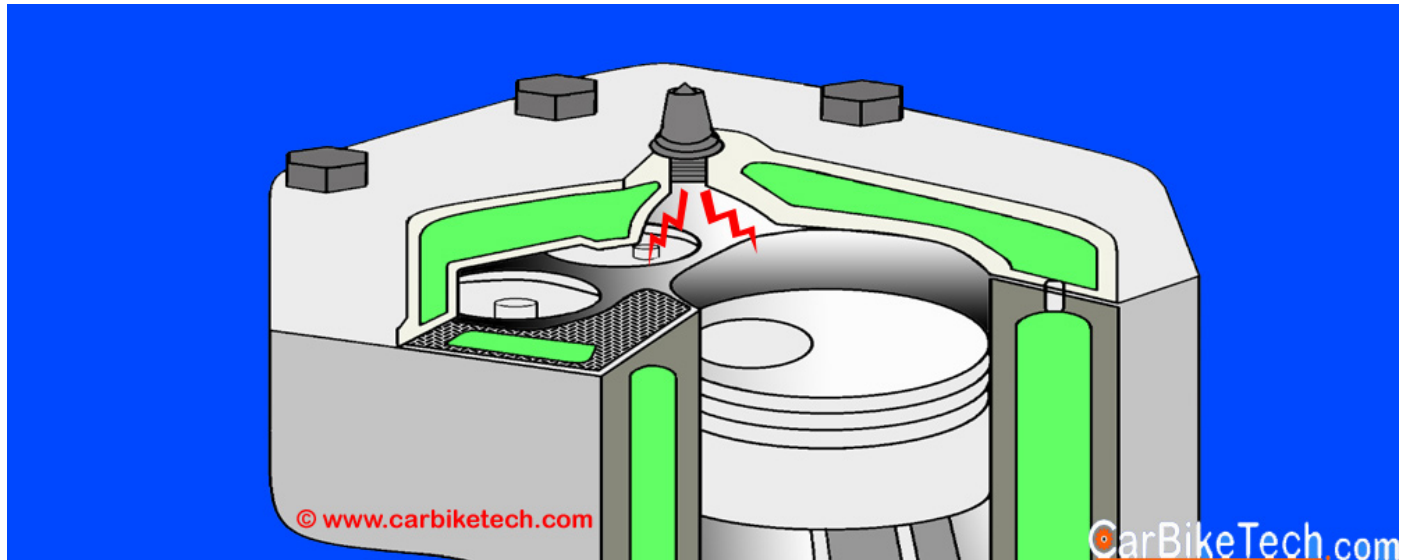


Ignition Timing For Optimum Engine Performance.!

By: CarBikeTech



What is Ignition Timing?

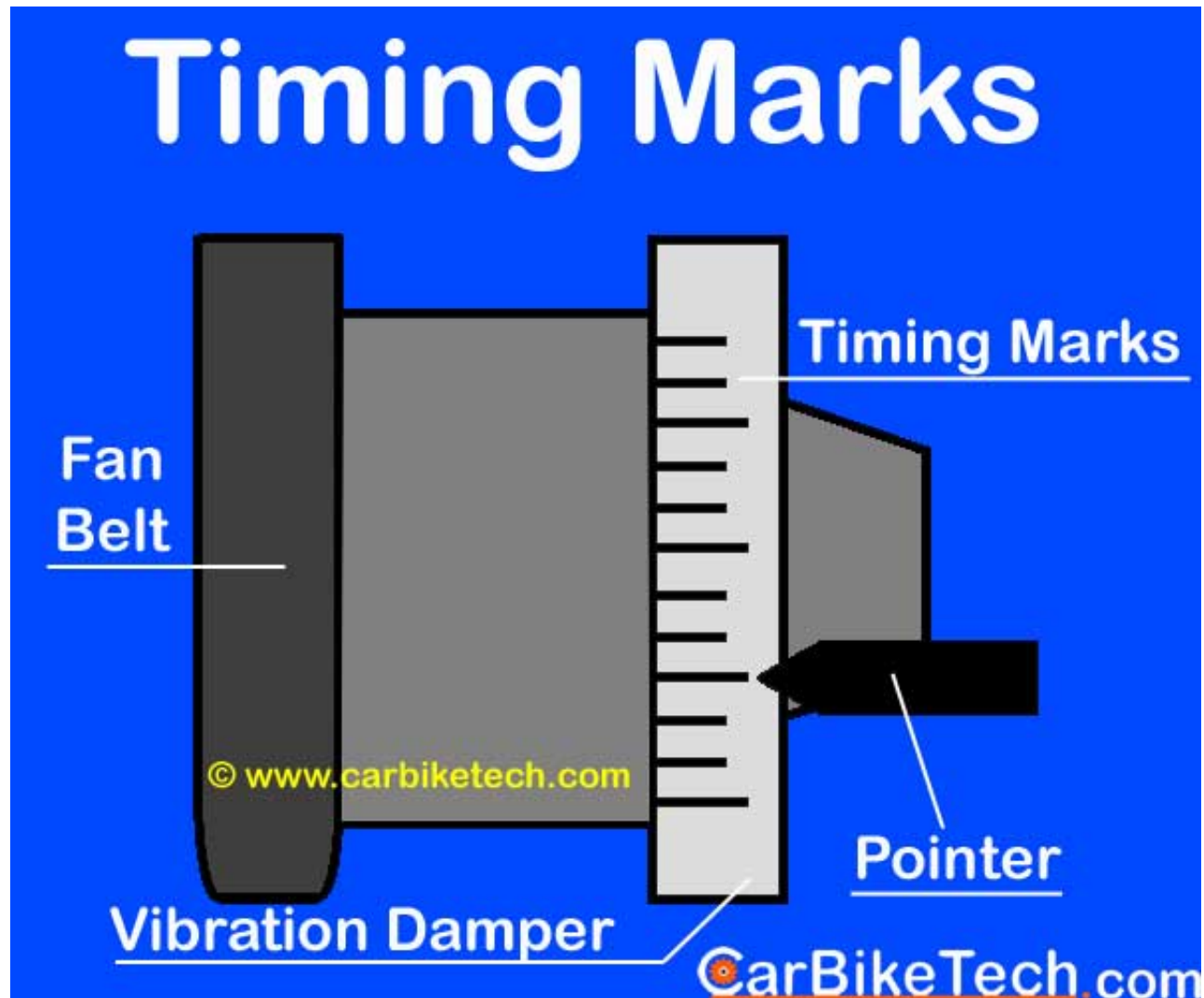
Ignition Timing is a process to deliver spark at correct time. It sets the pointer with respect to the position of the piston as well as the crankshaft's velocity. Thus, it delivers the spark at the most accurate timing to burn the [air-fuel](#) mixture. The [Ignition System](#) provides a [spark](#) at the end of the [compression](#) stroke in the combustion chamber at an appropriate time. Hence, it is known as Ignition Timing. You should set the timing according to the [engine design](#) and as specified by the manufacturers. If the spark occurs too early or too late in the engine cycle, it results in excessive vibrations. It may also cause damage to the engine.

Ignition timing also affects several variables. They include the engine [power](#), [torque](#), [fuel economy](#), and also engine's life to some extent. Modern engines' control unit uses a computer to control the ignition timing more

precisely. The earlier generation cars required the driver to control or adjust the timing as per the [driving](#) conditions. However these days, in the modern car engines; those actions have been automated. Whenever you carry out any major changes to the engine, you may also need to implement the necessary changes in the ignition timing.

Timing Marks:

The manufacturers provide the 'Timing Marks' as the indicators for setting up the ignition timing for the engine's ignition system. The manufacturers carve out/punch these marks on the crankshaft number of degrees before the [Top Dead Centre](#) (TDC). The engine-makers normally punch the timing marks on the vibration damper at the front or on the flywheel at the back of the engine.



Ignition Timing Marks on the Vibration damper

At times, these marks are located on the crankshaft pulley or the largest radius that rotates at the speed of the [crankshaft](#). Timing marks indicate in terms of the number of degrees before the Top Dead Centre (TDC). The older engines used the timing light for setting up the ignition timing.

You can set the ignition timing at the correct point of firing while the engine rotates. However, it has to be exactly a few degrees prior to the Top Dead Centre (TDC) which could advance with increasing engine speed. You can adjust the timing by loosening and/or rotating the distributor on its seat. Modern engines come with a [crank angle sensor](#) which directly connects to the [engine management system](#). The timing marks of the crankshaft must

also match with that of the camshaft for achieving the correct [valve timing](#).

Automatic Ignition Timing Advance:

There is a certain delay called the 'Ignition delay' to start the combustion after the spark is fired. The spark must occur before the prior to the moment at which the cylinder reaches the maximum pressure. Ignition Advance is the difference between this moment and the occurrence of the spark.

The timing advance occurs when the ignition occurs earlier in the compression stroke i.e. before the Top Dead Centre (TDC). However, if the spark advances too much, then the combustion will complete even before the piston reaches the TDC. Then, the crankshaft and connecting rod would have to force the piston to move upwards against the pressure in the compression stroke. In such a case, this force might not be sufficient enough to overcome the pressure.

As a result, the engine could stop or stall. An advanced spark may also cause the fuel to explode or detonate midway to produce an audible knock. However, the timing advance is necessary when the engine operates at full speed. Thus, it allows sufficient time for burning the air-fuel mixture. The engineers need to accurately control the ignition timing advance. So, they provide different systems such as the manual, centrifugal, vacuum advance and complete vacuum control mechanisms.

The 'Timing Advance' depends on the following factors:

1. Nature of fuel
2. Engine speed
3. Load on the engine

4. Engine temperature

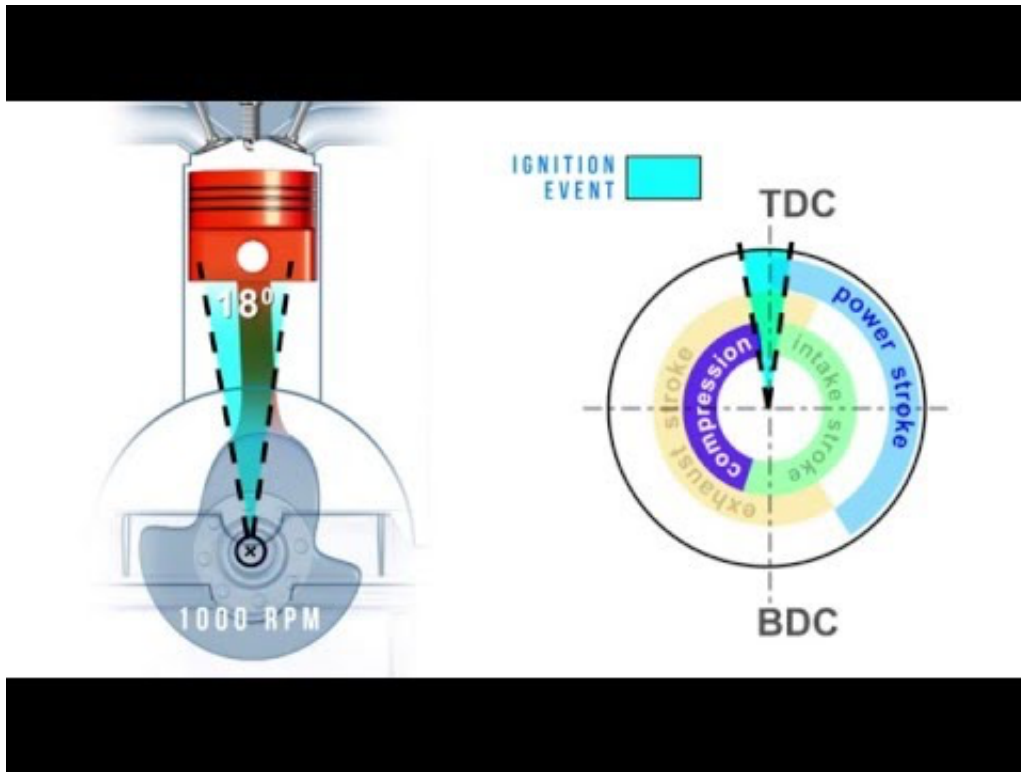
Ignition Timing Retard:

On the other hand, the timing retards when the spark occurs late or at the end of the compression stroke. There is a component which retards the timing called the timing retard. The manufacturers mostly employ the timing retard functionality to supplement the regular braking in vehicles. The braking friction causes the [brakes](#) to fade if used extensively for the long period. It can be dangerous too if the braking performance drops below the desired value for stopping the vehicle.

So, the [engine](#) retard function helps to slow down the engine performance. Thus, it delivers the spark later in the engine cycle. Some engines also retard the [valve timing](#) to compensate for the ignition timing retard. The retarding of the engine lowers the engine speed and causes loss of power. Also, it can cause engine knocking which can harm the engine.

The electrical retarding mechanism uses the electromagnetic induction to provide the force of retardation. The manufacturers place the electric retardation unit onto the transmission or the axle which consists of the rotor. However, there is no contact between the rotor and the stator surface.

Watch Ignition Timing in action here:



Read more: [What is Valve Timing?>>](#)

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