Journal of Advances and Scholarly Researches in Allied Education
Vol. 17, Issue No. 1, April-2020, ISSN 2230-7540

A Study on Gas Turbine and Its Mechanical Components and Devices

Mohith N. Kumar[1]* Dr. K. V. Sreenivas Rao[2]

[1] Mechanical Engineer, QuEST Global Engineering Services PVT LTD

[2] PhD, Supervisor (Principal) Akshaya Engineering College, Tumkur

Abstract* – *Gas turbines are motors in which the chemical energy of the fuel is transformed into either mechanical energy of the pipe, or kinetic energy. Gas turbines using shaft power are generators for supplying fossil energy. Gas turbines that transform the fuel energy to kinetic energy are used to drive a thrust producing aircraft. Gas turbines are generators in which the fuel's chemical energy is transformed into either shaft- or kinetic-load mechanical energy. Gas turbines creating shaft power are generators for generating energy from coal. Turbine technology is built to extract its aim is to extract turbine technology.

A gas turbine engine is a device containing many elements of turbomachinery and ancillary subsystems. Air reaches the compressor part that is powered by a portion of the turbine and mounted on the same shaft. Under greater speed, air leaves the compressor and reaches the combustion chamber, where the fuel's chemical energy is transformed into thermal energy generating exhaust gas under a temperature that correlates to the configuration temperature of the turbine inlet. In the following turbine section the combustion gas spreads, where its overall energy is partly transformed into shaft function and exit kinetic energy. The shaft function is the main part of the energy forms described above for the power generation gas turbines. This includes the total compressor part function needed, bearing frictions, multiple auxiliary subsystems, and the generator. For aircraft gas turbines, a significant part of the overall energy is used to produce high escape kinetic energy, which is necessary for the production of thrust

Keyword:* *Gas Turbine, Gas Turbine Accessories, Mechanical Components

-----------------------------------X-----------------------------------

INTRODUCTION

A gas turbine engine is made up of thousands of components that experience a broad range of stress and temperature influences, being used for applications in aerospace or power production. Material collection requires an understanding of the role that every component performs in overall engine operation. Components may bear heavy weights, or undergo strong vibration; others must be able to tolerate the intrusion of gasoline, oxidation, or abrasives (e.g., sand). Since the engine utilizes high-pressure gas and burns fuel for power production, certain parts face elevated temperatures and/or extreme temperature gradients. Easy running of a gas turbine generator results in temperatures in turbine varying from air inlet normal to 1000 ° C or more. Depending on the design of the engine this temperature differential will happen over a very short period. In addition to introducing high thermal forces, these temperature gradients often change the overall engine dimensions: when reaching normal operating temperature, This is not unusual for the turbine to thermally 'transform' a few centimeters. In consideration of the differing conditions inside the vehicle, all design choices for specific parts will result in a vehicle that satisfies the specifications of the consumer. Performance (especially when it relates to particular fuel usage, or SFC), cost and weight (mainly for aerospace applications) are usually the most relevant parameters. Generally the relative value of both would be product-specific; for example, a military program will be far more involved in efficiency than expense. These specifications spill down and become essential architectural criteria for constructing individual assemblies and parts.

In the end, the selection of materials in an engine for a given component is focused on the relative importance of the basic requirements for that element. Most design reviews will concentrate on strength, fatigue performance, weight , and cost; the creep resistance and Components are also very important for thermal stability in the turbine segment. High thermal expansion coefficient (CTE) is usually not a major condition for most materials. But the regulation of thermal expansion plays an significant role in optimizing overall efficiency of the engine. That decision in the design phase is a trade-off between different factors and their effect on the final product, and the positive advantages of utilizing a low CTE alloy for some products – and therefore minimizing thermal expansion – are offset by a debit in other properties. (Resistance to corrosion, for example). There are a range of design problems where the benefit of low CTE alloys may help boost engine efficiency but there are also a variety of explanations that it is always inefficient to use them.

GAS TURBINE

A gas turbine is a combustion engine capable of transferring hydraulic energy to natural gas or other liquid fuels. And the energy can fuel an electrical generator. It is renewable energy which travels via the power lines to households and businesses.

How the gas turbine produces electricity?

The gas turbine heats up a combination of air and gasoline to produce steam at extremely high temperatures, which enables turbine blades to rotate. The spinning rotor drive a turbine to turn the energy into electricity.

The gas turbine can be used in conjunction with a steam turbine — in a combined-cycle power plant — to produce electricity incredibly effectively. Mixture of air-fuels ignites.

The gas engine compresses the air and combines it with gasoline and is then burnt at very high temperatures, producing a hot flame.

Turbine blades of heavy gas turns.

The hot air-fuel mixture moves through turbine blades, causing them to spin fast.

Spinning blades allow the drive shaft spin.

Fast-spinning turbine blades compress a shaft for turbine running.

Turbine rotating gives fuel to the engine.

The rotating turbine is attached to the rod in a generator that spins around a broad magnet, enclosed by coils of copper wire.

The magnet motor allows electrons to travel and generates energy.

GAS TURBINE ACCESSORIES

Any of the devices which could be powered include gas turbine and gas turbine components Computer equipment and gas turbine modules

- Pumping Gas
- Generators, sometimes airplane and sometimes airplane generators
- Material Speed control to ensure steady performance of AC motor
- Benzin lubricating pumps
- Air pump
- High-pressure air compressor (under power board, etc.)
- Low-pressure air compressor (cabin air conditioning) where it is not given by taping the bleed air compressor engine.
- Tactometer Drives Monitor
- External gearbox drive to the gearbox which may be required in certain installations.

Fuel pump: In motor vehicles the fuel pump is a component that transfers liquid from the fuel tank to the combustion engine's internal carburetor. The engine can run rough and dirty when the gasoline pressure becomes too strong, providing the machine unpredictable and a pollutant not to fire all the pumped gasoline.

Generators: Each gas turbine engine has a segment (red), a generator (cyan), and a magenta combustion turbine. The engine's center is called the generator, boiler, and turbine, since all gas turbines have these sections. The core also was regarded as the gas engine, since hot exhaust gas is the primary production.

Constant Speed Drive: Constant velocity drive is essentially a hydraulic transfer with mechanical controls regulating the rate of movement in the tube. The transfer will either be added to or deducted from the gearbox speed to ensure a constant output speed at the intensity of the engine.

Lubricating oil: The lubrication fluid is placed in a gas turbine tank behind it. Usually a moist-sump lubrication system is used in aircraft gas turbine engines. ... One of the main uses of the turbine engine oil process is to cool the bearings in the bearing by removing heat and spreading steam.

Hydraulic pump: Hydraulic systems often have more than one pump functional for pressurization of the machine. When an electric pump is used as the main source of energy, the device may be fitted with a second electric pump or a Ram Air Turbine as a hydraulic power source.

High-pressure air compressor: In these cases any type of refrigeration unit or heat exchanger cools down the temperature. Motor compressors have such a range of uses. These are a vital component of a turbine engine delivering high-pressure fuel, high-temperature combustion fuel and bleed air device operation.

Low pressure air compressor: The high-pressure engine attaches a combustion gas to the high-pressure compressor, which is pumped out of the combustion chamber. The low-pressure engine is attached to the low-pressure compressor and to the front ventilator driven by a combustion gas expelled from the combustion chamber.

Engine starter: The fuel / air combustion Starter utilized the fusion energy of jet A fuel and compressed air to drive gas turbine engines. The starter consists of a control unit generator and auxiliary petrol, air, and ignition systems.

Tachometer sensor drives: Most turbine generators use tachometer rpm signal detectors, instead of a tachometer rotor unit. We are offering a massive advantage, because there are no moveable bits. Those are enclosed tubes that are mounted on a flange and protrude through the section of the motor compressor.

Auxiliary gearbox drive: Accessory gearbox control is part of a turbine gas engine. While not part of the engine 's core, it regulates the otherwise required parts, fuel pumps, etc. for a engine or aircraft on which it is mounted to function. The adapter drives accommodate big motors from 400–500 horsepower**.**

GAS TURBINE COMPONENTS AND MECHANICAL DEVICES:

The gas turbine has three primary components, including the generator, combustor, and turbine portion (though the other major part classes – rotor, cap, and auxiliaries – are often of concern from a material perspective).

Compressor Section:

The compressor section conducts many roles in gas turbine engine. The key role it plays is to provide the air in adequate quantities to fulfill the burners' requirements. In order to perform the purpose, the compressor must increase the pressure of the wide volume of air collected from the air inlet duct and then discharge it in the appropriate manner to the burners quantity and also at the required speed.

The compressor's secondary function is to supply or deliver bleed air into the aircraft and engine for various purposes. The bleed air is drawn from each of the different compressor pressure levels. The precise position of the bleed ports depends on the temperature or pressure required to facilitate the roles in question. In the compressor situation, terminals are the narrow holes next to the specific stages through which the air has to leak. The air often bleeds from the maximum or last levels of strain. It is because it has high temperature at the level between air and heat. Cooling the high-pressure air can often be important. And is used for cabin pressure for certain activities for which over feeding may be harmful or unpleasant, then air is sent via the air conditioning device before reaching the cabin.

The bleed air used in different ways. Some of the applications of this bleed air are:

1. Tools for Anti-icing and deicing

2. Auxiliary moves

3. Pressure, cooling and even ventilation in the cabin

4. Pneumatic. For this purpose, the compressor must increase the pressure of the large volume of air collected from the air inlet duct and then discharge it to the burners in the appropriate manner The goal is to obtain a combustion of fuel as full as possible (97 percent or higher) and with no fuel coming out in the exhaust gas. More would be stronger, additional horse-power (HP), more total combustion. In fact, the compressor increases the temperature of the inlet air to a very high degree (Boyle's rule, Charles' law) until it is guided to the combustion chamber, particularly whether there are burners within the room.

The compressors are also able to do such. The compressors may be single-stage or multi-stage compressors; nevertheless, their more than one stage is much more commonly used.

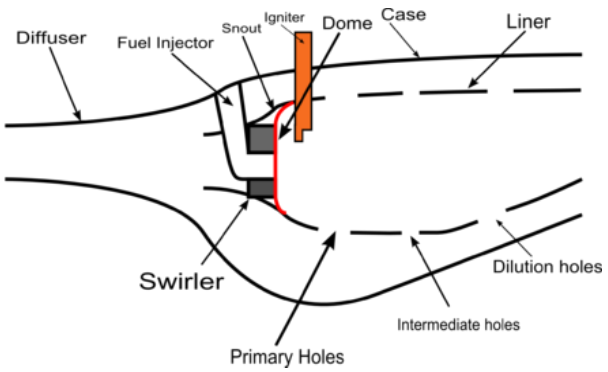
Combustor Section:

The combustor's function in a gas turbine would be to contribute energy to a turbine power device and create a high-speed gas to escape in aircraft applications through to the nozzle.

A combustion engine is a part or region of a gas turbine, ramjet or scramjet generator, wherein combustion occurs. It is also classified as a burner, flame keeper or combustion chamber. In a gas turbine generator, high pressure air is pumped by the compression mechanism to the combustor or combustion chamber. The air is then ignited at high pressure by the combustor. After heating, air passes to the turbine through the nozzle guidance vanes from the combustor. For a ramjet or scramjet engine the air is pumped directly to the nozzle.

That have very high air flow speeds a combustor must produce and sustain efficient combustion. To do so, combustors are specially built to blend and burn the air and fuel first, and then add in more air to complete the process of combustion. Early gas turbine engines used a single chamber known as may be a combustor type. Today there are three primary layouts: cannular, cannular, and cannular (also called cannular tube-annular). Sometimes afterburners are called a particular form of combustor.

Combustors have a vital function to play in deciding all of the operational characteristics of an engine, including such fuel output, pollution rates and transient reaction (the reaction to evolving factors such as fuel flow and air speed).



Case: The case is the combustor 's outer shell, and is a rather simple structure. The casing usually requires little maintenance.] The case is protected either by air flowing in it from thermal loads, therefore thermal performance is of limited concern. The casing, fortunately, provides as a pressure vessel which must withstand the difference between the high pressures inside the combustor and the lower outside pressure. For moving design the mechanical (rather than thermal) load is a factor.

Diffuser: The diffuser's aim is to slow high-speed, extremely compressed air from the Compressor to an optimum combustor velocity. Reducing the velocity results in an eventual overall pressure drop, and one of the architecture problems is to reduce the pressure drop as much as possible. In fact, the diffuser must be designed to limit the flow distortion as much as possible by avoiding flow effects like boundary layer section Like most other gas turbine engine components, the diffuser is designed to be as short and light as possible.

Liner: The liner comprises the combustion process and establishes the different airflows into the combustion zone (intermediate, dilution, and cooling, see Air flow paths below). The liner needs to be built and manufactured to survive repeated high temperature periods. Of this purpose, liners appear to be constructed by superalloys such as Hastelloy X. However, while high-performance composites are being used, the liners need to be insulated by air flow. Even certain combustors using thermal Barrier coatings. Besides that there is also a need for air conditioning.

Dome / swirler: The dome and the swirler are the portion of the combustor from which the primary air passes (see Air flow pathways below) as it approaches the combustion region. The function is to produce friction in the flow to quickly combine air and water. Early combustors preferred to use bluffed body dome (instead of swirlers), which used a basic plate to generate wake friction to blend the fuel and air. Nevertheless, most current structures are stabilized by a vortex (use swirlers). The swirler creates a localized low pressure region which causes recirculation of some of the combustion materials, causing the extreme disturbance. The greater the friction, though, the larger the pressure loss for the combustor would be, such that the dome and swirler will be properly constructed so that it doesn't produce more noise than is required to combine the fuel and the air in adequate amounts.

Fuel injector: The gasoline injector is essential for the injection of fuel into the combustion region, which is responsible for combining fuel and air together with That results in a decline (above). Four primary forms of fuel injectors are available; pressure atomizing, air blasting, vaporizing, and pre - mixed / pervaporizing injectors. To atomize the gasoline, pressure atomizing gasoline injectors depends on strong fuel pressures (as many as 3,400 kilopascals (500 psi)). Although this form of fuel injector has the benefit of being quite quick, it has some drawbacks. The fuel system should be extremely durable to survive these extreme temperatures, so the fuel appears to be atomized heterogeneously, likely to result in imperfect or irregular combustion that contains additional contaminants so smoke.

Igniter: In gas turbine implementations several igniters are electronic spark igniters, comparable to automobile spark plugs. The igniter will be in the combustion region, where if the fuel and air are now combined, but it must remain far sufficiently away such that the fire itself will not destroy it. When the igniter first begins the fire it becomes self-sustaining and no longer needs the igniter. The flame will spread in cannular and annular combustors from one combustion zone to another (see Types of combustors below), hence igniters are not needed at each. Such ignition-assist mechanisms are found in several applications. Another such process is oxygen injection, in which oxygen is supplied to the field of combustion, allowing the gasoline to burn quickly.

Turbine Section:

The turbine transforms a portion of the kinetic (velocity) energy of the exhaust gas into mechanical energy to drive the gas generator compressor and connections. The prime feature of the gas generator turbine is to absorb about 60 to 70 % of the total exhaust gas pressure power. The precise sum of energy absorption at the turbine is determined by the load that the turbine drives (i.e., the compressor size and form, the number of adapters and the load that the other turbine stages add). Both steps of the turbine growing be used to drive a low-pressure compressor (fan), propeller, and shaft. The turbine part of a gas turbine engine is situated upstream of or downstream of the combustion chamber. In fact it lies immediately behind the outlet of the chamber for combustion.

The turbine assembly is formed by two main elements: turbine inlet guidance vanes and turbine blades. The stator component is defined by many names, of which three are most frequently used in turbine inlet nozzle valves, turbine inlet guidance valves, and nozzle diaphragm. The turbine inlet nozzle vanes are located just downstream of the chambers of combustion and the turbine wheel just below. This is the engine's lowest or highest temperature, which falls in contact with metal parts. The turbine inlet temperature must be controlled, or there could be damage to the turbine inlet valves.

The Pressure air flow nozzles have to be equipped to move the turbine rotor after the combustion chamber injects heat energy into the mass airflow and transmits it similarly to the turbine inlet nozzles. The stationary valves of the turbine inlet nozzles are contoured and mounted at such an angle that they form a number of minute nozzles, which amazingly discharge gas at high speeds; thus, the nozzle transforms a varying portion of the heat and pressure energy into velocity energy which can then be transferred through the Turbine blades to power process.

There are three types of turbine blades: pulse turbine blade, turbine blade reaction blade, and turbine blade reaction-impulses. The tip of the impulse generator is often called a cup. That's because it changes the energy direction as the air current hits the center of the blade and it helps the blades to rotate the disk and rotor shaft. The turbine nozzle lead vanes can usually be adjusted during engine overhaul and implementation to enhance the efficiency of the air stream that reaches the turbine blades or seals.

Reaction turbine blades allow the disk to spin through the aerodynamic action of the air stream that is guided to pass through the blade at a certain angle to produce its most effective strength of the turbine engine. The reaction-impulse turbine rotor combines control of both the impulses blade patterns and the reaction blade styles. Around the blade base, the blade has more of the bucket form of the impulse blade and it even has more than just the airfoil design of the reaction blade on the Second half top side of blade.

The second function of the Turbine Inlet Nozzle is to guide the gases to a precise angle in the direction of turbine wheel rotation. Considering that the gas flow from the nozzle has to enter the turbine blade passage while it is already rotating, it is necessary to generally direct the gas towards turbine rotation. The arrangement of the turbine inlet nozzle consists of an inner covering and an exterior envelop under which the nozzle vanes are mounted. The number and scale of reservoir vanes used differs with various sizes and styles of turbine inlet nozzles common of engines with loosen and welded valves.

The turbine inlet nozzle vanes may be mounted in a number of forms between the outer and the inner shrouds or loops. While the individual components that differ significantly in the design and construction characteristics, there is one aspect that is unique to all turbine inlet nozzles: to allow temperature rise, the nozzle vanes must be produced. Otherwise the metal elements will be badly bent or twisted because of sudden increases in temperature. One solution fulfills the thermal extension of turbine nozzles. One method includes loosely aligning the shrouds of the inner and outer vane to support.

What vane in the shrouds fits into a contoured slot that also corresponds to the vane's airfoil design. Both holes are marginally wider to give loose fit than the vanes. The internal shrouds are surrounded by inner and outer support bands, which offer improved strength and stability for additional protection. Such support rings also help detach the nozzle vanes as a device. The vanes could come over without the bands, because the shrouds had been cut.

Another way of creating thermal expansion is to insert the vanes into the anterior and posterior hoods; furthermore, the vanes are welded or riveted into place using this process. To allow thermal expansion, some means must be provided; thus, either the internal or the external ring of the cloak is split into segments. The saw breaks dividing the sections require adequate expansion to keep the vanes from being strained and warped.

The turbine segment rotor part basically consists of one shaft and one axle. The turbine wheel is a dynamically balanced structure that consists of blades fixed to a revolving disk. In addition, the disk is connected to the engine's central power-transmitting tube. The discharge gasses which leave the turbine inlet nozzle vanes act on the turbine wheel blades, causing the assembly to spin at a very high speed rate.

The strong rotational speed places extreme centrifugal forces on the turbine shaft, although at the same time the elevated temperatures result in a loss in material strength. So the speed and temperature of the engine must also be regulated to maintain the activity of the turbine within reasonable limits.

The blade-free turbine Disk is referred to as such. The disk is then the turbine shaft, while the blades of the generator are installed. The disk serves as a part anchoring the turbine blades. Since the disk is bolted or welded into the tube, the blades may transfer the energy they absorb from the exhaust gases to the rotor shaft.

The surface of the disk is exposed to the hot gasses flowing through the blades and receives substantial heat from these gasses. For fact, the surface also receives conductive power from the turbine blades. So the temperatures of the disk surface are usually strong and way above its temperatures of the more distant inner portion of the disk.

Thermal stresses are applied to the rotational stresses as a consequence of certain temperature gradients. There are different approaches to mitigate the latter strains, at least partly. Another other technique is to leak the refrigerating air back into the disk rim. A further way to relieve the disk 's thermal pressures is incidental to mounting blades In the surface of the disk a number of ridges or notches are broached, conforming to the design of the blade base.

These grooves enable the turbine blades to be connected to the disk; the notches offer room for the thermal expansion of the disc at the same time. There is adequate space between the blade root and the nozzle to enable the turbine blade to travel while the rotor is cold. Disc expansion reduces visibility throughout engine operation. It allows the root edge to fit securely into the base of the plate.

Generally the turbine shaft is constructed from alloy material. This needs to be able to withstand the heavy levels of torque that are placed on it.

The directions the shaft is connected to the turbine disk differs. For one process, the shaft is welded to the disk and provides for the connection with a butt or protrusion. Another option is to fire. This approach allows the shaft to have a hub in position on the disk face that matches a machine surface. So the bolts are placed into the shaft hub via gaps, then fixed in the disc's tapped openings. Bolting is more common between the two types of communication.

The turbine shaft will provide some form of access to the center of the rotor compressor. This is generally done through a spline cut at the shaft's forward end. The distance measure fits in between the compressor and turbine shafts in a coupling device. When a linkage is not used, the splined end of the turbine shaft will pass into a splintered recess within the compressor rotor hub. This splined coupling system can be used for centrifugal compressor engines almost entirely, while axial compressor engines can use one of these mentioned methods.

There are many methods to connect turbine blades, some of which are identical for compressor blade repair. The fir-tree design utilizes the most satisfactory form. The blades are held by a variety of methods in their corresponding grooves, the most popular of which are peening, forging, locking tabs and riveting.

The blade retention peening process is commonly used in different forms. Among the most popular peening software needs a tiny notch to be ground in the edge of the blade fir-tree root before mounting the tool. The disk metal covers the gap after the blade is placed into the disk, and is "flowed" through it through a tiny punch-mark created in the disc next to the notch. The device to use for this job is similar to a punch hub.

One type of blade preservation is to create the blade root in such a manner that it incorporates all the elements required to maintain it. This technique uses the blade root as a stop created on one end of the root such that the blade may be placed and withdrawn in one direction only, although tang is on the opposite end. This tang must be twisted to protect the blade within the ring.

Turbine blades can either be forged or casted, depending on the grain structure. Many blades are shaped correctly and finish ground to the ideal form. Most turbine blades are casted as a single crystal which provides better strength and heat properties for the blades. Heat shield insulation, such as surface treatment, and air flow ventilation aid to cool the turbine blades and inlet nozzles. It helps to increase the exhaust temperature, thereby growing the engine's output. Figure 8 displays a turbine blade for cooling purposes, with air gaps.

Some turbines are transparent at the exterior circumference of the blades; however, often a second form is used, called the closed turbine. In addition the veiled turbine blades create a band across the turbine wheel's outer circumference. It increases the properties of performance and vibration, which makes for lighter weights throughout the point. At the other side, the turbine speed is reduced so it needs more blades.

In turbine rotor design, the use of turbines of more than one stage can sometimes become required. A single turbine wheel is sometimes insufficient to absorb adequate pressure from the exhaust gases to move the turbine-dependent modules for rotary operation; thus multiple turbine stages need to be installed. A turbine level comprises of a row of stationary vanes or nozzles and a row of spinning blades preceded. For certain turboprop engine versions as often as five turbine stages were effectively used. This should be noted that regardless of the amount of wheels needed to move engine parts, each wheel is often followed by a turbine nozzle.

Throughout the previous turbine process analysis it was found out that the periodic usage of more than one turbine wheel is needed throughout heavy rotational loads. It also should be noted that the same loads which require multi-stage turbines also make it an advantageous to integrate multiple compressor rotors.

In the single-stage rotor generator, the power is produced by one turbine rotor and all motor-powered components are driven by that single axle. This program refers to engines which have prevailing low weight and compactness requirements. This is the purest Turbojet engine design.

For several spool engines each spool has its own sequence of turbine phases. The linked compressor flips over every sequence of turbine phases. Most turbofan engines have two spools: low pressure (a few fan shaft and turbine compression levels to power it) and high pressure (high compressor shaft and high pressure turbine).

The remainder item to be addressed with respect to the familiarization with turbines is turbine casing or accommodation. The turbine case includes the turbine wheel and the nozzle vane assembly, thereby supplying either directly and indirectly aid for the stator components in the turbine section. It also provided and front reverse flanges to secure the assembly into the combustion chamber housing and the emissions cone frame, respectively. A turbine shield is seen.

CONCLUSION

This investigation also focused on the performance of turbine components in gas turbine and mechanical equipment. Such engines are technically very complex, well developed from the fundamental aero-offshoots that gave rise to the current commercial gas turbine industry. In order to produce electricity, multiple effects and outlets were involved in advancing gas turbines into the industry. This review demonstrates how engineering research and development interaction with other drivers attributed to gas turbine.

Gas turbines are widely used in systems where a strong strength to weight ratio, low pollution and high efficiency specifications forbid the use of certain mechanical drivers. Modern gas turbines also serve as hydraulic drivers for natural gas centrifugal compressors. Due to their operational versatility, low maintenance standards and pace fit with the powered machinery we are best equipped for this role. As for most equipment, gas turbines require a significant range of on-skid and off-skid tools for their safe and efficient operation, such as lube oil systems, control and instrumentation, smoke detectors and protection systems , fuel forwarding and filtration systems, starter and crank motors, and inlet / exhaust systems. For a specific need, the correct set of options for ancillary and auxiliary services must be selected. Such review reflects not only on the platform's mode of application and facilities, but also on the operating profile, reliability and/or efficiency requirements of the user. At the location, they'll need to consider the atmospheric conditions. This paper discussed the packing device collection possibilities for a typical gas turbine driven compressor packet. Considerations were addressed on the API.

REFERENCES

Klaus Brun, Rainer Kurz, Joseph M. Thorp, Bernhard Winkelmann (2016) on GAS TURBINE PACKAGING OPTIONS AND Features

Abhishek Kumar Sharma, Ankit Singhania, Ankit Kumar Ranendra Roy (2017) on Improvement of Gas Turbine Power Plant Performance: A Review

Marie Anheden (2000) on Analysis of Gas Turbine Systems for Sustainable Energy Conversion

Gubbala Sesha Saikrishna, Mallavolu Sai Nithish, Nekkanti Raviteja (2013) on Overview of a Gas Turbine and the different methods to improve its Thermal Efficiency

Hamid Asgari, XiaoQi Chen, Senior Member, IEEE and Raazesh Sainudiin (2011) on Considerations in Modelling and Control of Gas Turbines – a Review

Wintgens, Eric, Dubreuil, Jean (2016) on ACCESSORY DRIVE SYSTEM FOR A GAS TURBINE ENGINE

K. D. Mach (2008) on Improving Turbine Component Efficiency

W. Zhuang, B. Wicks (2003) on Mechanical Surface Treatment Technologies for Gas Turbine Engine Components

R. Kurz, C. Wen, L. H. Cowell, J. Lee (2006) on Gas Fuel Considerations for Low Emissions Industrial Gas Turbines, The Future of Gas Turbine Technology

K. Brun, R. Kurz (2010) on All Corrosion in the Gas Turbine is the Same, Turbo machinery International

Sharma, S., Sharma, A. and Sharma, M. (2015). Gas turbines- current scenario and future prospects in India

Ahmadi, P. and Dincer, I. (2011). Thermodynamic and exergoenvironmental analyses and multi-objective optimization of a gas turbine power plant

Popli, S. Rodgers, P. and Eveloy, V. (2013). Gas turbine efficiency enhancement using waste heat powered absorption chillers in the oil and gas industry.

Mohanty, D. K. and Venkatesh, V. (2014). Performance analysis of a combined cycle gas turbine under varying operating conditions.

Ameri, M. and Enadi, N. (2012). Thermodynamic modelling and second law based performance analysis of a gas turbine power plant

Corresponding Author

Mohith N. Kumar*

Mechanical Engineer, QuEST Global Engineering services PVT LTD

mohithnkumar98@gmail.com