gomina, Jacques Guillaume Noudem, *Materials Research Bulletin*, 45 (2010) 1240–1249