

# Mechanical engineering technology

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## **History of Ford's first car**

The very first automobile that was powered by an internal combustion engine was invented and its design conceptualized in Germany during the 1880s. In the year 1903, Henry Ford founded the Ford Motor company and began an era of United States leadership within the automobile industry that lasted for quite a number of years in the twentieth century. The industry has been faced with constant advancements over the years that makes the key actors in the sector to always be on toes especially regarding the engine efficiency and the safety features that comes with the vehicles. Vast improvements are aimed at bringing out more effective engines that are capable of doing more but at much lesser costs in terms of maintenance and fueling. On the other hand, consumers are constantly on the lookout for much safer vehicles hence the need to improve the different safety features in the automobile industries. Besides the engine and safety on the roads, the automobile industry has had an undeniable effect on the society as a whole both negatively and positively.;

## **Efficiency of internal combustion engine**

The automobile industry developed vehicles that made use of a propulsion system called the internal combustion engine. The internal combustion engine works as a heat engine whereby the combustion of the fuel being used happens with an oxidizer (often air) within a combustion chamber which is a very important part of the functioning fluid circuit. The engine consists of a piston that is fixed in one point and another that is on constant motion. Once the piston applies relative pressure on the mixture of air and fuel, the spark ignites it, bringing about combustion. The resultant expansion

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of the combustion gases, exerts pressure on the piston pushing it in the process of the power stroke.; In a diesel engine, only air is inducted into the engine and then compressed (newworldencyclopedia, 2014). A combustion engine is an engine which generates mechanical power by combustion of fuel. Combustion engines are of two general types: internal and external combustion engine. The internal combustion engines are a wide term but it is mostly seen or rather connected to the transportation sector (newworldencyclopedia, 2014).

In a nut-shell, when referring to the internal combustion engines, there are currently two types that are in production and they are: the spark ignition gasoline engine and the compression ignition diesel engine. Currently majority of the mentioned engines are four-stroke cycle engines (four piston strokes are required in order to finish a cycle). The cycle on the other hand will include intake, combustion and power stroke and exhaust.

Crumple definition of the car

Safety is without a doubt one of the most sort after feature by the automobile consumers in today; s market. Each company is on the look out to improve their safety components and features in every enhancement they make in their products. Among the safety features installed in vehicles, in this paper we will look at the Crumple Zones feature (Raiciu, 2016). The functioning behind the crumple zones involves the management of the crash energy. The Crumple Zones work by managing crash energy, where it is then absorbed within the external parts of the automobile instead of it being directly moved to the occupants. It also helps in the prevention; of intrusion

within or rather the resultant deformation of the passenger cabin. It should protect the car occupants against injury.; The invention of the Crumple Zone took place in the year 1952. The invention was conceptualized by a Mercedes-Benz engineer Bela Barenyi. The technique was first implemented in 1959 which came with the Mercedes-Benz 220.;;

There is much of physics that applies to this feature:

Considering Newton; s first law of motion (an object in motion will stay in motion at the same speed and same direction unless it is acted upon by an unbalanced force). This tries to prove that if a vehicle huts another or a solid wall and stops immediately, then the passengers will continue moving at the same speed the vehicle was moving until stopped by something or hit somewhere which will cause serious injury or even death. The technique slows the automobile down which decreases the amount of inertia the vehicle can pass on to the people inside (Makers).

On Newton; s Second law of motion ( $F = ma$ ) conveys that there is much force experienced with a reduction in the stopping time. The Crumple zones now aid in allowing the vehicle to crash like an accordion. It decreases the acceleration which then decreases the force received inside the vehicle. With a decrease in acceleration and considering the mass is constant, then the force is reduced. The relative capability of these crumple zones to collapse at the occurrence of applied force is to ultimately aid in increasing the period taken for the automobile to completely stop; ;(Makers).

With the front of the vehicles acting like a cushion, this relatively slows down the time taken for the vehicle to come to a complete stop and hence less

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force is applied on the passengers. When the automobile crashes into something, the force received by the automobile is transferred to the crumple zone where it reacts by crumpling. Kinetic energy used as work to deform the vehicle.

## **Negative and positive effects of the automobile**

The invention of automobile has brought quite a number of effects and impacts to the society as a whole. These can be negative and positive, economical and social.

### Positive Impacts

The ability for families to travel in a group together to explore.;

Being able to cover great distances quickly and efficiently.

Improved business transactions in current world as goods are easily transferred from one point to another.

The automobile has also improved the aspect of luxury and entertainment within the society (greenercars. org).

### Negative Impact

Rapid utilization of automobile has been coupled by increased road accidents in current days.

Increased emission of green house gases has caused a rapid rise in global warming.

On the other hand, the same emissions from vehicles have brought about several health complications to human beings mostly the respiratory problems (King).

On a security perspective, automobiles are currently used to carry out criminal issues like bombings or transfer of illegal substances and bank robberies (LeisureLife, 2016).

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