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Investigate Individual Features Insurer in Tend to Purchase the Insured Body Insurance (Case Study Branches and Agencies Alborz Insurance Company from the Perspective of Insurers)

Shahram Gilaninia, Hosein Ganjinia, Soghra Rezaei Iman Abadi

Department of Mechanical Engineering, Government college of Engineering Jalgaon,

Maharashtra, India

ABSTRACT: As we know with the rapid changing environment and atmospheric effect, the air conditioning of the moving vehicle has become a necessity. In the same time consumers are incapable to bear the increasing operating cost of the vehicles due to continuous raise in fuel prices associated with vehicles. The conventional automobile air conditioning system draws power from the engine. In this paper an attempt has been made to avoid the use of engine to run compressor of AC system by introducing a turbo charger in order to transform the kinetic energy of the exhaust gas in to useful power. Also an additional heat exchanger has been implemented to supply warm air during cold seasons which again uses exhaust gases. This makes the whole air conditioning system as year round that is to supply cold air during summer and hot air during winter.

KEYWORDS: Exhaust, Turbocharger, compressor, evaporator.

I. INTRODUCTION

Today, energy crisis and environmental pollution have become two primary problems which are concerned by the countries all over the world. As one of the largest consumers of oil and also the largest pollutant emission sources, IC (Internal Combustion) engine becomes an important object for energy saving and emission reduction. At present researchers mainly focus on following two aspects for reducing energy crisis and relieving polluting gases. One is the research on IC engine alternative fuels owing to the shortage of petroleum resources and the soaring oil prices; the other is to explore new technologies for IC engine energy saving, including the technologies for IC engine waste heat recovery. Nowadays climate changes are becoming unpredictable. Average atmospheric temperature is increasing at a significant rate. We find it difficult to cope up with the sudden changes in the weather conditions hence the need for an efficient air condition system is increasing. So, the present automobile AC system is hence more often put use. This situation demands for an improvement in the contemporary system. The increasing fuel prices are also one of our main concerns. The power required for the working of the AC system is usually drawn from the automobile engine, which in turn results in increased fuel consumption. A recent comprehensive study of fuel consumption for vehicle AC on a state-by-state basis using thermal comfort based approach shows that US uses an estimated 7 billion gallons of gasoline every year for air conditioning vehicles. This is equivalent to 6% of domestic petroleum consumption, or 10% of US imported crude oil. The study further shows that vehicle air conditioning loads are the most significant auxiliary loads and outweighs even other significant loads such as rolling resistance, aerodynamic drag or driveline losses. The fuel economy of vehicle drops substantially when the AC compressor load is added to the engine. The AC increases the fuel consumption of a conventional gas-fuelled car by approximately 35% and significantly higher for hybrids. So energy efficient air conditioning systems are getting significant attention from the automotive industry to improve fuel economy of their vehicles. These situations led us in a search for an alternative powering solution for the automobile year round air conditioning system, which does not extract power directly from the engine power.

II. LITERATURE REVIEW

Two major types of A/C systems are used in the vehicles: RD-TXV and AD-OT. In these systems the primary function of the compressor is to compress and pressurize gaseous cool refrigerant from the evaporator outlet with minimum compressor power, and deliver maximum amount of high-pressure high-temperature gaseous refrigerant to the condenser. These objectives are measured by isentropic and volumetric efficiencies. The compressor is powered by a drive belt from the engine. The compressor has an electrically operated engagement clutch to either turn the A/C system off or on. Next is the condenser; the condenser is located in front of the radiator. In automotive A/C systems, the condenser is typically a crossflow heat exchanger that uses air through the fins and the refrigerant through the tubes. Through the use of cool airflow provided by the engine condenser fan or ram air, the condenser cools the high-pressure hot refrigerant gas and converts it to liquid with generally a small pressure drop. The exiting liquid (subcooled in many cases) is sent via a small tube (liquid line) to a receiver-drier (RD) (applies only to an expansion valve system). The RD is a metal can with a desiccant bag inside. It is usually located near the condenser outlet pipe. Now-a-days, the RD bottle is an integral part of the condenser, and condenser is referred to as an integral receiver-drier condenser (IRDC). In this case, refrigerant passes through the RD bottle before leaving the condenser through the last pass. The objective is to improve the degree of subcooling of refrigerant at the condenser outlet. There is a negligible pressure/temperature change in the refrigerant through the RD bottle, except that the moisture is removed by the desiccant. As the high-pressure warm liquid exits the RD/condenser, it passes through an expansion device. The pressurized liquid passes through the expansion device, with considerable reduction in the pressure and corresponding temperature. The cold liquid/vapour refrigerant mixture from the expansion device is fed to an evaporator in an HVAC module under the dashboard. It cools fresh or recirculated warm air, which flows into the car interior with the help of a blower. As the air is cooled in the evaporator on one fluid side, the liquid/ vapour mixture of the refrigerant is heated on the other fluid side and evaporates. The evaporated refrigerant gas then returns via the large tube (suction hose) to the compressor "suction" port to begin this whole process again.

III. COMPONENTS USED IN SYSTEM

Various components used in air conditioning system as given below

1. Turbine
2. Compressor
3. Condenser
4. Expansion device
5. Evaporator
6. Exhaust gas carrying coil
7. Directional control (DC) valve.

Turbine: A turbine is a mechanical device that extracts thermal energy from pressurized exhaust gases from exhaust manifold, and converts it into rotary motion. It has almost completely replaced the reciprocating piston steam engine primarily because of its greater thermal efficiency and higher power-to-weight ratio. Because the turbine generates rotary motion, it is particularly suited to be used to drive a compressor of the AC system. The turbine is a form of heat engine that derives much of its improvement in thermodynamic efficiency through the use of multiple stages in the expansion of the exhaust gases, which results in a closer approach to the ideal reversible process.

Compressor: The low pressure and temperature vapour refrigerant from evaporator is drawn into the compressor through the inlet or suction valve, where it is compressed to a high pressure and temperature. This high pressure and temperature vapour refrigerant is discharged into the condenser through the delivery or discharge valve where the high pressure and temperature vapour refrigerant is cooled and condensed. The refrigerant, while passing through the condenser, gives up its latent heat to the surrounding condensing medium which is normally air or water.

Condenser: The condenser or cooler consists of coils of pipe in which the high pressure and temperature vapour refrigerant is cooled and condensed. The refrigerant, while passing through the condenser, gives up its latent heat to the surrounding condensing medium which is normally air or water.

Expansion device: It is also called throttle valve or refrigerant control valve. The function of the expansion valve is to allow the liquid refrigerant under high pressure and temperature to pass at a controlled rate after reducing its pressure and temperature. Some of the liquid refrigerant evaporates as it passes through the expansion valve, but the greater portion is vaporized in the evaporator at the low pressure and temperature

Evaporator: An evaporator consists of coils of pipe in which the liquid-vapour refrigerant at low pressure and temperature is evaporated and changed into vapour refrigerant at low pressure and temperature. In evaporating, the liquid vapour refrigerant absorbs its latent heat of vaporization from the medium (air, water or brine) which is to be cooled.

Exhaust carrying coil: Exhaust carrying coil is a special type of heat exchanger used for providing or supplying warm air in winter and monsoon season for car A/C system, the exhaust gases of an engine are passed through this coil around 400 to 500^{o}C temperature range

IV. WORKING OF SYSTEM

The working of the our system is like a conventional year round air conditioning system, the system worked on two seasons, which are below

Summer weather: Below A/C system consists of a compressor, condenser, expansion valve, evaporator and exhaust carrying coil. Here we are introducing a turbine to the system which is driven by the engine exhaust. Turbine runs the centrifugal compressor. That is drop in enthalpy gain in kinetic energy of the exhaust is used to run the gas turbine which in turn runs the compressor by a shaft. The high pressure and compressor temperature vapour refrigerant from the compressor is transferred to the condenser. Condensed refrigerant is in the form of liquid (Latent heat of condensation), slight drop in pressure (negligible), change in its phase from vapour to liquid. The refrigerant then made to expand in the hand operated expansion valve to ensure pressure drop drastically very close to atmosphere pressure. The low pressure and expansion temperature liquid refrigerant then enter into the evaporator absorb heat from the cooling space their by undergoing the change from liquid to gaseous state (Latent heat of vaporisation). This change of phase equals the amount of heat absorbed resulting in cooling of the space (refrigerating effect) in summer season.

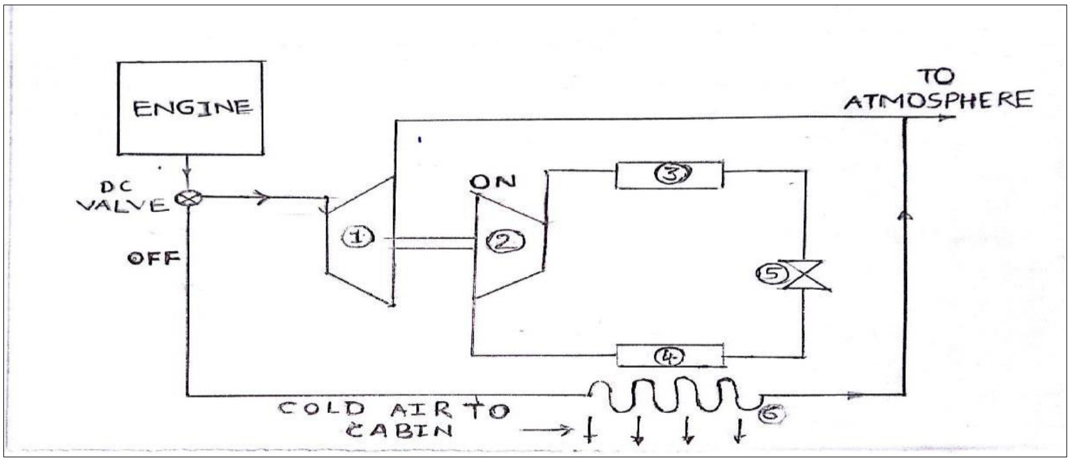

Fig. 1

Cold weather: During cold season, the exhaust gases pass through exhaust gas coil via directional control (DC) valve when the VCC system is off. In exhaust gas coil the temperature range of exhaust gases is 400 to 500°C and heat is transferred from high temperature gases to air from evaporator fan. Ultimately air temperature increases and send to the cabin and we achieve heating effect without any power source.

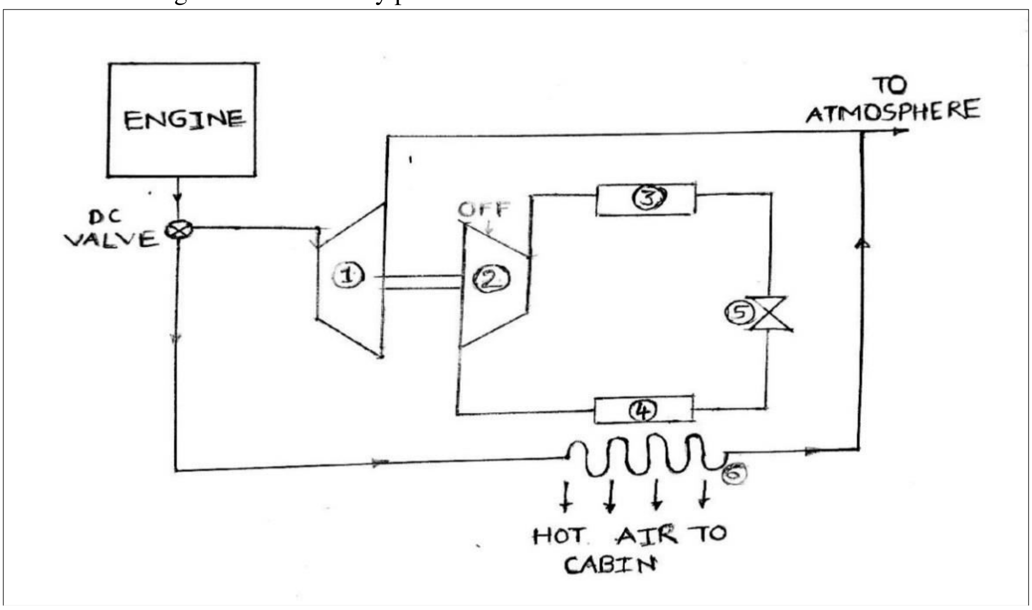

Fig. 2

V. CONCLUSION

In this work the conventional A/C system is studied in detail and come to a conclusion that the air conditioning system uses the power from the engine shaft and reduces the mileage. The major advantage of this system is that the whole air conditioning is achieved by waste gases whether it may be in summer or winter. By using the exhaust to run the compressor and can achieve the cooling. The project not only aims to reduce the cabin temperature but also to increase the mileage. An acceptable alternative for increasing the mileage of the vehicle is the air conditioning powered by engine exhaust. By adopting this system there is a reduction in the fuel consumption rate in turn. This system can also be used as heat pump in winter season without utilization of power of engine

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