International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE)
ISSN: 0976-1353 Volume 28 Issue 5 – MAY 2021.

MODIFICATION OF STEAM HEATER FROM ELECTRICAL HEATER IN HFO SEPERATOR

G. Brightlin Immanuel [#1], *J. John Moses* [#2], *G. Ebenezer* [*3]

[#]*Student , Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Anand Nagar, Krishnankoil, India, 9818009006@klu.ac.in*

[#]*Student , Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Anand Nagar, Krishnankoil, India, 9917009042@klu.ac.in*

[*]*Assistant Professor, Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Anand Nagar, Krishnankoil, India, g.ebnezer@klu.ac.in*

***Abstract*— HFO separation unit electric heaters are used to store fuel temperature. If the current cost of electricity is higher. It therefore requires a lot of cost in operation and affects the profitability of the company. Therefore, we can convert the smoke heater from an electric heater using an HFO separation unit. If steam costs are too cheap, then we use a steam heater to keep the fuel temperature constant. When compared to an electric heater, it is a huge economy and increases the company's profits. We can therefore change the smoke heater from an electric heater, using the HFO separator unit.**

Index Terms- Hfo Separator, Fire Order, Engine Auxiliary System

I. INTRODUCTION

There are 2 production facilities installed in this plant and each has a 6MW captive and the total prisoner is 12MW. The diesel engine is the leading power converter for each 11KV alternator. Diesel engine plays an important role. As the energy produced from this plant is applied to the whole plant. So this plant uses engines to generate the energy produced and only one engine is left like a train with an engine. The engines are supplied with fuel to the power generator. Since we use furnace oil to generate electricity, we have not been able to generate energy in the first case, so we move the lubricant oil continuously to the engine to keep the engine parts warm. The furnace oil used here to generate electrical energy contains a lot of foreign material and high viscosity .So we use many units to filter out foreign matter and reduce its viscosity. Another unit of the HFO unit is separation unit if the front heater separator of the HFO unit is used to burn fuel. It costs a lot of money in our project to convert a steam heater from an electric heater to a pre-HFO separator unit. It reduces operating costs to burn fuel. Increases corporate profits.

II. PROBLEM DEFINITION

HFO separation unit electric heaters are used to store fuel temperature. If the current cost of electricity is higher. It therefore requires a lot of cost in operation and affects the profitability of the company. therefore we can convert the moisture heater from an electric heater using an HFO separator unit. If steam costs are too cheap, then we use a steam heater to keep the fuel temperature constant. When compared to an electric heater, it is a huge economy and increases the company's profits. so that we can change the steam heater from an electric heater, using an HFO separation unit.

III. METHODOLOGY

- Installation of 2 Generators.
- Diesel engine used as Prime mover.
- Using Furnace Oil for Power Generation.
- Filtering of Foreign Matter.
- HFO Seperator used
- Efficiency Increased

There are 2 generators installed in this plant and each has a capture of 6MW and the total capacity is 12MW. The diesel engine is the leading power converter for each 11KV alternator. So this plant uses engines to generate the energy produced and only one engine is left like a train with an engine. The engines are supplied with fuel to the power generator. Since we use furnace oil to generate electricity, we were unable to generate energy in the first instance, so we provide continuous lubricating engine oil to keep the engine parts warm. many filtering foreign news and reducing its viscosity We therefore use many units to filter foreign news and reduce its viscosity. One unit is the HFO separator unit if before the HFO separator unit heater electrical is used to heat the fuel. It costs a lot of money in our project to convert a steam heater from an electric heater to a pre-HFO separator unit. It reduces operating costs to burn fuel. Increases corporate profits. The company's profits will be affected if the current cost of electricity and operating costs are higher The HFO heater separator units are used to store the fuel temperature, thus enhancing the performance of the heater. the steam heater is fitted with oil entering the settling tank and the fuel pump is pumped to the oil from the reservoir tank to enter the electric heater. Electric heater heats oil up to 900 C control valve controls oil flow in HFO separation unit.

IV. COMPONENTS

STEAM HEATER

Steam is one of the most common and efficient heat transfer devices used in the industry, but it is not only available. Other liquids such as hot water and oil are also used in

indirect heat exchanges. The following article will focus on the benefits of using steam compared with hot water or hot oil.

Figure 1: Steam Heater

Usage

- Steam trap
- Temperature control
- Condensed pump

STEAM TRAP

Steam trap is a type of automatic valve that filters condensate. (I, e. Condensed water) and gases that cannot be absorbed as air without allowing steam to escape. In industry, the seam is usually heated or powered by electricity. Steam traps are used in such systems to ensure that the smoke is not wasted. Smoke is formed when water evaporates to form a gas to form a process of vaporization that occurs, water (hydrogen bonds, etc.) breaks down. This energy provided to convert liquids into gases is called latent heat. Steam operating systems use subtle heat and transfer it to a given product. When the work is completed (I, e.steam give up its latent heat), the steam condenses and shrinks. In other words, condensate does not have the ability to do the work that the steam does. Efficient heating and therefore condensate is not removed very quickly, either in the exhaust pipes or in the heating system.

EMERGENCY CONTROL

Temperature controller is a device used to control the temperature of an oil behind a heater. It is also used to maintain a stable oil temperature.

ELECTRIC HEATER

Electric heating is widely used in the industry. The advantages of electric heating systems over forms include precise temperature control and heat dissipation, unused fire power to increase heat, and the ability to detect temperatures that are not easily accessible by chemical fire. Electric heating can be used precisely in the precision area required for this process, at high power filters in each area or by volume. The electric heating device can be built to any size required and can be found anywhere inside the plant. The electric heating system is generally clean, quiet, and non-exhaust especially with product temperature in the surrounding areas. Electric heat exchangers have a high reaction speed, which leads to faster mass production equipment. The limitations and disadvantages of the electric heating industry include the high cost of electricity compared to direct fuel consumption, as well as the high cost of both the electrical equipment itself and the infrastructure required for large amounts of electricity to the point of use. the same effect. The construction of an industrial heating system begins with an assessment of the required temperature, required temperature, required temperature, and possible methods of heat transfer. In addition to operation, convection and radiation heating methods can use electric and electric fields to burn property. Electrical heating methods include heat resistance, electric arc heating, and dielectric heating. In some processes (for example, welding), electrical energy is applied directly to the object. In another process, heat is produced within a piece of work by ingestion or dielectric loss. Also, heat can be produced and transferred to the work by process, transfer or radiation.

Figure2: Electrical heater

Industrial heating processes can be broadly categorized as low temperature (to about 4000C or 7520C), medium temperature (between 400 and 11500C or 752 and 21020F), high temperature (beyond 11500C or 21020F). low temperature processes include, baking and drying, curing finishes, soldering, moulding and shaping plastics and some non-metals for casting or reshaping, as well as annealing, stress-relieving and heat treating metals. High temperature processes include steel making, brazing, welding, casting metals, cutting, smelting and the preparation of some chemicals.

V. IMPLEMENTATION AND RESULT

Microcontroller

1. Installation of two Generators.
2.Diesel engine used as Prime mover.
3.Using LSHS Oil for Power Generation.

4.Filtering of Foreign Matter.
5.HFO Seperator used.

Industrial temperature processes can be broadly classified as low temperature (up to about 4000C or 7520C), medium temperature (between 400 and 11500C or 752 and 21020F), high temperature (above 11500C or 21020F). low-temperature processes include, baking and drying, curing finish, wrapping, molding and construction of plastics and other non-casting or recycling materials, as well as reduction, pressure reduction and metal heating. High-temperature processes include metal fabrication, binding, welding, metal dispersing, cutting, melting and preparation of other chemicals.

ELECTRICAL HEATER

Units consumed in 1 hour = 62kw/hr
Cost for 1kw/hr= Rs 7.50
Cost for 52kw/hr = 62x7.50s
= Rs465
Units consumed in 1 day = 465x24
= Rs11,160

STEAM HEATER

Amount of steam produced per day = 8 tonnes Cost of steam for 1 tonne = Rs900
Cost of steam for 8.5 tonnes = 900x8
= Rs7,200
Cost of steam used per day = Rs7,200

SAVING COST

Saving cost per day = (operating cost electrical heater per day) – (operating cost of steam heater per day)
= Rs11160-Rs7200
= Rs3960
Saving cost per month= Rs3960x30
= Rs204840
Saving cost per year =Rs2586800
during night.

VI. CONCLUSION

The project is primarily focused on increasing company profits. The electric heater is wide and the maintenance costs are also high. So we can turn the steam heater into an electric heater. The steam heater is cold but steam costs are very low and energy costs are very high. We can therefore change the steam temperature to maintain an increase in oil temperatures and increase the company's profits.

REFERENCES

1. IEA. Renewables 2019; IEA: Paris, France, 2019.
2. IEA. Tracking Power; IEA: Paris, France, 2019.
3. IRENA. Planning for the Renewable Future: Long-Term Modelling and Tools to Expand Variable Renewable Power in Emerging Economies; International Renewable Energy Agency: Abu Dhabi, UAE, 2017.
4. IRENA. Renewable Energy Prospects for the European Union; International Renewable Energy Agency: Abu Dhabi, UAE, 2018.
5. IEA; IRENA; UNSD; World Bank; WHO. Tracking SDG 7: The Energy Progress Report; World Bank: Washington, DC, USA, 2020.
6. IEA. Status of Power System Transformation 2019; IEA: Paris, France, 2019.
7. Kroposki, B. Integrating High Levels of Variable Renewable Energy into Electric Power Systems. Available online: https://www.nrel.gov/docs/fy17osti/68349.pdf (accessed on 30 May 2020).
8. Henderson, C. Increasing the Flexibility of Coal-Fired Power Plants; CCC/242; IEA Clean Coal Centre: London, UK, 2014.
9. Garðarsdóttir, S.Ó.; Göransson, L.; Normann, F.; Johnsson, F. Improving the flexibility of coal-fired power generators: Impact on the composition of a cost-optimal electricity system. Appl. Energy 2018, 209, 277–289.
10. Sloss, L. Levelling the Intermittency of Renewables with Coal; CCC/268; IEA Clean Coal Centre: London, UK, 2016.
11. Göransson, L.; Goop, J.; Odenberger, M.; Johnsson, F. Impact of thermal plant cycling on the cost-optimal composition of a regional electricity generation system. Appl. Energy 2017, 197, 230–240.
12. Wiatros-Motyka, M. Power Plant Design and Management for Unit Cycling; CCC/295; IEA Clean Coal Centre: London, UK, 2019.