ECONOMICAL AIR CONDITIONER FOR AUTOMOBILES

Mr. Vikas Kantish Lokhande, Mr. Raunak Sangram Tawade, Mr. Shahrukh Shikalgar, Miss. Megha Pundlik Havare, Prof. Seema Raut
Department of Mechanical Engineering Alard College of Engineering and Management

Abstract*:* The vehicles have become an in separable part of the human life. These automobiles run on fuel which comes from the nature. Thus leading to the depletion of the crude oil sources in the nature. The use of air conditioner in vehicles increases the fuel consumption. The air conditioner requires compressor for its functioning, and the compressor runs on the engine. Hence, it increases the load on the engine, resulting in high fuel consumption. This increase in the fuel consumption costs the vehicle user.

It also in term harms the nature by emitting more harmful gases like carbon dioxide, carbon mono- oxide. An economical Air Conditioner is proposed in order to decrease the fuel consumption made by the air conditioner of the vehicles.

This product aims at the purification, cooling, humidification of air without increasing the fuel consumption.

I. INTRODUCTION:

The invention of the air conditioner took place with the motive of providing human comfort. With the increase in the temperature every year, the Air conditioner has become a necessity. But in these years as the vehicles have increased, the topic of fuel consumption has become a major issue. Now to overcome this problem a economical Air Conditioner has been designed and developed. This product will cut down the fuel cost bearded by the vehicle owner and also will be a nature friendly alternative to the traditional air conditioning

II. LITERATURE REVIEW:

Paper Name: Development of Efficient Air Conditioning and Refrigeration System for Service Vehicles.
Author Name: F. Bagheri
Description: This thesis aims to develop a proof-of-concept demonstration of a high efficiency vehicle air conditioning and refrigeration (VACR) system to be employed in service vehicles. The work herein is part of a collaborative research project with two local companies: Cool-It Group, and Saputo Inc., with a main focus on service vehicles. Due to global energy consumption and the environmental impacts of air conditioning and refrigeration (A/C-R) systems, the development of a high efficiency system can significantly contribute to green and sustainable development and environmental Protection. This thesis fills a gap in the literature by developing real-time thermal and performance characteristics of the VACR systems employed in the food transportation industry. Field data is acquired from pilot refrigerated service vehicles during different seasons of the year and the duty cycles are established. The acquisition of field data begins in stationary A/C-R systems and continues in mobile VACR systems. Moreover, a test bed is built in the Laboratory for Alternative Energy Conversion (LAEC) for more comprehensive experiments. Mathematical models are developed for thermal and performance simulations of VACR systems under steady state and transient operating conditions. The models are validated using the laboratory and field data

and employed for a thermal and performance investigation of VACR systems. A proof-of-concept demonstration of high efficiency VACR systems is built in LAEC using variable speed compressor and fans and high efficiency heat exchangers. The modeling results are validated and used to develop an optimization model. The optimization model is validated and utilized to determine the optimum compressor and fans speeds for achievement of the highest coefficient of performance (COP) under realtime operating conditions. The optimization model is integrated with an existing cooling demand simulator to develop a proof of concept demonstration of a proactive and model predictive controller (MPC) for the VACR system. The controller is implemented on the laboratory-built VACR system and a proof-ofconcept demonstration of high efficiency VACR is finalized. The developed concept and platform is expandable to the entire transportation industry as well as stationary A/C-R systems.

Paper Name: Conceptual Design of Automotive Compressor for Integrated Portable Air Conditioning System.
Author Name: F. Bagheri
Description: This study introduces a new concept of portable air conditioner which integrated with some available components in automotive air conditioning system. This new idea intends to solve the storage problems as well as to reduce the price of current portable air conditioner since some devices could directly be used from the automotive air conditioning system. The primary emphasis of this study was on the modification of automotive compressor design so as the system may alternately be operated. The length of conventional compressor shaft is extended to place an additional clutch pulley, a drive plate and a clutch coil. The new concept particularly the shaft and pulley were analysed through slope deflection and computational finite element analyses. The result of engineering analyses exhibited that the new design of compressor shaft and clutch pulleys promote a low risk of failure as the data values recorded are lower than the critical value for each criterion investigated.

Paper Name: Design and Development of Portable AirConditioner.
Author Name: Shahi Satyam, Sucheta Jagtap, Sanap Archana, Patil Swapnil
Description: Air conditioning is defined as the simultaneous control of temperature, humidity, cleanliness and air motion depending upon the requirement, air conditioning is divided into summer air conditioning and winter air conditioning. Air conditioner conditions the air, transport it, and introduce it to the conditioned space. It provides heating and cooling of air. The portable Air conditioner system should satisfy the need of user at the most economical cost. The selection of system depends upon many factors. It could be only a relief in temperature or complete control of environment. It could be lowest first cost or lowest running cost. Level of cleanliness, acoustics, and concentration of load within the space may affect the selection. The portable air conditioner is based on air water system, in this system the room unit is supplied with both processed air and chilled water. life .Conventional Air conditioners satisfies that need but they are not affordable to everybody. The solution on this problem is portable air conditioner which is having very low manufacturing and maintenance cost. Its cooling power is comparable to wall air conditioner. It provides transportability, can be move anywhere easily. It is small in size; hence it would sit nicely in our bedroom, drawing room and kitchen. It is completely non-polluting.

III. PROPOSED SYSTEM:

Step 1:- Design of the product in catia v5.
Step 2:- Selection of material.
Step 3:- Shear force analysis in Ansys.
Step 4:- Carrying out market analysis for the product to be manufactured.
Step 5:- Design sent for 3D Printing.
Step 6:- Carrying out Tests and studying the results on the component.
Step 7:- Die making process of the product.
Step 8:- Product manufactured by injection molding.
Step 9:- Sale of product on online and offline media.

IV. CURRENT TECHNOLOGY USED

The current technology uses the traditional AC which consists of condenser, evaporator and compressor. All this amounts to an increase in fuel consumption.

It increase the load on the engine and thus affects the efficiency of the engine.

The AC does not act as a purifier or humidifier resulting to dry skin.

The most common refrigeration cycle uses an electric motor to drive a compressor.

In an automobile the compressor is driven by a pulley on the engine's crankshaft, with both using electric motors for air circulation. Since evaporation occurs when heat is absorbed, and condensation occurs when heat is released, air conditioners are designed to use a compressor to cause pressure changes between two compartments, and actively pump a coolant around an enclosed system.

The cooling liquid, or refrigerant is pumped into the cooled compartment (the evaporator coil). `

Low pressure then causes the refrigerant to evaporate taking the heat with it. In the other compartment (the condenser), the refrigerant vapor is compressed and forced through another heat exchange coil, condensed into a liquid which then rejects the heat previously absorbed from the cooled space.

V. REFERENCES

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