Difference between quasi turbine and i c engine engineering essay

In quasi turbine we gets lower temperature on combustion stroke, in this engine the expansion stroke time is little bit earlier than the other engines though this reason we get the all the energy at the power stroke and that all energy we can transfer in mechanical manner. because of the earlier fuel combustion the cylinder head is cooled very quickly because all heat they transfer by exhaust stroke and finally we will get the lower temperature with continuous working of engine .

higher rate of torque and Acceleration

In the mechanism of the quasi turbine we getting the higher rate of torque without need of the flywheel . flywheel resist acceleration of engine because flywheel consume more energy in motion. thus Quasi turbine has no flywheel still we gets higher acceleration.

Transfer The Energy From Rotation To Mechanical

In this engine all assembled parts are symmetric on one axis and the all parts are rotates on same axis however we will get good mechanical energy because of symmetric design of engine. as per on the figure the periphery of the ring is owl shape and the displacement of all stroke work on different angle on same periphery because we can convert more rotation energy to mechanical energy .

Multiple fuel engine

we can use quasi turbine on different type of fuel like gas , hydrogen steam, pneumatic, etc but as per the all results the gas fuel is the most compatible fuel for this engine

CONSTRUCTIONAL DETAILS

The system of the quasi turbine consist of four carriages which provide the support the pivot of four element, and it support the different shaped rotor this all parts enclosed in a chamber which has shape of saint hilaire skating shaped rink profile. this profile makes the engine bigger because of the rotary component of the engine, and it gives the continuous radial path and it unable the maximum torque is produced than the which we produce in the normal combustion. It has two cover plate which cover the engine and take it close at end. The rotor has four pivoting blades which playing the same role which they performed in the piston and in turbine blades. In the assembly each pivots sit into carriages and each rocking carriages is free to rotate at same pivot in same ways continuous and throughout in contact with the housing center. In the mechanism of the quasi turbine there is not required of central shaft for operating engine . The engine can be operate through a coupling arm which is attached with the blades which has slots and with the help of arm braces which is connected to the central shaft , Moreover in this mechanism central shaft of the quasi turbine will be changed without open the engine.

In the quasi turbine design the pivoting blades are provided with the filler tip which allow the control of residual volume at the top and bottom chamber with maximum pressure and the carriage wheels design should be wide enough to reduce the contact pressure with the counter wall. For smooth operation roller bearing is provided at the blades hook pivots.

The arrangement of the spark plug , intake and exhaust ports are either radically in housing and axially on the side of the cover or both type . The

passing way of the flame(it's called the ignition flame transfer slot) which are using for the combustion of the fuel continuous in the engine which one located along the internal portion of the wall and side of the spark plug permits flow back of the hot gases to the combustion chamber which is ready to fire . the spark plug will not change the flow of by screwing or unscrewing . And these arrangement called the ignition transfer cavity. we can change the ignition timing advanced by changing the position of the spark plug or the channel also.

For the cooling and to reduce the lubrication one side of the engine has large hole is provided which shows the connection between the pivoting blades and the mid area of the rotor that's why all external and internal parts of the engines are in good thermal contact with the housing contour. And for the reduction of the lubrication by the using of the optimal choice of anti-frictional material.

Metal, ceramics or plastics are used for the making of housing , carriages and the pivoting blades and later most of the materials are used for pump , compressor and for hydraulic equipments.

According to the photo-detonation engine concept it has a combination of homogenous charge and compression ignition, it is also known as HCCI engine . HCCI (Homogeneous charge Compression Ignition) will improve the fuel efficiency and no emission. It occurs because in the photo detonating process completely combustion of the fuel that's why it produced less hydro-carbon as compared to traditional engine. During the photo detonation process higher pressure is required so during this process significant amount

of stress on the engine. If we talking about the piston engine it can`t withstand against the higher amount of force of detonation. and in traditional rotary engine (wankel engine) has a longer combustion chamber so it will not create that amount of force of detonation.

Even though in Quasi turbine , design of the carriages is strong and compact enough to withstand against the excessive pressure which is create during the photo-detonation.

5. THE WORKING OF A SIMPLE QUASI TURBINE

basic housing of quasiturbine engine

From the looks wise Quasi turbine model similar like a traditional rotary engine, A rotor is enclosed into the oval-shaped housing. In the quasi turbine has a four elements in place of the three which is generally we see in the traditional engine. The side portion of the rotor is sealed against the side of the housing and corner is also sealed from the periphery of the inner side . This arrangement divided into four chamber.

In the regular piston engine when one complete four-stroke cycle is done it produces two complete revolutions of the cranks shaft. it means output of the piston is half of the stroke per revolution. In the quasi turbine there is no need of the piston because instead of the four stroke engine it has arrangement of sequentially round oval housing. Even though there is no need of the crankshaft for performing rotary movement

the four cycles of the internal combustion engine is given below

Intake : in this process it draws the mixture of fuel and air

Compression,: the mixture of air and fuel is compressed in the smaller volume

Combustion : during this process spark plug produce the spark and it ignites the air-fuel mixture.

Exhaust: the waste gases produce during the ignition of the fuel will expels from the engine.

6. WORKING OF QUASI TURBINE WITH CARRIAGES.

quasiturbine carriage engine internal mechanism

In a Quasi turbine, when rotor blades turn it will change the volume of the chambers charge . initially volume rise , which allows the mixture of fuel and air expand in the chamber. when the volume increases rises, which allows the fuel air-mixture to expand. than sequentially volume is decreases, duet o this volume decrease the mixture of air -fuel mixture is compressed into small space.

From the working mechanism we get that when one combustion stroke is done than next combustion stroke is ready to fire. in the quasi turbine construction there is one arrangement of small channel it's called Ignition Flame Transfer slot which is along the internal housing wall next to the spark plug. this slot helps to allowed the hot gases flow back to the combustion chamber for next ready to fire when each carriage seals to pass over the channel because of this manner combustion is become continuous. these

results of continuous combustion like the airplane gas turbine like Lycoming engine which is used in air hawk .

These are all parameters which improve the efficiency and the performance of the quasi turbine. In the construction of the quasi turbine four chamber which is created by the carriage mechanism produce two consecutive circuits. In the first circuit used for compression and expand during the combustion. and the second circuit is used for the exhaust and intake air. In quasi turbine one revolution of the rotor is required to produce one power stroke which is eight time s more than traditional engine . Even though in wankel engine one revolution of the rotor produce the three power stroke but can`t beat the performance of the quasi turbine.

SPARK-PLUG

OUTER-RING

FILLER TIP

CARRIAGE

ASSEMBLY OF FILLR TIP

ASSEMBLY OF FILLER TIP AND CARRIAGES

ASSEMBLY OF FILLER TIP AND CARRIAGES WITH SPARK PLUG :

6. THE DISTINGUISHED BETWEEN WANKEL ENGINE AND QUASI TURBINE

In mechanism of the Wankel engine rotor has three faces with crankshaft

The quasi turbine has four faces of rotor without Crankshaft.

The crankshaft of the Wankel engine turns three times the rotor RPM. in the quasi Turbine rotor and crankshaft run at same RPM.

In wankel engine during the combustion it fires only once per revolution. whereas during the process of quasi turbine it fires four times per revolution.

When the rotor of the wankel engine goes from T. D. C. to the next it will increase the torque up to its maximum value and then start decreasing progressively . in other side quasi turbine generate the torque instantly at the plate and remain maximum for long duration before decreasing , which will give better mechanical energy .

The wankel engine is not available in the diesel mode because in this mode excess expansion of volume is arises which is adiabatically cool down the combustion. In the case of quasi turbine there is no excessive volume and it can run also on diesel mode.

Due to its fire once in each crankshaft revolution and wankel engine has dead time to that's why Wankel engine needs a flywheel. whereas Quasi turbine has no dead time because of consecutive stroke.

10. APPLICATIONS

1. Quasi turbine aviation

For propeller airplane reduction in the weight which allows a larger payload , saving in the space is one of the most desirable advantages for aerodynamic drag, Even in working of the quasi turbine there is no vibration that's why it will increase the comfort level and reliability of the system also, moreover

reduction in the noise will give discretion level. quasi turbine produced the high torque that's a reason it used in the multi blades propeller.

Even though in mechanism of the helicopter , large size quasi turbine produced the higher rate of torque without any gearbox and it will make less noise.

quasi turbine give the high power density , low cross section area and most favorable thing is intake characteristics these are the parameters on which we expect to used in airplane engine.

2. Quasi turbine pneumatic engine

quasi turbine has a pure expansion of the air-fuel mixture during the combustion so it's called the pure expansion engine . even wankel and most of the rotary engine is not pure expansion engine . it works on the compressed fluid as well on the air engine also.

3. Quasi turbine racing car

in the concept of the racing car quasi turbine concepts is more suitable and appropriate also because it generate more power density than the piston engine. for example in a single quasi turbine diameter of rotor is 50 cm and thickness is 20 cm produce 1000 H. P. at 3000 RPM. Even in quasi turbine has no flywheel that`s why it allows much higher acceleration.

4. Quasi turbine hydrogen engine model

The best way to store hydrogen is to bond with the carbon atom. quasi turbine used hydrogen storage in the carbon atom. these techniques is safe and good and it has been proved by the hydrocarbon fuels.

5. Quasi turbine pumps

according to the mechanism of the quasi turbine it is very simple and light device without the crankshaft and flywheel. it will allows the large volume because in the pump mode it has two intake and two exits.

QUASI TURBINE SPECIFICATION

SHAFT POWER

ROTOR DIAMETER

ROTOR THICK

SHAFT POWER

70 HP

530 HP

4000 HP

ROTOR DIAMETERE

10 cm

25cm

53 cm

ROTOR THICKNESS

5 cm

10 cm

20cm

Technical Description of the Lycoming IO-360-L2A

172 Rated Horsepower at 2400 RPM 160

172S* Rated Horsepower at 2700 RPM 180

Number of Cylinder 4 Horizontally opposed

Displacement 361. 0 Cubic Inches

Bore 5. 125

Stroke 4. 375

Compression Ratio 8: 5: 1

Firing Order 1-3-2-4

Magnetos:

Right Magneto Slick Model NO. 4371 (fires at 25 BTDC)

Left Magneto Slick Model No. (fires at 25 BTDC)

Spark Plugs 18MM

Torque : 420 In lbs

Valve Rocker Clearance

(hydraulic tappets collapsed) 0. 028 to 0. 080 inch

Fuel injector RSA-5AD1

Tachometer Mechanical Drive

Oil Capacity 8. 0 Quarts

Oil Pressure

Minimum Idling 20 PSI

Normal 50 to 90 PSI

Maximum 115 PSI

oil Temperature

Normal 100 F to 245 F

Maximum 245 F

Dry Weight -without alternator or 278 Lbs

vacuum pumps

9. DIFFERENCE BETWEEN QUASI TURBINE AND TRADITIONAL TURBINE

TRADITIONAL TURBINE

In the conventional turbine flow of the air -fuel mixture is continuous at intake and exhaust. conventional turbine not convert the pressure forces but it will convert the kinetic energy of flow of the fuel. It's necessary to convert the pressure forces into high speed flow by the channeling or by expansion. These type of conversion is complex. During this period some amount of energy will be lost because of turbulence, viscosity and thermal conductivity of the hot gases.

In the traditional turbine is placed where the flow of fuel is fast. even complete conversion of the kinetic energy in to mechanical energy is not possible in the conventional turbine.

QUASI TURBINE

As per the conventional turbine , quasi turbine is a continuous flow of the fuel at the intake. even at the exhaust under the effect of the static forces and the moreover it doesn't use the aerodynamics flow properties. it will change the potential force into mechanical energy. Because under the effect of the static forces quasi turbine will not damage the turbine by the steam pressure and fluid impurities.