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Chapter 1 : Internal Combustion Engine - Introduction and Types Â« racedaydvl.com

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Published on Jan 10, Abstract The Internal Combustion Engine is an engine in which the combustion of a fuel generally, fossil fuel occurs with an oxidizer usually air in a combustion chamber. In an internal combustion engine the expansion of the high temperature and pressure gases, which are produced by the combustion, directly applies force to a movable component of the engine, such as the pistons or turbine blades and by moving it over a distance, generate useful mechanical energy. The term internal combustion engine usually refers to an engine in which combustion is intermittent, such as the more familiar four-stroke and two-stroke piston engines, along with variants, such as the Wankel rotary engine. A second class of internal combustion engines use continuous combustion: Invention of the two-stroke cycle is attributed to Scottish engineer Dugald Clerk who in patented his design, his engine having a separate charging cylinder. The crankcase-scavenged engine, employing the area below the piston as a charging pump, is generally credited to Englishman Joseph Day and Frederick Cock for the piston-controlled inlet port. A two-stroke engine is an internal combustion engine that completes the thermodynamic cycle in two movements of the piston compared to twice that number for a four-stroke engine. This increased efficiency is accomplished by using the beginning of the compression stroke and the end of the combustion stroke to perform simultaneously the intake and exhaust or scavenging functions. In this way two-stroke engines often provide strikingly high specific power. Gasoline spark ignition versions are particularly useful in lightweight portable applications such as chainsaws and the concept is also used in diesel compression ignition engines in large and non-weight sensitive applications such as ships and locomotives. Today, internal combustion engines in cars, trucks, motorcycles, aircraft, construction machinery and many others, most commonly use a four-stroke cycle. The four strokes refer to intake, compression, combustion power , and exhaust strokes that occur during two crankshaft rotations per working cycle of the gasoline engine and diesel engine. A less technical description of the four-stroke cycle is, "Suction, Compression, Ignition, Exhaust" The cycle begins at top dead center TDC , when the piston is farthest away from the axis of the crankshaft. Common rail direct fuel injection is a modern variant of direct fuel injection system for petrol and diesel engines. The common rail system prototype was developed in the late s by Robert Huber of Switzerland and the technology further developed by Dr. The first successful usage in production vehicle began in Japan by the mids. Shohei Itoh and Masahiko Miyaki of the Denso Corporation, a Japanese automotive parts manufacturer, developed the common rail fuel system for heavy duty vehicles and turned it into practical use on their ECD-U2 common-rail system mounted on the Hino Rising Ranger truck and sold for general use in Denso claims the first commercial high pressure common rail system in Modern common rail systems, whilst working on the same principle, are governed by an engine control unit ECU which opens each injector electronically rather than mechanically. This was extensively prototyped in the s with collaboration between Magneti Marelli, Centro Ricerche Fiat and Elasis. After research and development by the Fiat Group, the design was acquired by the German company Robert Bosch GmbH for completion of development and refinement for mass-production. In hindsight the sale appeared to be a tactical error for Fiat as the new technology proved to be highly profitable. The company had little choice but to sell, however, as it was in a poor financial state at the time and lacked the resources to complete development on its own. The first passenger car that used the common rail system was the model Alfa Romeo 1. Common rail engines have been used in marine and locomotive applications for some time. The Cooper-Bessemer GN-8 circa is an example of a hydraulically operated common rail diesel engine, also known as a modified common rail. Principle Solenoid or piezoelectric valves make possible fine electronic control over the fuel injection time and quantity, and the higher pressure that the common rail technology makes available provides better fuel atomisation. Some advanced common rail fuel systems perform as many as five injections per stroke. Common rail engines require no heating up time [citation needed] and produce lower engine noise and emissions than older systems. Diesel engines have historically used various forms of fuel injection. While these older systems provided accurate fuel quantity and injection timing control they

were limited by several factors: This typically meant that the highest injection pressure could only be achieved at the highest engine speed and the maximum achievable injection pressure decreased as engine speed decreased. This relationship is true with all pumps, even those used on common rail systems; with the unit or distributor systems, however, the injection pressure is tied to the instantaneous pressure of a single pumping event with no accumulator and thus the relationship is more prominent and troublesome. Next More Seminar Topics: Are you interested in this topic. Then mail to us immediately to get the full report.

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An internal combustion engine is defined as an engine in which the chemical energy of the fuel is released inside the engine and used directly for mechanical work, as opposed to an external combustion engine in which a separate combustor is used to.

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