

AUTOMOTIVE ENGINE

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An essential component of the contemporary automobile sector is vehicle engines. They are devices that transform fuel chemical energy into the mechanical energy required to move a vehicle forward. For millions of people worldwide, automobile engines are essential because they provide mobility and transportation.

Over a century of invention and advancement in technology has gone into the development of vehicle engines. There have been several stages of evolution, ranging from the first steam-powered mechanical devices to the most potent engines of today. The development of gasoline and diesel engines, the creation of internal combustion, and the incorporation of cutting-edge technology for improved efficiency and environmental safety are important turning points in the history [1].

Numerous factors can be used to categorize automotive engines. The kind of fuel utilized is one of the criteria. Diesel engines run on compressed air and diesel fuel, while gasoline engines run on a mixture of gasoline and air. Electric engines only run on electricity; hybrid engines run on a combination of electricity and fuel. Car engines can also be categorized according to whether they run on internal combustion or electric power.

Internal combustion is the process by which fuel's chemical energy is transformed into mechanical energy and powers automobile engines. The four primary steps of this process are the intake, compression, power stroke, and exhaust. *Intake*: at this point, the intake valve allows the air-fuel mixture to enter the engine cylinder. The mixture is then able to flow inside the cylinder as a result of the piston moving downward and producing a low-pressure area. *Compression*: as soon as the cylinder is filled with the air-fuel mixture, the piston rises, compressing the mixture. This raises the temperature and density of it, intensifying the effects of

the future combustion. *Power Stroke*: in gasoline engines, the spark plug ignites the air-fuel combination during this stage; in diesel engines, auto-ignition does the same. Gases suddenly expand as a result, applying pressure that pushes the piston downward and produces mechanical work. *Exhaust*: as the piston rises, the exhaust gases finally leave the cylinder through the exhaust valve. By doing this, the engine's exhaust gases are removed, readying it for the following cycle of operation [1].

Numerous technological advancements have been made in modern car engines to increase their effectiveness, dependability, and environmental safety. Electronic fuel injection systems are noteworthy improvements that offer enhanced precision and efficiency in fuel distribution. By using exhaust gasses to raise intake manifold pressure, turbocharging technology increases engine power while consuming less gasoline. Systems for variable valve timing are also essential for maximizing engine performance.

In the present world, the environmental characteristics of car engines are becoming more and more significant. Pollutant emissions, including hydrocarbons and nitrogen oxides, have an effect on the environment and air quality. To lessen the negative consequences, a number of technologies are being developed, such as exhaust gas recirculation systems, catalytic converters, and various exhaust gas cleaning techniques.

The future of automotive engines is directly related to innovation and the never-ending quest of performance and environmental safety improvements. Important areas of development include autonomous engine management systems, the incorporation of network technologies and the Internet into automobiles, and the move toward alternative energy sources including electric and hydrogen-powered engines [1].

Within the contemporary automobile business, vehicle engines are essential. The efficiency and environmental safety of automobiles are shaped by their development and advancements. For this subject to continue advancing, it is essential to comprehend the fundamentals and classification of automotive engines in addition to technical advancements and environmental factors.

References

1. Engine systems: The Fundamentals of How They Work. [Electronic resource] – Mode of access: nifty-knuth-4c7c95.netlify.app/blog/engine-systems. – Date of access: 01.03.2024.