A REVIEW OF LPG CYLINDER FABRICATION BY UTILIZING WASTE HEAT FROM OIL FIRED FURNACE

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ABSTRACT

Nowadays, once fuel costs constantly grow, the energy efficiency is turning into additional pressing and saving of fuel and energy recourses has become of high priority. Non-efficient use of fuel is determined in the majority branches of industry. It causes the requirement of importing of approximately 5-hitter of the desired fuel. Consistent with the applied mathematics information, heating offer needs almost 95 million tons of' typical fuel everywhere world. Thus, the problem of' efficiency improvement of' fuel use should be paid special attention.

Keywords: Waste Heat, Recovery, Waste Heat Utilization, Energy Efficiency

1. INTRODUCTION

The engineering industry in India manufactures a spread of product, with significant engineering goods accounting for majority of the production. Most of the leading players within the significant engineering goods segment manufacture high worth significant engineering product using high end technology. The necessity of giant capital investments acts as an entry barrier. Consequently, the small and unorganized companies have small market presence. The unorganized sector focuses on manufacturing low-technology product whereas many small scale units are concerned only in assembly of imported elements.

On the other hand, manufacturers of light engineering product use medium to low-end technology. The entry barrier is low, due to comparatively lower demand of capital and technology. This phase is characterized by dominance of small and unorganized players that manufacture low added product. However, some medium and enormous scale firms produce high value-added product. This phase is additionally characterized by small capacities and high level of competition.

Classification of Metal Fabrication Industries:

1. Industrial
2. Structural
3. Commercial

In industrial fabrication, equipment's are manufactured for industries.

Structural sort includes creating of the parts that are used for building or another term that may be used for these parts is building parts.

Commercial fabrication includes the manufacturing of finished product that are purchased by consumers.

The task of selecting a right fab search becomes hard, once there are scores of decisions accessible in front of you. Because of the enhanced demand of metal structures, several fab shops have emerged. You need to research them well so as to search out a right one.

It is a proven fact that all firms won't provide the particular product you need, you'll need to shop around for that. Experience, skills, worth and

reviews of customers are the factors that are required to investigate for selecting a right company. The method of manufacturing metal structure is similaralogous to an art wherever completely different metal components are joined to make a complex metal structure that may be used for various purposes for residential, industrial or different purposes.

2. LITERATURE SURVEY

Kim et al (2002) [1] the analysis of burner status is extremely necessary as a result of the combustion method in turn affects the surroundings. The pollution of the surroundings will be reduced if the thermal efficiency is higher and also the content of element within the exhaust gas is less. The emissions of Nox and CO ought to be at intervals limits to reduce the environmental drawback.

S.Umamaheswari et al [2] carried out the analysis work on the efficient way to generate captive power through Waste Heat Recovery (WHR) to satisfy out of the requirements of Iron and Steel Industries has been discussed.

Yogendra Saidawat, et al [3] carried out the analysis work on the power generation from the waste heat extracted through clinker production within the cement industry. This study includes the power generation calculation for a cement plant and also the totally different methodologies (cycles) wont to generate power. Waste heat power generation features a wide scope in future to reduce carbon emissions and to optimize resources similarly as energy savings.

Binoy C N at al. (2014)[4] have done analysis on price reduction using different fuel during a forging industry [34]. Their study includes waste plastic pyrolysis oil, waste plastic pyrolysis oil and its mix as an alternate fuel for a formation business has been introduced. In their study, applicability of waste tyre pyrolysis oil was studied basis on a forging industry.

Miguel Vaz Jr et al [5] presents a general framework for numerical simulation of blanking method using finite parts. The work discusses some process problems on modeling blanking method and investigates the result of clearances between the punch and die within the stress distribution throughout the penetration stage of the cutting method. Smaller clearance produces high compressive stress close to the punch tip whereas on the other hand, larger clearance caused larger tensile radial stress over an extensive region on at the lower face of the metal blank and comparatively smaller compressive stress near the punch tip. The high stress near the punch tip, promotes excessive tool wear once successive cutting operation.

R. Hambli et al [6], investigated the blanking method using tools with four completely different wear states, four different clearances and studied the consequences of the interaction between the clearances, the wear states of the tool and sheet thickness on the evolution of the blanking force and therefore the geometry of the sheared surface. during this investigation, it's assumed that the clearance is optimum once the direction of crack propagation coincides with the line joining the points of crack initiation within the punch and die, giving cleanly blanked surfaces while not secondary crack formation. During this case, the entire separation of the sheet is obtained for a lower worth of punch penetration. If the cracks generated by the punch and die don't coincide, the formation of secondary cracks.

Totten and Howes (1997) [7] Heat treatment processes are used to manufacture changes within the metallurgical structure and also the connected material, structural, and surface texture properties of steel .Different heat treatment processes have totally different effects on the resulting microstructure and structural properties as well as the strength, fracture toughness, and ductility of steel. Heat treatment is usually employed in the steel producing method to enhance the standard or properties being made. However, it may be used to repair harm or rehabilitate older or used steels.

3. WASTE HEAT

Waste heat is heat generated during a method by manner of fuel combustion or chemical reaction that is then "dumped" into the surroundings and not reused for useful and economic functions. The essential fact isn't the quantity of heat, however rather its "value".

3.1 Benefits of Waste Heat Recovery

Benefits of "waste heat recovery" may be generally classified in 2 categories:

Direct Benefits: [2], [4]

Recovery of waste heat contains a direct impact on the efficiency of the method. this can be reflected by reduction within the utility consumption prices and method value.

Indirect Benefits: [2], [4]

a) Reduction in pollution: variety of toxic combustible wastes like carbon monoxide gas, sour gas, etc. releasing to atmosphere if/when burnt within the incinerators serves dual purpose i.e. recovers heat and reduces the environmental pollution levels.

b) Reduction in equipment sizes: Waste heat recovery reduces the fuel consumption that ends up in reduction within the flue gas made. This results in reduction in equipment sizes of all flue gas handling equipment like fans, stacks, ducts, burners, etc.

c) Reduction in auxiliary energy consumption: Reduction in equipment sizes provides further advantages within the kind of reduction in auxiliary energy consumption like electricity for fans, pumps etc.

4. WASTE HEAT RECOVERY TECHNOLOGIES

Methods for waste heat recovery include transferring heat between gases and/or liquids (e.g., combustion air preheating and boiler feed-water preheating), transferring heat to the load coming into furnaces (e.g., batch 'cullet preheating in glass furnaces), generating mechanical and/or electric power, or using waste heat with a heat pump for heating or cooling facilities. a number of the equipment for the aim is as follows:

4.1 Heat Exchangers

Heat exchangers are most commonly wont to transfer heat from combustion exhaust gases to combustion air coming into the furnace. Since preheated combustion air enters the furnace at a better temperature, less energy should be supplied by the fuel. Typical technologies used for air preheating embrace Recuperators, furnace regenerators, burner regenerators, rotary regenerators, and passive air pre-heaters.

Recuperator:

Recuperator recover exhaust gas waste heat in medium to high temperature applications like soaking or annealing ovens, melting furnaces, afterburners, gas incinerators, radiant tube burners, and heat furnaces. Recuperator is supported radiation, convection, or combinations of each. Recuperators are created out of either metallic or ceramic materials. A typical Recuperator is shown in Fig 1.

Regenerators:

The Regeneration that is preferred for giant capacities has been very wide utilized in glass and steel melting furnaces. Necessary relations exist between the dimensions of the regenerator, time between reversals, thickness of brick, conduction of brick and heat storage ratio of the brick. A typical Regenerator is shown in Fig 2. During a regenerator, the time between the reversals is a very important aspect. Long periods would mean higher thermal storage and thus higher price. Additionally long periods of reversal lead to lower average temperature of heat and consequently reduce fuel economy. Heat losses from the walls of the regenerator and air in leaks throughout the gas amount and out-leaks throughout air amount additionally reduces the heat transfer.

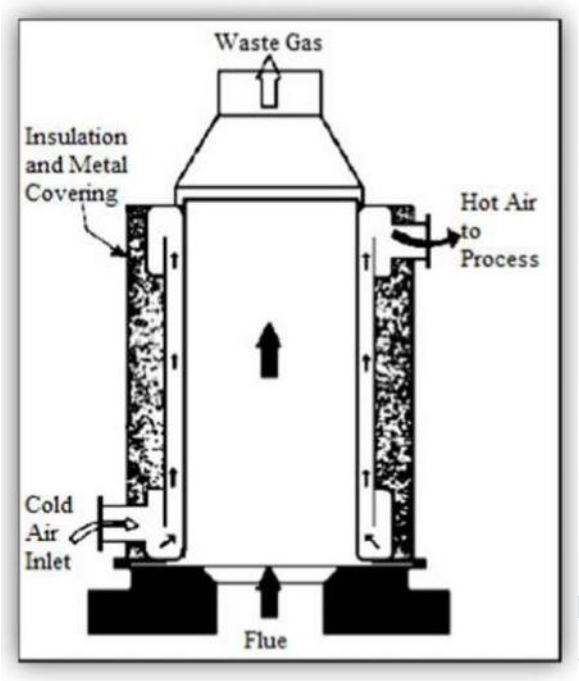

Fig. 1 Metallic Radiation Recuperator

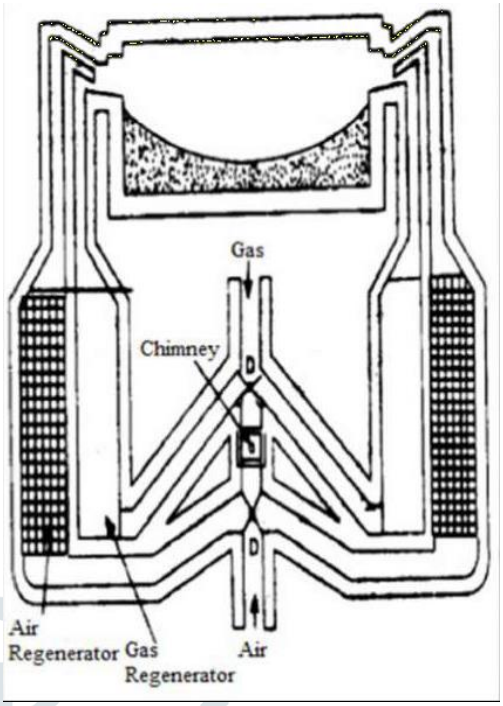

Fig. 2 Regenerator

4.2 Waste Heat Boilers

Waste heat boilers are normally water tube boilers within which the hot exhaust gases from gas turbines, incinerators, furnaces etc., pass over variety of parallel tubes containing water. The water is vaporized within the tubes and collected in a very steam drum from that it's drawn out to be used as heating or process steam. These WI-id uses medium to high temperature exhaust gases to get steam. Waste heat boilers are out there during a form of capacities that allowing gas intakes from 1000 to 1 Million ft.-3/min. [3]

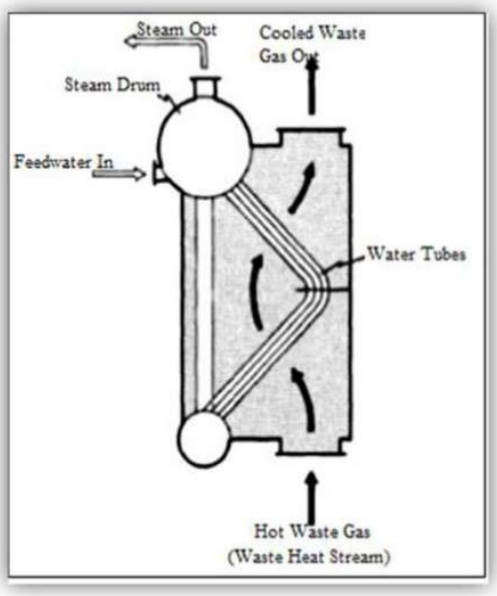

Fig.3 Two Pass Water Tube Waste Heat Boiler

4.3 Economizers

In the case of boiler systems, an economizer is provided to utilize the flue heat for pre-heating the boiler feed water. On the opposite hand, in an air pre-heater, the waste heat is employed to heat combustion air. In each the cases, there's a corresponding reduction within the fuel needs of the boiler.

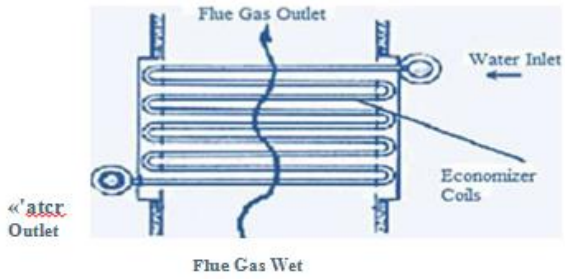

Fig.4 Economizer

4.4 Heat Wheels

A heat wheel is finding increasing applications in low to medium temperature waste heat recovery systems. Fig.5. is a sketch illustrating the application of a heat wheel.

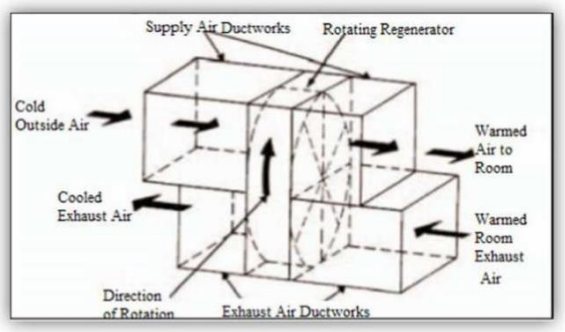

Fig.5 Heat Wheel

It is a large porous disk, fabricated with material having a fairly high heat capability that rotates between 2 side-by-side ducts: one a cold gas duct, the opposite a hot gas duct. The axis of the disk is found parallel to and on the partition between the 2 ducts. Because the disk slowly rotates, sensible heat (moisture that contains latent heat) is transferred to the disk by the recent air and, because the disk rotates. From the disk to the cold air. The efficiency of sensible heat transfer for this type of regenerator is as high as 85 %. Heat wheels are designed as giant as 21 metres in diameter with air capacities up to 1 130 m3 !min.

A variation of the heat Wheel is that the rotary regenerator wherever the matrix is in a very cylinder rotating across the waste gas and air streams. the heat or energy recovery wheel could be a rotary gas heat regenerator, which might transfer heat from exhaust to incoming gases. Its main space of application is wherever heat exchange between massive masses of air having little temperature variations is needed. Heating and ventilation systems and recovery of heat from appliance exhaust air are typical applications. [3]

4.5 Heat Pipe

A heat pipe will transfer up to 100 time's additional thermal energy than copper, the simplest well-known conductor. In different words, heat pipe could be a thermal energy absorbing and transferring system and haven't any moving components and therefore need minimum maintenance. The working of a typical Heat Pipe is shown in Fig.6.

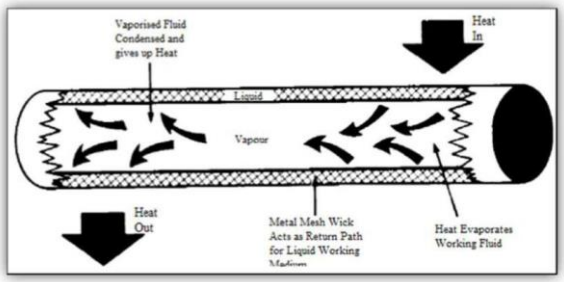

Fig.6 Heat Pipe

5. CONCLUSION

Nowadays, once fuel costs constantly grow, the energy efficiency is turning into additional urgent and saving of fuel and energy recourses has become on high priority. As well as, non-efficient use of fuel is observed in the majority branches of business. It creates the need of importing the additional needed fuel thence recovering waste heat is a choice that definitely a benefit to all such industries.

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