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Combustion Chamber and Type of the Gas Turbine

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ABSTRACT
The combustion chamber in a turbo cycled engine is a crucial part of the operating cycle of this type of engine. The combustion chamber aims to convert the chemical energy contained in the fuel into thermal energy that can be used to run the engine. The goal of this study is how to operate the annular combustion chamber, as well as the fuel pumping process and the amount of flow rate inside the combustion chamber.
Key words:-combustion chamber, turbo cycled engine, fuel pumping, flow rate.

I. INTRODUCTION

The gas turbine is a machine that burns fuel to provide Energy to create a moving flow of air, and to extract valuable power or generate useful thrust from that movement.

The jet engine has revolutionized air transport over the last 50 years, and Rolls-Royce has been at the cutting edge, pioneering many of the key advanced Technologies of the jet age. a jet engine employs Newton's laws of motion to generate Force, or thrust as it is normally called in aircraft Applications.

It does this by sucking in air slowly at the front, and then blowing it out quickly at the back.

-Gas turbine Maine part isAir intake system, the air inlet duct must provide clean and unrestricted airflow to the engine. Clean and undisturbed inlet airflow extends engine life by preventing erosion, corrosion, and foreign object damage, Air compressor compressor usually consists of multiple stages. One addition row of fixed blades (inlet guide vanes) is frequently used at the compressor inlet to ensure that air enters the first stage rotor at the desired angle in addition to the stators an additional diffuser at the exit of the compressor further diffuses the fluid and controls its velocity when entering combustors Combustion chamber, The air from the compressor enters the combustion chamber from below and flows upwards through the combustion chamber to increased heat air flow Turbine Complete gas-turbines power plant contains of a group of units each consist of a compressor ,combustion chamber ,heat exchanger and a turbine the most important parts is the producing power component heat needs periodic maintenance. It receives the highest temperature gases.

Three different designs of turbines are found depending on shaft support Overhung power turbine a section of this kind of turbines used in small units. Two-bearing turbine: this design is used in bigger size turbine Three-bearing turbine: this design is used in the turbine having only one driving shaft with the compressor. Exhaust Passes the turbine discharge gases to atoms sphere at a velocity, and in the required direction to provide the resultant thrust.

II . MATERIAL AND METHODS

Burner:-

Dual fuel and it is asocial auxiliary erumpent introduce the gases and liquid fuel into the combustion chamber at the same the burner thoroughly mixes the fuel with the (primary air) and stability the flame by providing an appropriates air the flow.

. Design:-

The principle parts of the burner are the burner cover the swirl insert the fuel feed with the fuel nozzle and servomotor for liquid fuel the gas burner jackets for supplying gaseous fuel and the nozzle cap and the igniter the hot parts of the burner in particular the burner cover are fitted with detachable cover this prevents tube oil or fuel leakages from coming into contact with hot part.

. Burner cover:-

All the components of the burner are mounted on the burner cover which closes of the combustion chamber the burner cover is one piece

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item made of ferrite alloy material and is bolted to the top flange of the combustion chamber cover by expansion bolted and nuts

Fig (1) burner

- **Swirl insert:-**

The Swirl insert is a welded constriction made of heat resistant plate and is mounted in the three swirl insert adjusters on the burner cover so that it can freely expanded with heat its positioned so that it hangs in the top opening of the combustion chamber internal assembly the nozzle of liquid and gessoes fuel are in the center of the swirl insert.

Fig (2)swirl insert

Fuel feed:-

The actual burner its self-comprises the components for supplying the liquid and gaseous fuel the cylinder double_ welded gas burner jackets is bolted on by its lower flange to the center of the burner cover with expanded studs and hexagonal nuts the gas burner jackets composite welded constriction the fuel gas is fed into the ring duct of the gas burner jackets through a cost stub at the top the inside and outside ring are screwed on to bottom of the gas burner jacket and together form the bottom termination of the ring duct the annular configuration out let bores for feeding the fuel gas into the combustion chamber are located in the outside ring the gas burner jacket support the inner jacket whites fits inside it and in turn support the liquid fuel feed so that all three parts are mounted concentrically the inner jackets is fast end to the other two parts by two flange connection with expansion stud and hexagonal socket nuts expansion sleeve are fitted at the flange connection to the fuel feed.

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Fig(3) Fuel injector

Igniter:-

The igniter is mounted between the gas burner jacket and the inner jackets that the ignition flame penetrates into the combustion space of the combustion chamber in the section and checks to the igniter can be easily carried out since once the servomotor has been removed only the flange connection between the gas burner jackets and the inner jacket fastened needs to be undone in order to whit draw the inner jacket complete with fuel nozzle the igniter is screwed into the inner jacket.

Principal of operation:-

The dual fuel burner is designed for operation with liquid and gaseous fuel and also for mixed operation with both types of fuel simultaneously the primary are required for combustion passes into the combustion space two parts the major part of the air flow down from above through the swirl insert which import consider turbulence to it and contributes to butter mixing with the fuel and to a more stable flame the position of the swirl insert can be adjective vertically bring it into the most favorable location with raged to the burner nozzle out let to achieve optimal combustion the second part of the (primary air) flows through four longitudinal openings in the gas burner jacket into the annular space between the inner jacket and the inner wall of the gas burner jacket and inters the combustion space directly at the fuel nozzle with turbulence imported by the inner swirl insert the air supply mixes thoroughly with the fuel which ensures good and quick combustion.

In the liquid fuel operation the fuel quantity required for the operation point in the question is set by the stork of the nozzle spindle in the fuel nozzle with aid of the servomotor the fuel is under high presser and atomizes at the nozzle end and enters the combustion space as conical spray. The required quantity of gaseous fuel is set by the hydraulically-operated control valve which is insulated in the gas control back the fuel gas flows through the annular passage in the gas burner jackets and is passed into the combustion chamber through the out let bores located an annular configuration in the outside ring in gaseous fuel operation a lineated quantity is cooling is introduces into the annular duct between the liquid fuel nozzle and the nozzle cap to protect the fuel nozzle from excessively high temperature when the gas turbine is started the fuel the fuel is ignited by propane gas flame from igniter the propane gas stored gas bottles and is supplied to the burner of igniter via automatically-controlled solenoid valves the propane gas is ignited by an electric igniter plug fitted in the flame pipe of the igniter. After the main flame has been successfully lit the ignition flame is turned by automatic control equipment.

III. RESULTS

Final paper of the results of first unit In (H.P.I.4) periodic disclosure of the period from 27/12/2011P and until 01/05/2012 P.

Operating data:

_Number Of operation turns (342)
_Total Hour number operation (122601)
_Total Equivalent hour (128994)
_Number Of equivalent hour since last over holding (34381).
_Number hour of equivalent since last inspection (4196)

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Mechanical work:

3.1.Combustion chamber (CC):-

3.1.1 lower combustion chamber (LCCI):-

the presence of cracks on the ocean most of the combustion chamber and the holder of LCCI-tiles and, particularly in the overlap between the ring been processed by welding. Tiles Carrier thermal

3.1.2 Sight glasses and flame monitor:-

Was detected on the flame tubes and things manifest vision lenses and found in good condition.

3.1.3 Diffuser and tiles (ETS):-

_ Number 2 is installed tile by heat welding and found the rest of the tiles in good condition.

3.1.4 Tiles carriers: -

Has been detected on the carrier thermal tiles and found in good condition.

3.1.5 hot gas casing (HGC):- crack been working on the maintenance of this (HGC) cracking due to a large crack in the carrier gas hot. Carry out processing operations by cutting and welding. and display processing has been hailed for this work is cut out the cracked piece of metal on the body length of 40cm and 20cm withed separated from the body of hot gas carrier was cleaning the edges and knead a process of abrasive and survey.

Part of the lump to re-weld to the new procedure has been hailed several consecutive welding operations to reach the dam. (Dye penetrate Test) and a test for the (HGC) welding the space between the lump and the body.It was the welding process as required and to the fullest and by the possibility of working group of engineers, technicians, welding station. Has also been a (STOP DRILL) to stop cracking in the body of a simple (HGC) from the right side.

3.2. Exhaust system: -

-Has been detected on the exhaust system and found some of the thermal insulation of flurried saluting his place was filling the place as new insulation has been cut sheet welding, fly ash; Aiza was detected on the carrier gas directed and found in good condition.

Found in poor condition and need to be replaced.(EXP. JOINT)

- has been detected on the link to the exhaust.

3.3. Air intake: -

Was detected on the main compressor and found in good condition and was taking measurements for the compressor blades clearance (Grade I) was good and in conformity with the specifications.

3.4. Burner: -

Burning a full installation of the fifth unit to the first unit where the decoder machine and cleaned and tested under a pressure of 110 bar and the results were good.

3.5 .Turbine: -

Was detected on the turbine blades the first stage and fifth stage as well as moving and fixed the first results were good clearance measurements were taken for the blades were good and in conformity with the specifications.

3.6 Accessory Systems: -

Was detected on all the systems and help change the grease and oils for their own pumps.

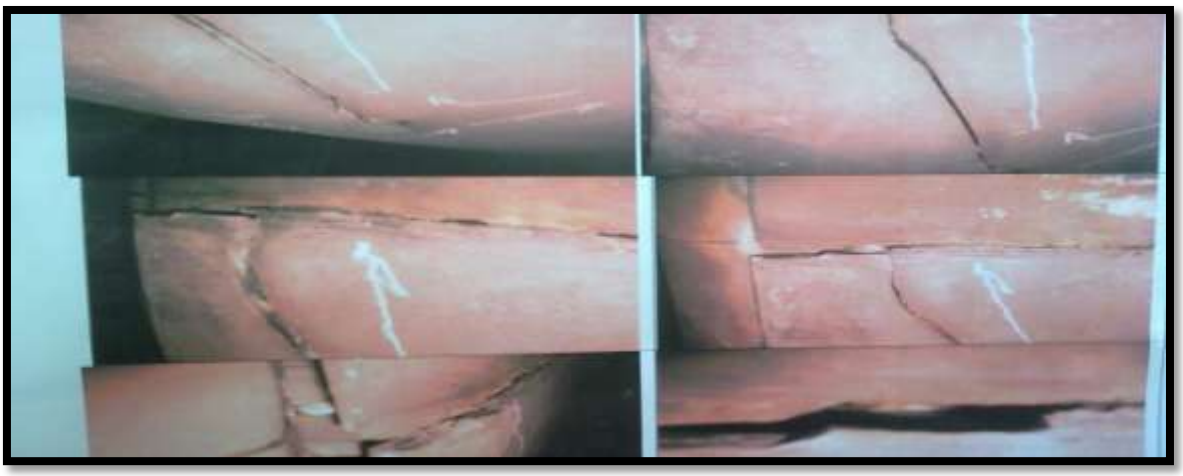

Fig (4)show the crack of (HGC).

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IV. CONCLUSION

Through the study of type's combustion chamber and in the gas turbine engine:-

- Best types of combustion chamber are tube annular in gas turbine engines.

Advantages in that much useful chamber development can be carried out with modest air supplies. Tube-annular chambers are still in widespread use, although the great majority of modern combustors for large engines are of annular form.

- Best types of atomizer are the pressure jet.

The advantage consequently this type of atomizer has only a narrow throttling range, because doubling the pressure increases the rate of flow by only about 40%. Also the droplet size is directly proportional to viscosity, and inversely proportional to the cubic root of pressure, which determines a minimum pressure at which the droplet becomes too large to burn completely.

The disadvantage of the pressure atomizers is the turndown ratio; this is the parameter used to characterize the flexibility of the burner.

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