

KMCT
POLYTECHNIC COLLEGE, KUTTIPPURAM



DEPARTMENT OF AUTOMOBILE ENGINEERING

DEPARTMENTAL TECHNICAL MAGAZINE VOLUME 2

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INDEX

SL.NO	SUBJECT	PAGE NO.
	About the college	1
	Vision and mission of the college	2
	Messages from faculty	3
	Program Educational Objectives	4
	Student Articles	5
1.	Cylinder deactivation system	6
2.	Exhaust brake	7
3.	Digital key the vehicle access	9
4.	Airless tire	10
5.	Air powered Engine	12
	Events conducted at the department	14

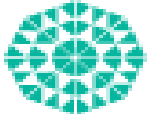
ABOUT THE COLLEGE



KMCT Polytechnic College, Kuttippuram was established in 2014 with a key determination to provide quality technical education for socially and economically backward classes at this area. The college is rising progressively as one of the top notch Polytechnic Colleges in Kerala.

Approved by AICTE and affiliated to Directorate of Technical Education, Govt. of Kerala, KMCT Polytechnic College encourages and gives better technical education for students to excel in the highly volatile marketplace.

A vast number of students from different parts of the state are trained within the portals of our institution. The college is situated at Pazhoor, in Kuttippuram, Kerala.



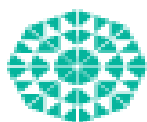
KMCT
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Institute Vision

Be a premier technical institution of academic excellence by imparting value based professional education with social responsibility.

Institute Mission

- *To produce self-motivated, skilled professionals of academic excellence.*
- *To provide value oriented quality technical education through innovative teaching learning process.*
- *To equip students to be Responsible Professionals for the betterment of society.*



ADMINISTRATOR'S MESSAGE

India has the world's largest population. It is not enough to only foster cognitive intelligence among the youth. The youth requires a mutual faculty endowed with multi dimensional intelligence. What are the objectives that the youth should work towards? These cannot be purely materialistic, materialistic Programme alone does not guarantee national security. What is essential is the character or integrity of the country's citizens. A national policy for integrating spiritual values and organization leadership can be achieved through measures by which we can create a modern Mindset among the youth. This will not only motivate them to acquire technical cognitive competence but also develop their emotional,, moral , social, spiritual, environmental and innovational intelligence. This will make them more patriotic self-reliant individuals of high character, possessing a social conscience. Such an army of evolved youth will be the asset of the nation



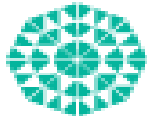
PRINCIPAL'S MESSAGE

I am happy to meet all of you through this Technical Magazine and I thank all the staff who strived to give professional education in a new perspective manner and achieve perfection in all the fields. The main reason for our tremendous performance in various activities is the involvement of the faculty members who motivated students whole heartedly to participate in the seminars, industrial visit, inter activity session and other extracurricular activities to inculcate in them sound moral values, strong personality and eagerness to work in the society. Because of these efforts we have been successful in molding the personality of our students and imbibe in them moral values and the spirit to team work.. I wish this solidarity continues for successive years and we would be proud to release many more magazines like this, highlighting our student's activities.



HOD MESSAGE

The greatest asset of the department is its highly motivated and learned faculty. The available diversity of expertise of the faculty with the support of the other staff prepares the students to work in global multicultural environment. We have hoped that we will continue to deliver our best to serve the society and mankind. It is also expected and that our students will continue to pass-on the skills which they have developed during their stay at this department to whole of the world for a better society. We will be happy to receive your suggestions for further improvement and development of our department.



PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Program Educational Objectives (PEOs) are Broad Statements that describe what Graduates are expected to attain within a few years of Graduation. Program Educational Objectives are based on the needs of the program's Constituencies.

OBJECTIVES OF THE PROGRAM

PEO1: Shall excel in Industry, in higher studies, research and as entrepreneurs.

PEO2: Shall acquire continuous technical knowledge in Mechanical and allied engineering leading towards innovation and creativity.

PEO3: Shall have good communication skills, interpersonal skills, managerial skills, leadership skills, ethical values and understand the need for lifelong learning.

PROGRAMME OUTCOMES (PO'S)

PO1: Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standard methods.

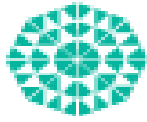
PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context of technological changes



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STUDENT ARTICLES

CYLINDER DEACTIVATION SYSTEM

By SREEHARI

This topic focuses about the reduction of fuel consumption of an internal combustion engine. The power required is very less inside the city than the peak power generated by the car. This mechanism is introduced in 1981 by General Motors .

This is the method of deactivating engine cylinders according to requirement of power to achieve better fuel efficiency and also emission control. It works because only a small fraction of an engine's peak horsepower is needed to maintain cruising speed. Each cylinder is disabled by interrupting the operation of intake and exhausts valves with spark and fuel delivery.

METHODS OF CYLINDER DEACTIVATION

1.Lifter Pin Control Mechanism

2.Variable Profile Cam

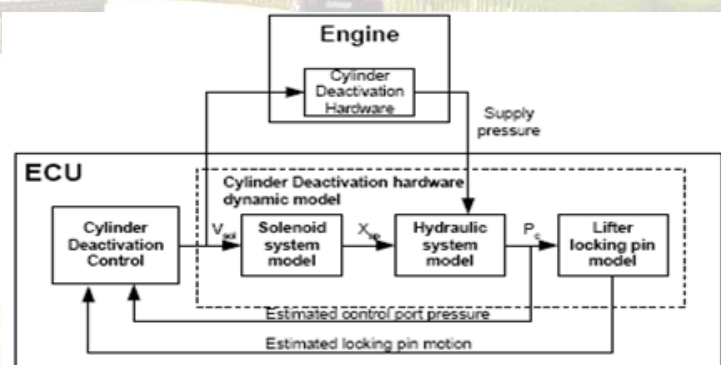
3.Active Valve Train

LIFTER PIN CONTROL MECHANISM

There are 4 subsystems

Electronic Control Module, Solenoid Valves ,Hydraulic Subsystem, Lifter locking pin mechanism

When the solenoid valve is energized, the oil becomes pressurized in the control port, the pressure force acts on the pins and makes it lock. It decouples the camshaft from the valves(i.e. inlet and outlet manifold). So the cylinder is deactivated.



VARIABLE PROFILE CAM

This system allows the engine to have multiple cam shafts. As the engine moves into different r.p.m computer can activate alternate lobes on the camshaft and change the cam timings.

ACTIVE VALVE TRAIN

This system uses electrohydraulic operation, movement of engine poppet valves initiated by oil flow into and out of the hydraulic chamber. It is controlled by fast acting electrohydraulic servo valves, this in turn allows variable timing, duration and lift.

THE NEED OF CYLINDER DEACTIVATION

To reduce the pollution from the internal combustion engines and the demand of automobile which burns less fuel. With the increase of price of petroleum products the fuel is burnt according to the power requirement.

EXHAUST BRAKE

By ANAND P DINESH

An exhaust brake is a device that essentially creates a major restriction in the exhaust system, and creates substantial exhaust back pressure to retard engine speed and offer some supplemental braking. In most cases, an exhaust brake is so effective that it can slow a heavily loaded vehicle on a downgrade without ever applying the vehicle's service brakes.

This project working on pneumatic powered, this is cylinder working on exhaust gas power utilize, If the piston moves forward, then the breaking arrangement activated. The breaking arrangement is used to break the wheel gradually or suddenly due to the piston movement. The breaking speed is varied by adjusting the valve is called "FLOW CONTROL VALVE".

4. WORKING

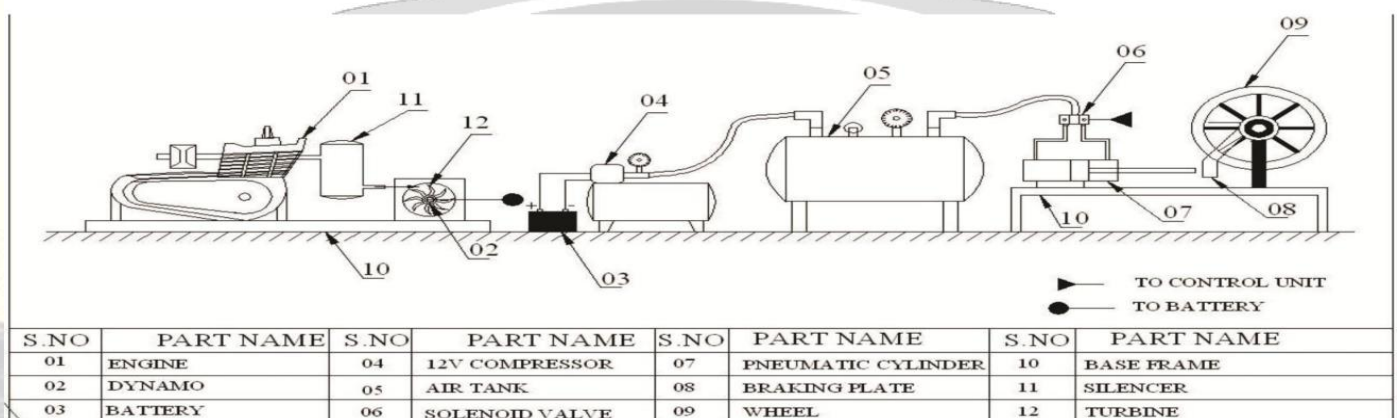


Fig 1 Assembly of Airbrake system using engine Exhaust gas

In our project we have to apply this breaking arrangement in one wheel as a model. The compressed air drawn from the engine exhaust gas in our project. The exhaust air flow through the Polyurethane tube to the flow control valve. The flow control valve is connected to the solenoid valve as mentioned in the block diagram. Normally working on two stroke or four stroke engine model that is engine model running condition while getting the exhaust gas in silencer in air tank arrangement.

ADVANTAGE:

- It don't be used in external power on braking system.
- Cost wise low project.
- Simple construction.
- Maintenance is easy.

APPLICATION:

- It is used on four wheeler and two wheeler.

This brake uses exhaust gas pressure, thus it improves the efficiency of engine compared to default air brake system. It helps in filtering the toxic impurities from exhaust gas using air filter and thereby reducing the atmospheric pollution.

DIGITAL KEY THE VEHICLE ACCESS

By, MOHAMMED SAFWAN V

car connectivity consortium (ccc) digital key is a standardized ecosystem. It enables mobile device to store, authenticate, and share digital keys for vehicles in a secure, privacy – preserving way that everywhere, even when the smartphone’s battery is low. Digital key maybe used to access a vehicle, start the engine, mobilize the vehicle, or authorize any author operation by placing a mobile device. Digital Key allows consumers to easily and confidently use their mobile devices to access vehicles. Along with robust capability and convenience, it offers enhanced security and privacy protections. Digital Key aims to complement traditional methods, while being robust enough to fully replace them. The CCC Digital Key standardization consortium has brought together all of the relevant.



industries to create a solution that serves everyone. In this whitepaper, we discuss the Digital Key, Release 2.0 specification. This release, the second in a series of releases, allows individual owners to use their mobile devices as keys to their vehicles. Conversely, mobile devices do not provide the same security and user experience guarantees to which users of vehicle access systems are accustomed. For example, today’s

smartphones cannot guarantee that each vehicle's mobile app implements access protocols securely and in a way that protects the user's privacy; that credentials are isolated, tamper-proofed, and protected from cloning and other host vulnerabilities when stored; or that radio technologies are available that provide secure positioning with enough accuracy to satisfy automotive requirements, while providing a consistent user experience in all use cases.

The CCC has adopted Bluetooth Low Energy (BLE) in combination with Ultra-Wideband (UWB) wireless connectivity technologies to enable these new location-aware features for Digital Key and to allow secure positioning with accuracy equal to or better than existing passive key fobs. The NFC interface is routed directly to the Digital Key applet, providing a communications path that is protected from, and that operates independently of, the rest of the mobile device.

AIRLESS TYRE

By, **ARSHADUL HAUQE**

Airless tires, non-pneumatic tires (NPT), or flat-free tires are tires that are not supported by air pressure. They are used on some small vehicles such as riding lawn mowers and motorized golf carts. They are also used on heavy equipment such as backhoes, which are required to operate on sites such as building demolition, where risk of tire punctures is high. Tires composed of closed-cell polyurethane foam are also made for bicycles and wheelchairs. They are also commonly found on wheelbarrows which may be used for yard work or construction.

The main advantage of airless tires is that they do not go flat. Other advantages are that airless tires need to be replaced less frequently, resulting in savings. Heavy equipment outfitted with airless tires will be able to carry more weight and engage in more rugged activities.

Airless tires generally have higher rolling resistance and provide somewhat less suspension than similarly shaped and sized pneumatic tires. Other problems for airless heavy equipment tires include dissipating the heat buildup that occurs when they are driven. Airless tires are often filled with compressed polymers (plastic) rather than air, or can be a solid molded product.

Airless tires are attractive to cyclists, as bicycle tires are much more vulnerable to punctures than motor vehicle tires. The drawbacks to airless tires depend on the use. Heavy equipment operators who use machinery with solid tires may complain of fatigue. Bicycle riders who use airless tires may complain that the tire is harder than a comparable pneumatic tire, however, only anecdotal evidence suggests that airless tires may

cause broken spokes on a bicycle wheel. Any airless tire will be heavier than the rubber tire it is meant to replace.

As of 2021, airless tires are not popular with hardcore off-roaders as those vehicles often need to travel long distances at highway speeds. They are unstable, cause severe vibrations (passenger discomfort) and therefore potential for drivers to lose vehicle control at speeds above 80 km/h.^[1]

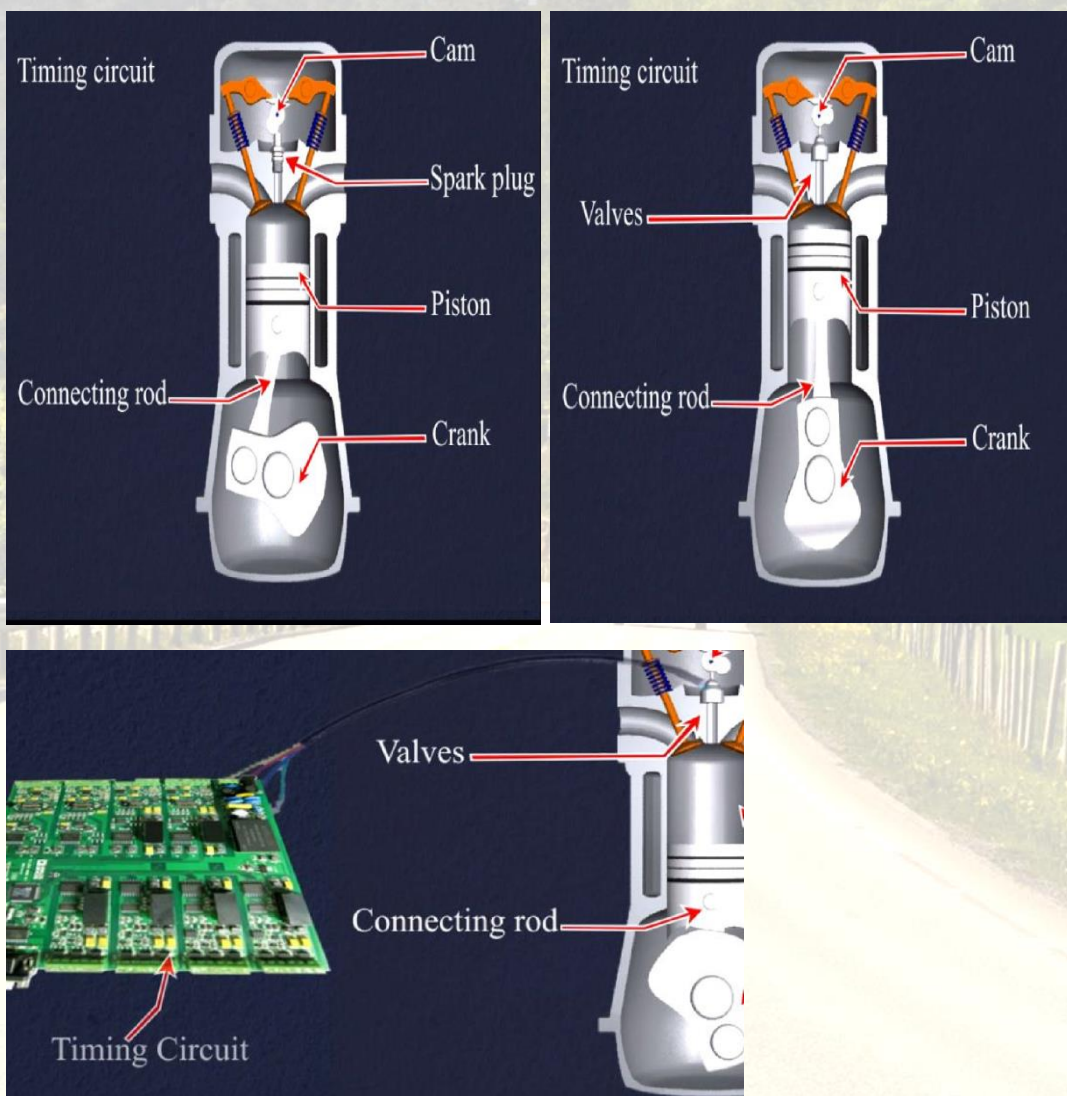
Installation of airless tires depends on the use. Heavy equipment will need special equipment to mount, but an airless bicycle tire can be mounted with little or no effort. Solid airless lawnmower tires come pre-installed on the wheel, allowing quick installation.



AIR POWERED ENGINE

By MOHAMMED SAHAL VK

In this world of energy crisis, it is inevitable to develop alternative technologies to use renewable energy sources, so that fossil fuels can be conserved. One of the major fields in which fossil fuels are used is Internal Combustion Engine. An alternative way to preserve the fossil fuel is the introduction of “AIR POWERED ENGINE”. It is an engine which will use compressed air to run the engine. It is cheap as it uses air as fuel, which is available abundantly in atmosphere. Exhaust temperature of it will be slightly less than atmospheric temperature around 20-25°C and thus helps in controlling global warming and reducing temperature rise.



On the whole, the technology is just about modifying the engine of any regular IC engine vehicle into an

Air Powered Engine. The Air Powered Engine technology is cheaper in cost and maintenance, can be easily adapted by the masses and it doesn't cause any kind of harm to the environment. Instead, its widespread use will help mankind in controlling the serious problem of global warming.



EVENTS CONDUCTED AT THE DEPARTMENT



Career guidance session was conducted by Automobile Association for all the students in the college to lead them to a better career and future.



Fire and safety program was conducted in association with fire and safety unit Tirur



Personality development program was conducted to all the students to enhance their attitude and vision



Farewell was given to Mr Murshid K, lecturer in mechanical engineering



College Tour of final year students on march 2022



Farewell was given to Nidhin N M, lecturer in Automobile engineering